

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

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SANTA BARBARA • SANTA CRUZ

OFFICE OF DESIGN & CONSTRUCTION SERVICES and PHYSICAL FACILITIES

CONTRACTING SERVICES
Building 439
Santa Barbara, California 93106-1030
Telephone (805) 893-3356
Fax (805) 893-8592

SENT VIA: FAX ON THIS DATE
 HAND DELIVERY ON THIS DATE
 FEDERAL EXPRESS ON THIS DATE
 UNITED PARCEL SERVICE ON THIS DATE

HOLDERS OF PLANS AND SPECIFICATIONS:

Job Order Contract – Energy Management & Controls
Project No. FM110462JOC
Addendum No. 02

February 13, 2012

Enclosed is **ADDENDUM NO. 02** to the Construction Documents on the above-captioned project.

Bid date has been changed from Wednesday, February 15, 2012 at 2:30 PM to **Wednesday, February 22, 2012 at 2:30 PM** to be held at:

CONTRACTING SERVICES
Facilities Management, Bldg. 439,
Door #E, Reception Counter
University of California, Santa Barbara
Santa Barbara, CA 93106-1030.

Late arrivals shall be disqualified. Please allow time for unforeseen traffic delays, securing a parking permit and potential parking problems.

Greg Moore,
Associate Director, Contracting Services

ADDENDUM NO. 02

to the

CONSTRUCTION DOCUMENTS

February 13, 2012

GENERAL

The following changes, additions or deletions shall be made to the following document(s) as Indicated; all other conditions shall remain the same.

I ADVERTISEMENT

Item No.

1. Advertisement for Bids, Second Page, Second Sentence, **CHANGE** to read in its entirety as follows:

“Bid Deadline: Sealed Bids must be received on or before 2:30PM, Wednesday, February 22, 2012.”

II SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

Item No.

1. Supplementary Instructions to Bidders, Number 4, **CHANGE** to read in its entirety:

“RECEIPT OF BIDS: Bids will be received on or before the Bid Deadline: 2:30PM, Wednesday, February 22, 2012, and only at: Contracting Services, Facilities Management, Building 439, Door E, Reception Counter, University of California, Santa Barbara, Santa Barbara, CA 93106-1030.”

III QUALIFICATION QUESTIONNAIRE

Item No.

- 1 Qualification Questionnaire: **REPLACE** in its entirety with Revised Qualification Questionnaire Revised per Addendum 2, 15 pages, attached. Any Qualification Questionnaire’s not submitted on the “Revised Qualification Questionnaire Revised per Addendum 2”, will be rejected by the University as non-repsonsive.

IV SPECIFICATIONS

Item No.

1. **ADD** in it's entirety with Attached "Revised Table of Contents" Revised per Addendum No. 2, 2 pages.

Item No.

2. **Section 01012 – "Information & procedures Instructions (RFI)"; ADD** this section in it's entirety with attached Section 01012. Revised per Addendum No. 2, 2 pages.

Item No.

3. **Section 01014 – "Contractor's Use of the Project Site"; ADD** this section in it's entirety with attached Section 01014. Revised per Addendum No. 2, 2 pages.

Item No.

4. **Section 01051 – "Project Coordination"; ADD** this section in it's entirety with attached Section 01051. Revised per Addendum No. 2, 1 page.

Item No.

5. **Section 01070 – "Cutting & Patching"; ADD** this section in it's entirety with attached Section 01070. Revised per Addendum No. 2, 2 pages.

Item No.

6. **Section 01080 – "Regulatory Requirements"; ADD** this section in it's entirety with attached Section 01080. Revised per Addendum No. 2, 3 pages.

Item No.

7. **Section 01090 – "Abbreviations, Symbols, Definitions"; ADD** this section in it's entirety with attached Section 01090. Revised per Addendum No. 2, 1 page.

Item No.

8. **Section 01200 – "Project Meetings"; ADD** this section in it's entirety with attached Section 01200. Revised per Addendum No. 2, 2 pages.

Item No.

9. **Section 01300 – "Submittals"; ADD** this section in it's entirety with attached Section 01300. Revised per Addendum No. 2, 3 pages.

Item No.

10. Section 01310 – “Contract Schedules”: **ADD** this section in its entirety with attached Section 01310. Revised per Addendum No. 2, 4 pages.

Item No.

11. Section 01340 – “Shop Drawings, Product Data and Samples”: **ADD** this section in its entirety with attached Section 01340. Revised per Addendum No. 2, 5 pages.

Item No.

12. Section 01400 – “Quality Controls”: **ADD** this section in its entirety with attached Section 01400. Revised per Addendum No. 2, 3 pages.

Item No.

13. Section 01500 – “Construction Facilities and Temporary Controls”: **ADD** this section in its entirety with attached Section 01500. Revised per Addendum No. 2, 1 page.

Item No.

14. Section 01560 – “Storm Water Pollution Prevention”: **ADD** this section in its entirety with attached Section 01560. Revised per Addendum No. 2, 13 pages.

Item No.

15. Section 01565 – “Hazardous Materials Procedure”: **ADD** this section in its entirety with attached Section 01560. Revised per Addendum No. 2, 1 page.

Item No.

16. Section 01600 – “Material and Equipment”: **ADD** this section in its entirety with attached Section 01600. Revised per Addendum No. 2, 2 pages.

Item No.

17. Section 01620 – “Anchors and Fasteners”: **ADD** this section in its entirety with attached Section 01620. Revised per Addendum No. 2, 3 pages.

Item No.

18. Section 01640 – “Product Options and Substitutions”: **ADD** this section in its entirety with attached Section 01640. Revised per Addendum No. 2, 3 pages.

Item No.

19. Section 01700 – “Project Closeout”: **ADD** this section in

it's entirety with attached Section 01700. Revised per Addendum No. 2, 1 page.

Item No.

20. Section 01710 – “Cleanup & Disposal”: **ADD** this section in it's entirety with attached Section 01710. Revised per Addendum No. 2, 2 pages.

Item No.

21. Section 01720 – “Contractor’s As-Built Documents”: **ADD** this section in it's entirety with attached Section 01720. Revised per Addendum No. 2, 2 pages.

Item No.

22. Section 01740 – “Guarantees, Warranties, Bonds, Service, & Maintenance Contracts”: **ADD** this section in it's entirety with attached Section 01740. Revised per Addendum No. 2, 4 pages.

V TECHNICAL SPECIFICATIONS

Item No.

1. Technical Specifications CSI Division 01000-16000, January 2012: **REPLACE** in it's entirety with attached Technical Specifications CSI Division 01000-16000. Revised per Addendum No. 2, 184 pages.

VI CONSTRUCTION TASK CATALOG

Item No.

1. Construction Task Catalog CSI Division 01000-16000, January 2012: **REPLACE** in it's entirety with attached Technical Specifications CSI Division 01000-16000. Revised per Addendum No. 2, 214 pages.

END OF ADDENDUM NO. 2



UNIVERSITY OF CALIFORNIA, SANTA BARBARA

**JOB ORDER CONTRACT ENERGY MANAGEMENT & CONTROLS
PROJECT NO. FM110462JOC
QUALIFICATION QUESTIONNAIRE (Rev.2)
REVISED PER ADDENDUM NO. 2**

UNIVERSITY OF CALIFORNIA, SANTA BARBARA
CAMPUS DESIGN & FACILITIES
FACILITIES MANAGEMENT, BUILDING 439
SANTA BARBARA, CALIFORNIA 93106-1030

FEBRUARY 2012



JOB ORDER CONTRACT ENERGY MANAGEMENT & CONTROLS

PROJECT NO. FM110462JOC

QUALIFICATION QUESTIONNAIRE (Rev. 2)

As used herein, the term "entity" means the prospective Contractor submitting this Qualification Questionnaire regardless of whether the entity is an individual company, joint venture, or partnership. Please note that the term "prospective Contractor" may sometimes be used interchangeably with the term "entity".

Each prospective Contractor must have a current and active California contractor's license at the time of the Qualification and must submit this Qualification Questionnaire with all portions completed, including any required attachments.

SUBMITTED BY:

(Entity Name. If a Joint Venture state name of JV entity) printed or typed

(Contact Name)

(Address)

(City, State, Zip Code)

(Telephone Number) (Facsimile Number)

(E-mail Address)

Each prospective bidder must answer all of the following questions and provide all requested information, when applicable. Any prospective bidder failing to do so may be deemed to be not responsive and not responsible with respect to this qualification at the sole discretion of the University of California. All information submitted for qualification evaluation will be considered official information acquired in confidence, and the University of California will maintain its confidentiality to the extent permitted by law. Any prospective bidder found to be not qualified as a result of the bidder's answers to this Qualification Questionnaire will receive written response from the University Facility explaining the Facility's decision. If the bidder can refute some of the facts upon which the decision was based, the bidder can request a hearing at the Facility to appeal the decision. The decision of the Facility is final and not appealable within the University of California.

NOTE: Where a time period is given, such as the last five (5 years, the period is to be measured backwards) from the date this qualification questionnaire is required to be submitted.



1. **LICENSE**

A. Does the entity hold the following California contractor's license, which is (are) current and in good standing with the California Contractor's State License Board?

C10

(Electrical)

YES NO

C20

(HVAC)

YES NO

(NOTE: The entity submitting this Qualification questionnaire must be the holder of the requisite license. If the entity submitting is a Joint Venture, the joint venture must hold the license or have applied for the license(s).

B. If YES, provide the following information about the entity's contractor's license.

1. Name of license holder exactly as on file with the California Contractor's State License Board.

2. License classification(s): _____

3. License code(s): _____

4. License number(s): _____

5. Date(s) issued: _____

6. Expiration date(s): _____

C. Can you truthfully state that the entity's contractor's license has not been suspended or revoked by the California Contractor's State License Board within the last 5 years?

YES NO



2. CONSTRUCTION EXPERIENCE (IN COMPARABLE PROJECTS)

Has the entity successfully completed at least 5 comparable projects with an Energy Management and Controls portion greater than \$100,000 within the last 3 years, all of which were constructed in the United States of America and constructed at a Higher education facility or Medical facility in the State of California?

YES NO

A. For the purpose of all questions and requests for information set forth in this Qualification questionnaire a “comparable project” is defined as having ALL of the following characteristics:

1. Self performed the installation of an Energy Management & Controls project as the General Contractor or as a Subcontractor for a General Contractor; AND
2. Had an Energy Management & Controls portion over \$100,000.00; AND
3. A Campus wide / Multi-Building energy management and controls system consisting of stand alone systems and / or integrated systems both between buildings and to third party equipment and devices for energy efficient comfort heating and cooling applications. The system shall also have a common user interface providing monitoring and control of: A Campus wide / Multi-Building HVAC system, or critical laboratory environments, or industrial and domestic water systems, and / or process heating and cooling; AND
4. Each Project must demonstrate experience with:
 - a. Integrating both BACnet and N2 communication protocols to common operator workstation;
 - b. Modifying, updating and integrating to PMI software;
 - c. Modifying and creating GPL programming language;
 - d. Modifying, updating and integrating to Metasys System Extended Architecture
 - e. Modifying, and creating LCT and CCT Programming Language AND
5. Constructed by the entity submitting this Qualification Questionnaire. (Note: Projects completed by present employees of the contractor for former employers are not acceptable.)

B. An entity wishing to use a predecessor business to satisfy the Qualification requirements must demonstrate with written information submitted with this Qualification Questionnaire that it is substantially the same organization (in terms of who is managing Contractor) as the predecessor business. An entity may meet the requirement of the preceding sentence by demonstrating that the same person is the qualifying individual (under California Contractor’s License Law) for:

1. Contractor’ license of Contractor which shall be the same type as license required for the Contract; and



2. Contractor's license of predecessor business which shall also be the same type as the license required for the Contract.

Provide Project Data Sheets – Exhibit A located at the end of this Qualification Questionnaire for each comparable project submitted as evidence of the entity's experience. Submit not more or less than the number Project Data Sheets corresponding to the required number of comparable projects listed above.

Exhibit A: For each project submitted as evidence of the entity's construction expertise

Use the Project Data Sheets provided. Make additional copies as required for each project submitted.



7. **SURETY**

Prospective contractors desiring to be prequalified are informed that they will be subject to and must fully comply with all bid conditions including 100% payment and 100% performance bonds.

A. Is the surety to be used for this project authorized by the Insurance Commissioner to transact business in the State of California as an admitted surety insurer (as defined in the California Code of Civil Procedure Section 995.120)?

YES NO

B. Can the entity truthfully state that **no** surety has paid out any monies on claims on the performance bond issued by a surety of the benefit of the Owner arising out of the construction activities of the entity within the last 5 years?

YES NO

C. Can the entity truthfully state that **no** surety has paid out any monies on claims on the payment bond issued by a surety of the benefit of the Owner arising out of the construction activities of the entity within the last 5 years?

YES NO

D. Is the entity able to obtain bonding in the amount of \$1,000,000.00 for this construction contract?

YES NO

E. Prospective Contractor shall obtain and submit the Surety Declaration in the form shown below, signed by an authorized representative of the surety proposed to be used for this project and notarized. Provide this Surety Declaration form to your surety(ies) for completion. Do not have the surety submit this information directly to the University. Include this completed and notarized form with the Qualification documents that you submit to the University.



Prospective Contractor shall obtain and submit the Surety Declaration in the form shown below, signed by an authorized representative of the surety proposed to be used for this project and notarized. Include this completed and notarized form with the qualification documents that you submit to University.

PROVIDE THIS SURETY DECLARATION FORM TO YOUR SURETY(IES) FOR COMPLETION. DO NOT HAVE THE SURETY SUBMIT THIS INFORMATION DIRECTLY TO THE UNIVERSITY.

E. Surety Declaration

The undersigned declares under penalty of perjury that the bonding capacity indicated above (\$1,000,000.00) is true and correct and that this declaration was executed in

_____ (County) _____, (State)

on _____ (Date)

_____ (Signature)

_____ (Name and Title – Printed or Typed)

_____ (Representing [Surety Name])

_____ (Entity Name)

_____ (Address)

_____ (City, State, Zip Code)

_____ (Telephone Number)

_____ (Facsimile Number)

_____ (E-mail Address)

(ATTACH NOTARIZATION of SURETY REPRESENTATIVE'S SIGNATURE)



8. **INSURER**

Prospective Contractors shall obtain and must fully comply with all bid conditions including the following four special provisions, insurance coverage and associated limits noted below

A. Is the entity able to obtain insurance in the following limits for this construction contract?

YES NO

<u>Comprehensive or Commercial Form General Liability Insurance* – Limits of Liability</u>	<u>Minimum Requirement</u>
• Each Occurrence – Combined Single Limit for Bodily Injury and Property Damage	\$3 Million
• Products – Completed Operations Aggregate	\$5 Million
• Personal and Advertising Injury	\$1 Million
• General Aggregate – Not Applicable to Comprehensive Form	\$5 Million
<u>Business Automobile Liability Insurance – Limits of Liability*</u>	<u>Minimum Requirement</u>
• Each Accident – Combined Single Limit for bodily Injury and Property Damage	\$ 1 Million
<u>Workers Compensation and Employer’s Liability Insurance**</u>	<u>Minimum Requirement</u>
• Workers Compensation	As required by Federal and State of California Law

* This Insurance must be (i) issued by companies with a Best rating of A- or better, and a financial classification of VIII or better (or an equivalent rating by Standard & Poor or Moody’s) or (ii) guaranteed, under terms consented to by the University (such consent to not be unreasonably withheld), by companies with a Best rating of A- or better, and a financial classification of VIII or better (or an equivalent rating by Standard & Poor or Moody’s). further, the deductible, or retained limit, for each coverage shall not be more than \$100,000.

** This insurance must be issued by companies (i) that have a Best rating of B+ or better, and a financial classification of VIII or better (or an equivalent rating by Standard & Poor or Moody’s); or (ii) that are acceptable to the University.

Special Provisions: Contractor’s insurance as required by the Contract Documents, shall, by endorsement to the policies, include the following:



- .1 University, University's officers, agents, employees, consultants, University's Representative, and University's Representative's consultants, regardless of whether or not identified in the Contract Documents or to Contractor in writing, will be included as additional insureds for and relating to the Work to be performed by Contractor and Subcontractors. This requirement shall apply to claims, costs, injuries, or damages, but only in proportion to and to the extent such claims, costs, injuries, or damages are caused by or result from the negligent acts or omissions of Contractor and Subcontractors. This requirement shall not apply to Worker's Compensation and Employer's Liability Insurance.
- .2 A Severability of Interest Clause stating that, "The term 'insured' is hereby used severally and not collectively, but the inclusion herein of more than one insured shall not operate to increase the limits of the insurers' liability."
- .3 A Cross Liability Clause stating that, "In the event of claims being made under any of the coverages of the policies referred to herein by one or more insureds hereunder for which another insured hereunder may be liable, then the policies shall cover such insureds against whom a claim is made or may be made in the same manner as if separate policies had been issued to each insured hereunder. Nothing contained herein, however, shall operate to increase the insurers' limits of liability as set forth in the insuring agreements."
- .4 University, University's consultants, University's Representative, and University's Representative's consultants will not by reason of their inclusion as insureds incur liability to the insurance carriers for payment of premiums for such insurance.
- .5 Coverage provided is primary and is not in excess of or contributing with any insurance or self-insurance maintained by University, University's consultants, University's Representative, and University's Representative's consultants.



Prospective Contractor shall obtain and submit the Insurance Declaration for the limits and provisions stated above and in the form shown below, signed by an authorized representative of its insurer and notarized. (If more than one insurer, submit a completed form for each insurer). PROVIDE THIS DECLARATION TO YOUR INSURANCE CARRIER FOR COMPLETION. DO NOT HAVE THE CARRIER SUBMIT THIS DECLARATION DIRECTLY TO THE UNIVERSITY.

INSURANCE DECLARATION

_____(County) _____,(State)

on _____(Date)

(Signature)

(Name and Title – Printed or Typed)

(Representing [Insurer Name])

(Entity Name)

(Address)

(City, State, Zip Code)

(Telephone Number)

(Facsimile Number)

(E-mail Address)

(ATTACH NOTARIZATION of INSURER REPRESENTATIVE’S SIGNATURE)



12. **TERMINATION**

a. Can you truthfully state that the entity (nor any member of the entity if a joint venture or partnership) HAS NOT been terminated for cause by an Owner after construction commenced within the last five (5) years?

YES NO

14. **STAFF EXPERIENCE:**

Have the Project Manager and Project Superintendent successfully completed at least 5 comparable projects as defined in Question 2 (A)?

YES NO

A. Provide the following information on the Project Manager (to oversee, manage and coordinate the overall project as a whole) who will be in charge of this project:

- 1. Name: _____
- 2. Years employed by your firm: _____
- 3. Present position/job function within your firm: _____

- 4. Years in present position/job function: _____year(s)

B. Provide the following information on the Project Superintendent

- 1. Name: _____
- 2. Years employed by your firm: _____
- 3. Present position/job function within your firm: _____

- 4. Years in present position/job function: _____year(s)



15. QUALIFICATION DECLARATION

I, _____ (Printed Name)
hereby declare that I am the _____ (Title)
of _____ (Name of Entity)

submitting this Qualification Questionnaire; that I am duly authorized to sign this
Qualification Questionnaire on behalf of the above named entity; and that all information
set forth in this Qualification Questionnaire and all attachments hereto are, to the best of
my knowledge, true, accurate and complete as of its submission date.

The undersigned declares under penalty of perjury that all of the Qualification information
submitted with this form is true and correct and that this declaration was executed in:

_____ (County), California, on _____ (Date).

(Signature)

(Printed Name)

(Address)

(City, State, Zip Code)

(Telephone Number)

(Facsimile Number)

(E-mail Address)



EXHIBIT – A

PROJECT DATA SHEET

(A separate sheet must be prepared for each project submitted)

Complete and submit the following Project Data Sheet for each comparable project submitted as evidence of the entity’s experience. Do not use any other form other than this Exhibit.

The Exhibit must be fully completed, but answering “NO” to a question contained solely in an Exhibit shall not necessarily result in failure to achieve Qualification status. Only those Contractors that have been determined to be prequalified and to have been determined to be responsible contractors will be eligible to submit a bid for this Project.

1. Project Name: _____
2. Project Location (including full address, if any):

 City: _____ State: _____ Zip _____
3. Project Description: _____
4. Construction or Project Type: _____
5. Size (gross square feet): _____
6. Business name of entity which constructed this project:

7. Did your entity self perform the installation of an Energy Management & Controls project as the General Contractor or as a Subcontractor for a General Contractor.?
 YES NO
 If YES, please specify the trades you self-performed or have the capability to self perform: _____

8. Did this project have an Energy Management & Controls portion over \$100,000.00?
 YES NO
9. Did this project consist of a Campus wide / Multi-Building energy management and controls system consisting of stand alone systems and / or integrated systems both between buildings and to third party equipment and devices for energy efficient comfort heating and cooling applications. Also common user interface providing monitoring and control of: A Campus wide / Multi-Building HVAC system, or critical



laboratory environments, or industrial and domestic water systems, and / or process heating and cooling.?

YES NO

10. Did this Project demonstrate experience with:

a. Integrating both BACnet and N2 communication protocols to common operator workstation;

YES NO

b. Modifying, updating and integrating to PMI software;

YES NO

c. Modifying and creating GPL programming language;

YES NO

d. Modifying, updating and integrating to Metasys System Extended Architecture

YES NO

e. Modifying, and creating LCT and CCT Programming Language

YES NO

11. Was the project begun and completed within the last 5 years?

YES NO

12. Date construction contract was completed: _____

13. Contract time: _____ days

Was the project completed within the original contract time or adjusted contract time?

YES NO

If NO and completion did not occur within the original or the adjusted contract time, indicate elapsed time in whole calendar days between original or adjusted contract time and actual final completion.

14. Cost at Bid: \$ _____

Final Contract Amount: \$ _____

15. Did the project include occupied facilities?

YES NO



If YES, what communications strategies used by your firm assisted the project team in mitigating the impacts of construction on the occupied facilities?

16. Did the project include California State Fire Marshal review and approval (planning, scheduling and obtaining State Fire Marshal approval of materials, shop drawings, and systems testing)?
 YES NO
17. Did the project include California Division of State Architect Handicapped Accessibility Compliance review and approval?
 YES NO
18. Entity's Project Team:
- a. Name of Project Executive: _____
 - b. Name of Project Manager: _____
 - c. Name of Project Superintendent: _____
19. Project Owner Team and References:
- a. Project Owner Name: _____
 - b. Project Owner Contact: _____ Title: _____
 - c. Project Owner Address: _____
 - d. City: _____ State & Zip code: _____
 - e. Telephone: _____ Fax: _____
 - f. E-mail Address: _____
 - g. Owner's Project Manager: _____
 - h. Owner's Project Superintendent: _____

(Attach additional pages with other pertinent information as necessary)

TABLE OF CONTENTS

PAGE No.

DIVISION 1	-	GENERAL REQUIREMENTS	
Section –01010		Summary of Work-----	1-2
01012		Information & Procedures Instructions (RFI) -----	1-2
01014		Contractor’s Use of the Project Site -----	1-2
01020		NOT USED -----	1-1
01051		Project Coordination -----	1-1
01070		Cutting & Patching -----	1-2
01080		Regulatory Requirements-----	1-3
01090		Abbreviations, Symbols, Definition -----	1-1
01100		NOT USED -----	1-1
01155		NOT USED -----	1-2
01200		Project Meetings -----	1-2
01300		Submittals -----	1-3
01310		Contract Schedules -----	1-4
01340		Shop Drawings, Product Data and Samples-----	1-5
01380		NOT USED -----	1-3
01400		Quality Control-----	1-3
01500		Construction Facilities and Temporary Controls -----	1-1
01532		Tree and Plant Protection-----	1-3
01560		Storm Water pollution Prevention-----	1-4
01561		NOT USED -----	1-4
01565		Hazardous Materials Procedures -----	1-1
01570		NOT USED -----	1-6
01600		Material and Equipment -----	1-2
01620		Anchors and Fasteners-----	1-3
01640		Product Options and Substitutions -----	1-3
01700		Project Closeout -----	1-1
01710		Cleanup & Disposal -----	1-2
01720		Contractor’s As-Built Documents -----	1-2
01740		Guarantees, Warranties, Bonds, Service, & Maintenance Contracts -----	1-4

SECTION 01012
INFORMATION & PROCEDURES INSTRUCTIONS (RFI)

PART 1. GENERAL

1.01 DESCRIPTION

- A. This SECTION contains the procedures to be followed by Contractor upon discovery of any apparent conflicts, omissions, or errors in the Contract Documents or upon having any question concerning interpretation.

1.02 PROCEDURES

A. Notification by Contractor:

1. Submit all requests for clarification or additional information in writing to University's Representative using the Request For Information (RFI) form provided by University's Representative or a similar form approved by University's Representative.
2. Number RFIs sequentially. Follow RFI number with sequential alphabetical suffix as necessary for each resubmission. For example, the first RFI would be "001". The second RFI would be "002". The first resubmittal of RFI "002" would be "002a".
3. Limit each RFI to one subject.
4. Submit a RFI if one of the following conditions occur:
 - a) Contractor discovers an unforeseen condition or circumstance that is not described in the Contract Documents.
 - b) Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents.
 - c) Contractor discovers what appears to be an omission from the Contract Documents that cannot be reasonably inferred from the intent of the Contract Documents.
5. Contractor shall not:
 - a) Submit an RFI as a request for substitution.
 - b) Submit an RFI as a submittal.
 - c) Submit an RFI under the pretense of Contract Documents discrepancy or omission without thorough review of the documents.

- d) Submit an RFI in a manner that suggests that specific portions of the Contract Documents are assumed to be excluded or by taking an isolated portion of the Contract Documents in part rather than whole.
 - e) Submit an RFI in an untimely manner without proper coordination and scheduling of Work of related trades
6. If Contractor submits an RFI contrary to the above, Contractor shall pay the cost of any review, which cost shall be deducted from the contract sum.
7. Contractor shall submit request for information or clarification immediately upon discovery. Contractor shall submit RFIs within a time frame so as not to delay the Contract Schedule while allowing the full response time described below.

1.03 RESPONSE TIME

- A. University's Representative, whose decision will be final and conclusive, shall resolve such questions and issue instructions to Contractor within a reasonable time frame. In most cases, RFIs will receive a response within 6 working days. If in the opinion of University's Representative more than 6 working days is required to prepare a response to an RFI, Contractor will be notified in writing.
- B. Should Contractor proceed with the Work affected before receipt of a response from University's Representative, within the response time described above, any portion of the Work which is not done in accordance with University's Representative's interpretations, clarifications, instructions, or decisions is subject to removal or replacement and Contractor shall be responsible for all resultant losses.
- C. Failure to agree: In the event of failure to agree as to the scope of the contract requirements, Contractor shall follow procedures set forth in Article 4 of the General Conditions.

END OF SECTION

SECTION 01014

CONTRACTOR'S USE OF THE PROJECT SITE

PART 1. GENERAL

1.01 RESTRICTIONS

- A. Contractor's use of the project site and buildings for the Work, storage, and staging is restricted to the areas designated on the drawings. Allow for continued use of existing buildings by University and by the public.
1. Scheduled Events: The University uses areas of Building for various activities. The Contractor shall schedule his new Work activities without interfering with University's regularly scheduled activities. A detailed list of scheduled activities and their locations will be available to the Contractor within 10 calendar days after receipt of Notice of Apparent Lowest Responsible Bidder.
 2. Access through campus for deliveries and for other construction-related traffic will be limited by the University so the campus' primary functions will not be disturbed.
 3. Obtain approval from the University Representative, whose determination will be final, for type, size, quantity, and locations of directional signs.
 4. Keep roads clear at all times to permit passage of emergency vehicles.
 5. The Contractor shall be responsible for making every provision necessary to insure the security of the existing buildings. University will make keys available to the Contractor under the conditions the University decides.
 6. Dogs, pets of any kind, alcohol, illegal drugs, radios and music, and the wearing of "walkman" type equipment are not permitted on the project premises.
 7. Do not commence Work activities before the designated starting times or remain in project area after the designated stop Work times. If this requirement is violated, the University's Representative will designate more restrictive Work hours.

1.02 WORK HOURS AND DAYS:

- A. Perform new Work activities on calendar days between the hours of 7 a.m. and 5 p.m. Other Work hours or days are subject to the approval of the University Representative.

1.03 CONTRACTOR USE OF THE EXISTING BUILDING:

- A. The existing building will be occupied by staff and students throughout new Work operations.

- B. Maintain the existing building in a safe and weather tight condition throughout the new Work period. Repair damage caused by new Work operations. Take precautions necessary to protect the building and its occupants during the new Work period. Do not disturb occupants normal use of the building; do not interfere with their use except as approved by University's Representative.
- C. Keep areas occupied by public and the University free from accumulation of waste materials, rubbish or construction debris.
- D. Contractor understands and agrees that the contract involves performance in and around existing, functioning facilities. The Contractor recognizes that the Work must be coordinated to avoid disruption of normal functions. No additional compensation shall be granted to the Contractor as result of the continuing use and function of portions of the facilities.

1.04 HARASSMENT

- A. Harassment of students or University's personnel during construction Work operations will not be tolerated and will be dealt with to the full extent of federal and state law.

END OF SECTION

SECTION 01051

PROJECT COORDINATION

PART 1. GENERAL

- 1.01 COORDINATE THE WORK AND DO NOT DELEGATE RESPONSIBILITY FOR COORDINATION TO ANY SUBCONTRACTOR.
- A. Anticipate the interrelationship of all Subcontractors and their relationship with the Work.
 - B. Resolve differences or disputes between Subcontractors concerning coordination, interference, or extent of the Work between sections of the Work.
 - C. Coordinate the Work of Subcontractors so that portions of the Work are performed in a manner that minimizes interference with the progress of the Work.
 - D. Do not obstruct spaces and installations that are required to be clear by applicable code requirements.
 - E. Remove and replace all Work that does not comply with the Contract Documents. Repair or replace any other Work or property damaged by these operations with no adjustment of contract sum.
 - F. Coordinate all portions of the Work requiring careful coordination in order to fit in space available. Before commencing such portions of the Work, prepare supplementary drawings for review by University's Representative.

END OF SECTION

SECTION 01070

CUTTING AND PATCHING

PART 1. GENERAL

1.01 WORK INCLUDED IN THIS SECTION

- A. Cutting, patching, and matching existing Work altered or disturbed to accommodate new Work.
- B. Cutting, patching, and matching existing Work damaged or defaced during new construction as required to restore to condition at time of award of contract.
- C. Cutting, patching, and matching existing Work relocated under this contract.
- D. Matching of new Work in existing construction to adjacent existing Work unless otherwise noted.
- E. Matching closures at former openings to adjacent undisturbed Work.
- F. Cutting, patching, and matching required for mechanical, plumbing, and electrical Work.

1.02 DESIGN CRITERIA

- A. Patching shall achieve security and protection where exposed to weather and preserve continuity of existing fire ratings, if required.
- B. Patching and matching shall successfully duplicate undisturbed adjacent finishes, colors, textures, and profiles. Where there is dispute whether duplication is successful or has been achieved to reasonable degree, the University Representative's judgment shall be final.

1.03 SUBMITTALS

- A. Product literature and/or Shop Drawings shall be submitted, in accordance with Section 01640 – Product Options and Substitutions for review and approval for materials, methods, or systems different from existing Work to be matched.

1.04 PRODUCTS

- A. Materials shall be as required to match appearance, quality and performance of existing finishes to be duplicated.

- B. Provide all primers, sealers, underlayments, backing, blocking, furring, suspension systems, and related items required for any purpose in patching existing Work.

1.05 EXECUTION

- A. Perform Work in accordance with manufacturer's recommendations.
- B. Inform the University's Representative of locations where Work will be noisy and obtain his/her approval of times; otherwise keep noise to minimum.
- C. Lay out cutting Work at job site and coordinate with related Work for which cutting is required.
- D. Take care not to damage or cut reinforcing or structural components scheduled to remain.

END OF SECTION

SECTION 01080

REGULATORY REQUIREMENTS

PART 1. GENERAL

1.01 PERFORMANCE

- A. The Work shall be performed in accordance with applicable code requirements and applicable requirements of all other regulatory agencies, including, but not limited to the following:
1. Federal Occupational Safety And Health Administration.
 2. National Electrical Code.
 3. California Code of Regulations, Title 8, Industrial Safety.
 4. California Code of Regulations, Title 13, Hazardous Materials Transportation.
 5. California Code of Regulations, Title 19, Public Safety.
 6. California Code of Regulations, Title 24.
 - a) Part 1, Administrative Regulations.
 - b) Part 2, California Building Code.
 - c) Part 3, California Electrical Code.
 - d) Part 4, California Mechanical Code.
 - e) Part 5, California Plumbing Code.
 - f) Part 9, California Fire Code.
 7. California Health And Safety Code.
 8. National Fire Protection Association (NFPA), "Life Safety Code", NFPA 101.
 9. Code of Federal Regulations, Part 1926.62, and Title 8, Code of California Regulations, Section 1532.1, pertaining to environmental and worker protection, and lead abatement methods and procedures.
 10. California/Federal Environmental Protection Agency.
- B. Unless otherwise specified, specific references to codes, regulations, standards, manufacturers' instructions, or requirements of regulatory agencies, when used to specify requirements for materials or design elements, shall mean the latest edition of each in effect at the date of submission of bids, or the date of the change order or field order, as applicable.

1.02 CONFLICTS

- A. If a conflict exists between referenced regulatory requirements and the Contract Documents, Contractor shall notify University's Representative and request that the conflict be resolved.

1.03 PERMITS AND NOTIFICATIONS

- A. The Contractor is not required to take out a general building permit on construction work on University property, but certain Work or operations in the Contract require a permit to be obtained or notification be made to the Project Manager and University organizations before Work commences. The following listed Work or operations listed, at a minimum, require such action; after which additional steps may be required before the actual Work or operation may commence or continue. Additional actions or notifications may be required in other locations in the Contract Documents.
- B. Construction Safety:
 - 1. Site Fencing: Pre-construction meeting.
 - 2. Warning Signs and Barricades: Pre-construction meeting.
 - 3. Crane Use: Three working days notice required.
 - 4. Helicopter Use: Three working days notice required.
 - 5. Accidents: Report as soon as possible.
- C. Hot Work Permits: There is no charge for hot work permits. Two working days advance notice is required for the following activities:
 - 1. Metal welding.
 - 2. Cutting metal with oxygen – acetylene torches.
 - 3. Work involving open flames.
- D. Fire Alarm Work and Fire Marshal Inspections: Two working days notice is required.
- E. Fire Alarm set-offs.
- F. Inspections of fire protection systems
- G. Environmental Health:
 - 1. Asbestos and Lead: Pre-construction meeting.
 - 2. Confined Space Entry: Pre-construction meeting.
 - 3. Noise levels generated greater than 72dBA.
 - 4. Hazardous Waste Disposal.

5. Chemicals, Material Safety Data Sheets (MSDS's).
 6. Dust creating work. Two working days advance notice.
 7. Asbestos or hazardous materials discovered during demolition: Report immediately.
- H. Physical Facilities: Call Project Manager, , .
1. Utility Shutdowns at existing buildings: Seven working days advance notice.
- I. Fire Hydrant Shutdown: Two working days advance notice.

END OF SECTION

SECTION 01090

ABBREVIATIONS, SYMBOLS AND DEFINITIONS

PART 1. GENERAL

1.01 ABBREVIATIONS

- A. The following abbreviations of organizations may be used in the Contract Documents:
1. Abbreviations or acronyms on names of organizations, associations, and titles may appear in Contract Documents. Where such acronyms or abbreviations are used, they mean the recognized name of the trade association, standards generating organization authority having jurisdiction, or other entity applicable to the context of the text provision.
- B. Additional abbreviations, used on the Drawings, are listed thereon.
- C. If additional abbreviations or acronyms are used that are not included in the above list, request clarification or meaning from the University Representative.

1.02 ABBREVIATIONS/SYMBOLS

- A. Abbreviations/Symbols, used only on the Drawings, are shown thereon.

1.03 ABBREVIATIONS OF ORGANIZATIONS

AA	Aluminum Association 900 19 th St., Suite 300 Washington, DC 20006 (202) 862-5104
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI 48219 (313) 532-2600
AFPA	American Forest and Paper Organization (American Wood Council of the) 2 nd Floor, 1250 Connecticut Ave., NW Washington, DC 20036 (202) 463-2455
AITC	American Institute of Timber Construction 333 W. Hampden Avenue Englewood, CO 80110

ANSI	American National Standards Institute 11 West 42 nd St., 13 th Floor New York, NY 10036 (212) 642-4900
APA	American Plywood Assoc. P.O. Box 11700 Tacoma, WA (206) 565-6600
ASTM	American Society for Testing and Materials 1916 Race St. Philadelphia, PA 19103-1187 (215) 299-5400
AWPA	American Wood Preservers' Assoc. P.O. Box 286 Woodstock, MD 21163-21163
AWS	American Welding Society 550 LeJeune Rd., NW Miami, FL 33126
CAL/EPA	California Environmental Protection Agency P.O. Box 806 Sacramento, CA 95812-0806
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Rd. Schaumburg, IL 60173
EJMA	Expansion Joint Manufacturers Assoc. 25 N. Broadway Tarrytown, NY 10591
FM	Factory Mutual Systems 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, MA 02062 (617) 762-4300
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
GA	Gypsum Association

	810 First St., NE, Suite 510 Washington, DC 20002 (202) 289-5440
ICBO	International Conference of Building Officials 5360 S. Workman Mill Road Whittier, CA 90601
MIL	Military Standardization Documents (U.S. Department of Defense) Naval Publications and Forms Center 5801 Tabor Ave. Philadelphia, PA 19120
ML/SFA	Metal Lath/Steel Framing Assoc. (A Division of the National Association of Architectural Metal Manufacturers) 600 S. Federal St., Suite 400 Chicago, IL 60605
NAAMM	National Association of Architectural Metal Manufacturers 600 S. Federal St., Suite 400
NFPA	National Fire Protection Assoc. (Now AFPA)
NWMA	National Woodwork Manufacturers Assoc. (Now NWWDA)
NWWDA	National Wood Window and Door Assoc. 1400 E. Touhy Ave., #G54 Des Plaines, IL 60018 (708) 299-5200
PCA	Portland Cement Assoc. 5420 Old Orchard Rd. Skokie, IL 60077 (708) 966-6200
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402 (202) 783-3238
SMACNA	Sheet Metal and Air Conditioning Contractors National Assoc. 4201 Lafayette Center Dr.

	Chantilly, VA 22021 (703) 803-2980
SSPC	Steel Structures Painting Council 4516 Henry St. Pittsburgh, PA 15213 (412) 687-1113
UL	Underwriters Laboratories 333 Pfingsten Rd. Northbrook, IL 60062 (708) 272-8800
WCLIB	West Coast Lumber Inspections Bureau P.O. Box 23145 Portland, OR 97281 (503) 639-0651

1.04 DEFINITIONS

- A. The following terms, when used on the drawings or in the specifications, shall have the following meanings:

<u>Term</u>	<u>Meaning</u>
As directed	“as approved by University’s Representative.”
As required	“as required by applicable code requirements; by good building practice; by the condition prevailing; by the Contract Documents; by University; or by University’s Representative.”
As selected	“as selected by University’s Representative.”
By others	“Work on the project that is outside the scope of work to be performed by Contractor under the contract but that will be performed by University, separate contractors, or other means.”
Equal	“of same quality, appearance, and utility to that specified, as determined by University’s Representative. Contractor bears the burden of proof of equality.
Furnish	“supply only, not install.”
Install	“install or apply only, not furnish.”
Owner	“University”
Owner’s Representative	“University Representative”
University-furnished,	“to be furnished by University at its cost and installed by

Contractor-installed	Contractor as part of the Work.”
Project site	“geographical location of the project.”
Provide	“furnish and install.”
Shown	“as indicated on the drawings.”
Specified	“as written in the Contract Documents.”
Submit	“submit to University’s Representative.”

END OF SECTION

SECTION 01200
PROJECT MEETINGS

PART 1. GENERAL

1.01 PRE-CONSTRUCTION CONFERENCE.

- A. Prior to commencement of Work, a preconstruction conference will be conducted by University's Representative to discuss procedures, which are to be followed during performance of the Work.
- B. Location: As designated by University's Representative.
- C. Attending shall be:
 - 1. University's Representative
 - 2. University
 - 3. University's Consultants and University's Representative Consultants, as appropriate.
 - 4. Contractor.
 - 5. Superintendent.
 - 6. Subcontractors, as appropriate.
 - 7. Others, as appropriate.

1.02 PROGRESS MEETING:

- A. During the course of construction, progress meetings will be held to discuss and resolve field problems.
- B. Location: As designated by University's Representative.
- C. Attending shall be:
 - 1. University's Representative.
 - 2. University.
 - 3. University's consultants and University's Representative's Consultants, as appropriate.
 - 4. Contractor.
 - 5. Superintendent.

6. Subcontractors, as appropriate.

7. Others, as appropriate.

1.03 BILLING MEETING

A. University's Representative will conduct a Billing Meeting each month prior to the Contractor's submittal of the Application For Payment, or the Billing Meeting may be conducted as part of a weekly Progress Meeting. Attendance shall be the same as for Progress Meetings.

1. No Application For Payment will be processed nor shall any progress payment become due until all required supporting data is received and approved by University's Representative.

1.04 GUARANTEES, BONDS, AND SERVICE AND MAINTENANCE CONTRACTS REVIEW MEETING.

A. Eleven months following the date of substantial completion, a meeting shall be conducted by University for the purpose of reviewing the guarantees, bonds, and service and maintenance contracts for materials and equipment.

B. Attending shall be:

1. University
2. University's consultants, as appropriate
3. Contractor
4. Subcontractors, as appropriate
5. Others, as appropriate

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1. GENERAL

1.01 DESCRIPTION

- A. Product literature.
- B. Shop drawings.
- C. Samples.
- D. Certificates of compliance.

1.02 SEQUENCE OF SUBMITTAL:

- A. All specified items, requiring submittal for review and approval by the University's Representative, shall be filed in accordance with Specification Section – Product Options and Substitutions.

1.03 QUALITY ASSURANCE

- A. Product literature shall permit the University's Representative to determine which materials, equipment and systems will be accepted in the project and shall consist of brochures, catalog cuts, or other data sufficient to clearly identify subject items, optional features to be utilized, performance characteristics, limitations, capacities, schedules, complete engineering information, physical dimensions, conformance with standards, codes, fire ratings, appearance characteristics, and any other pertinent data to identify it as either item specified or as equal to that specified. Statements such as "as specified" will not suffice and will be rejected.

1.04 SHOP DRAWINGS

- A. Shop drawings facilitate integration, coordination and progress of the Work and be not to be considered Contract Documents.
- B. The University's Representative will review Shop Drawings for general design requirements only.

- C. Variations from Contract Documents so minor as to involve no change in contract amount may be accepted if acceptance is in the University's interest. Do not construe the University's Representative review as allowing the following:
1. Variation from Contract Documents except as specifically authorized or requested by the University's Representative.
 2. Relieving the Contractor of responsibility for errors in details or dimensions.
 3. Relieving the Contractor of responsibility for integrating and coordinating various trades and separate contracts.

1.05 SAMPLES

- A. Review of samples shall permit the University's Representative to physically verify conformance of materials, products, fixtures, or devices with Contract Documents either by inspection or testing and to select textures, colors or other characteristic as stipulated in the Contract Documents.

1.06 CERTIFICATES

- A. Certificates shall certify compliance with published specifications of trade, industry, or governmental organizations or specifications of the University Representative and shall attest to the contractor's compliance with such specifications.

1.07 GENERAL REQUIREMENTS

- A. Number and type of copies to be submitted, distributed and returned will be established at the pre-construction conference, unless noted otherwise.

1.08 IDENTIFICATION AND SUBMITTAL PROCEDURES

- A. Transmit each submittal in accordance with format and procedures outlined under Section 01340 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Sequentially number each submittal. Re-submittals shall have original number plus an alphabetic suffix.
- C. Identify project, contractor, subcontractor or supplier; pertinent drawing sheet and detail numbers and specification section number; as appropriate.
- D. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

- E. Schedule submittals to expedite the Project and deliver to University's Representative at business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- G. Provide space for Contractor's and University Representative's review stamps.
- H. Revise and resubmit submittals as required and clearly identify changes and/or revisions made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- J. Mark each submittal with date, name of project and project number.

END OF SECTION

SECTION 01310
CONTRACT SCHEDULES

PART 1. GENERAL

1.01 PRELIMINARY CONTRACT SCHEDULE

A. Submission

1. Within 10 days after receipt of Notice of Selection as Apparent Lowest Responsible Bidder or with the agreement.
2. Within 7 days after receipt of the preliminary Contract Schedule, University's Representative will notify Contractor of its acceptance of, or its review comments about the schedule so that appropriate adjustments may be made by Contractor in the development of the Contract Schedule.

B. Form

1. Prepare the preliminary contract schedule as a bar chart showing continuous flow left to right. Specific calendar dates shall be clearly and legibly shown for the start and finish of each Work activity.
2. Prepare the Preliminary Contract Schedule in sufficient detail to demonstrate preliminary planning for the Work and to represent a practical plan to complete the Work within the Contract Time.
3. Identify the following milestone events on the Preliminary Contract Schedule:
 - a) All holidays and non-Working days.
 - b) Submittals and identify "Means & Methods".
 - c) Mobilization.
 - d) Start of demolition.
 - e) Punchlist.

C. Activities

1. Identify all Work activities which constitute the critical path.

1.02 CONTRACT SCHEDULE

A. Submission

1. Submit the Contract Schedule, in the form and having general content acceptable to University's Representative within 10 days following Notice To Proceed and prior to submitting the first Application For Payment.
2. University's Representative will determine acceptability of the Contract Schedule within 7 days after its receipt.
3. No Application For Payment will be processed nor shall any progress payment become due until the Contract Schedule is accepted by University's Representative.

B. Form

1. The Contract Schedule shall be a bar chart showing continuous flow from left to right. Specific calendar dates shall be clearly and legibly shown for the start and finish of each Work activity.
2. The Contract Schedule shall be suitable for monitoring progress of the Work, in sufficient detail to demonstrate adequate planning for the Work, and represent a practical plan to complete the Work within the contract time.

C. Activities

1. Identify all Work activities in correct sequence for the completion of the Work. Work activities shall include the following:
 - a) Major Contractor-furnished equipment, materials, and building elements, and scheduled activities requiring submittals or University's prior approval.
 - b) Show dates for the submission, review, and approval of each submittal. Dates shall be shown for the procurement, fabrication, delivery, and installation of major equipment, materials, and building elements, and for scheduled activities designated by University.
 - c) A minimum of 7 days shall be allotted for University's Representative to review each submittal.
 - d) Dates Contractor requests designated Working spaces, storage areas, access, and other facilities to be provided by University.
 - e) Scheduled inspections as required by codes, or as otherwise specified.
2. Identify all Work activities that constitute the critical path.
3. Critical Work activities are defined as Work activities which, if delayed or extended, will delay the scheduled completion of one or more the milestones specified in this SECTION or the scheduled completion of the Work, or both. All other Work activities are defined as non-critical Work activities and are considered to have float.
4. Float is defined as the time that a non-critical Work activity can be delayed or extended without delaying the scheduled completion of milestones specified in this SECTION or the scheduled completion of the Work, or both. Neither

- Contractor nor University shall have an exclusive right to the use of float. The party using float shall document the effect on the updated Contract Schedule.
5. Delays of any non-critical Work activity shall not be the basis for an extension of contract time until the delays consume the float associated with that non-critical Work activity and cause the Work activity to become critical.
 6. The presentation of each Work activity on the Contract Schedule shall include a brief description of the Work activity, the duration of the Work activity in days, and a responsibility code identifying the organization or trades performing the Work activity.
 7. Contractor shall furnish cost estimates for each Work activity which cumulatively equal the total contract cost. Mobilization costs may be shown separately; however, other costs, i.e., profit and bond shall be pro-rated throughout all activities.

1.03 UPDATING

- A. Review the Contract Schedule with University's Representative once each week to incorporate in the Contract Schedule all changes in the progress, sequences, and scope of Work activities.
- B. Prepare and submit to university's representative an updated contract schedule as mutually agreed.
 1. The updated Contract Schedule shall accurately represent the as-built condition of all completed and in-progress Work activities as of the date of the updated Contract Schedule.
 2. Contractor shall perform the Work in accordance with the updated Contract Schedule. Contractor may change the Contract Schedule to modify the order or method of accomplishing the Work only with prior agreement by University.
- C. Contractor shall submit the updated Contract Schedule, in the form acceptable to University's Representative, at least 7 days prior to submitting the Application For Payment.
 1. University's Representative will determine acceptability of the updated Contract Schedule within 7 days after its receipt.
 2. No Application For Payment will be processed nor shall any progress payments become due until updated Contract Schedules are accepted by University's Representative.
 3. The accepted, updated Contract Schedule shall be the Contract Schedule of record for the period it is current and shall be the basis for payment during that period.

END OF SECTION

SECTION 01340
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Shop drawings, Product Data, and Samples, other than in connection with proposed substitutions, shall be submitted to University's Representative only when specifically required and University's Representative will not review any other such submittals. Product Data And Samples for proposed substitutions shall be submitted to University's Representative in accordance with SECTION 01640 – PRODUCT OPTIONS AND SUBSTITUTIONS. Contractor shall be responsible for obtaining such copies of Shop Drawings, Product Data, And Samples as it may require for its own use.

1.02 RELATED REQUIREMENTS

A. Definitions

1. The terms "Shop Drawings" and "Product Data" as used herein also include, but are not limited to, fabrication, erection, layout and setting drawings, manufacturer's standard drawings, descriptive literature, catalogues, brochures, performance and test data, wiring and control diagrams, all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and the positions thereof conform to the Contract Documents.
2. As used herein, the term "manufactured" applies to standard units usually mass-produced. The term "fabricated" mean items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall establish the actual detail of all manufactured or fabricated items. Indicate proper relation to adjoining Work, and amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure.

B. Manufacturer's Instructions

1. Where any item of Work is required by the Contract Documents to be furnished, installed, or performed in accordance with a specified product manufacturer's instructions, Contractor shall procure and distribute the necessary copies of such instructions to University's Representative and all other concerned parties; and Contractor shall furnish, install, or perform the Work in strict accordance therewith.

C. Submittal Schedule

1. A schedule for submission of Shop Drawings, Product Data, and Samples by Contractor (the "Submittal Schedule"), and their processing and return by University's Representative, shall be agreed upon by both parties in order that the items covered by these submittals will be available when needed by the construction process and so that each party can plan its workload in an orderly manner.
2. Contractor shall prepare the Submittal Schedule in the form contained in the Exhibits and coordinate it with the Contract Schedule. No submittals will be processed before the Submittal Schedule has been submitted to and accepted by University's Representative, except in such cases where the processing of submittals is required before the acceptance of the Submittal Schedule.
3. In preparing the Submittal Schedule, Contractor must first determine from the Contract Schedule the date the particular item is needed for the Work. Working backwards, Contractor will add the required number of days for shipment, time for fabrication, and similar items to determine the date of the first submittal.
4. The Submittal Schedule shall be adjusted to meet the needs of the construction process and the Contract Schedule. Submit 2 copies of the Submittal Schedule after it is completed and each time it is updated by Contractor.

1.03 SHOP DRAWINGS

- A. Present information required on Shop Drawings in a clear and thorough manner. Identify details by reference to drawing and detail, schedule, or room numbers shown and specified.

1.04 PRODUCT DATA

- A. Preparation
 1. Clearly mark each copy to identify pertinent products or models.
 2. Show performance characteristics and capacities.
 3. Show dimensions and clearances required.
 4. Show wiring or piping diagrams and controls.
 5. Manufacturer's standard schematic drawings and diagrams:
 6. Modify the standard schematic drawings and other diagrams to delete information which is not applicable to the Work.
 7. Supplement standard information to provide information specifically applicable to the Work.

1.05 SAMPLES

- A. Office samples shall be of sufficient size and quality to clearly illustrate the following:
 - 1. Functional characteristics of the products, with integrally related parts and attachment devices.
 - 2. Full ranges of color, texture, and pattern.
- B. Field samples and mock-ups:
 - 1. Erect at the project site, at a location as directed by University's Representative.
 - 2. Size: As specified.
 - 3. Fabricate each sample and mock-up to be complete and fully finished.
 - 4. Remove mock-ups at conclusion of the Work.

1.06 CONTRACTOR'S REVIEW OF SUBMITTALS.

- A. Review, mark up as appropriate, and stamp Shop Drawings, Product Data, and Samples prior to submission. Submittals shall clearly show that they have been reviewed by Contractor for conformance with the requirements of the Contract Documents and for coordination with other sections.
- B. Determine and verify
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
 - 4. Conformance with Contract Documents.
- C. Coordinate each submittal with requirements of the Work and of the Contract Documents.
- D. Notify University's Representative in writing, at time of submission, of any changes in the submittals from requirements of the Contract Documents.
- E. Begin no fabrication or Work which requires submittals until the return of University's Representative's final reviewed submittals.

1.07 SUBMISSION REQUIREMENTS.

- A. Make submittals promptly in accordance with the Submittal Schedule and in such sequence as to cause no delay in the Work of any Separate Contractor.

B. Number of submittals required:

1. Shop drawings: Submit 1 reproducible transparency and 2 opaque reproductions. After checking, University's Representative will make prints for itself, University, and their consultants and then return the reproducible copy to Contractor. Contractor may make prints as it requires for its use and for Subcontractors' use.
2. Product Data And Non-Reproducible Submittals: Submit the number of copies which Contractor will need, plus 3 copies which will be retained by University's Representative.
3. Samples: Submit the number specified in the section which requires them.

C. Submittals shall contain:

1. Date of submission and dates of any previous submissions.
2. Project name and number.
3. Contract Identification.
4. The names of:
 - a) Contractor.
 - b) Subcontractor.
 - c) Supplier.
 - d) Manufacturer.
5. Identification of the product, with the Specification section number.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Reference standards, such as ASTM or Federal Specification numbers.
9. Identification of changes from requirements of the Contract Documents.
10. An 8-inch x 3-inch blank space for review stamp.
11. Contractor's stamp, initialed or signed, certifying to the review of the submittal; verification of materials and field measurements and conditions; and compliance of the information within the submittal with requirements of the Work and of the Contract Documents.

D. Resubmission Requirements.

1. Shop Drawings And Product Data:

- a) Revise Shop Drawings or Product Data, and resubmit as specified for the initial submittal.
 - b) Identify any changes which have been made other than those requested.
 - c) Note any departures from the Contract Documents or changes in previously reviewed submittals which were not commented upon by University's Representative.
2. Samples: Submit new samples as required for initial submittal.
- E. Distribution.
1. Reproduce and distribute copies of Shop Drawings and Product Data, which carry University's Representative's review stamp, to the following locations:
 - a) Contractor's Project site file.
 - b) Record documents file maintained by Contractor.
 - c) Separate Contractors.
 - d) Subcontractors.
 - e) Supplier or manufacturer.
 2. Distribute samples which carry University's Representative's review stamp as directed.
- F. University's Representative's Review:
1. University's Representative will review Contractor's submittals, such as Shop Drawings, Product Data, and Samples, for the limited purposed of checking for conformance with information given and the design concept expressed in the Contract Documents. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or system, all of which remain the responsibility of Contractor as required by the Contract Documents.

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1. GENERAL

1.01 DEFINITIONS

- A. The term "University's Testing Laboratory" means a testing laboratory retained and paid for by University for the purpose of reviewing material and product reports and performing other services as determined by University.
- B. The term "Contractor's Testing Laboratory" means a testing laboratory retained and paid for by Contractor to perform the testing services required by the Contract Documents. Contractor's Testing Laboratory shall be an organization other than University's Testing Laboratory and shall be acceptable to University's Representative. It may be a commercial testing organization, the testing laboratory of a trade association, the certified laboratory of a supplier or manufacturer, Contractor's own forces, or other organization. Contractor's Testing Laboratory shall have performed testing of the type specified for at least 5 years.

1.02 TESTS, INSPECTIONS, AND ACCEPTANCES

- A. Tests, inspections and acceptances of portions of the Work required by the Contract Documents or by applicable code requirements shall be made at the appropriate times. Except as otherwise provided, Contractor shall make arrangements for such tests, inspections, and acceptances with Contractor's Testing Laboratory. Contractor shall give University's Representative timely notice of when and where tests and inspections are to be made.
- B. If such procedures for testing, inspection, or acceptance reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for University's Representative's services and expenses.
- C. If University's Representative is to observe test, inspections, or make acceptances required by the Contract Documents, University's Representative will do so promptly and, where practicable, at the normal place of testing.

PART 2. CONTRACTOR'S RESPONSIBILITIES REGARDING UNIVERSITY'S TESTING LABORATORY

- A. Secure and deliver to University's Testing Laboratory adequate quantities of Representative samples of materials proposed for use as specified.

- B. Submit to University's Testing Laboratory the preliminary design mixes proposed to be used for concrete and other materials which require review by University's Testing Laboratory.
- C. Submit copies of product test reports as specified.
- D. Furnish incidental labor and facilities.
 - 1. To provide University's Testing Laboratory access to the Work to be tested.
 - 2. To obtain and handle samples at the Project Site or at the source of the product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- E. Provide notice to University's Representative sufficiently in advance of operations to allow for University's Testing Laboratory assignment of personnel and scheduling of tests.
- F. When tests or inspections are not performed after such notice, Contractor shall reimburse University for University's Testing Laboratory personnel and travel expenses incurred.

PART 3. TESTS AND INSPECTIONS

3.01 TESTING AND INSPECTIONS

- A. Certain portions of the Work will be tested and/or inspected at various stages. Nothing in any prior acceptance or satisfactory test result shall govern, if at any subsequent time the Work, or portion thereof, is found not to conform to the requirements of the Contract Documents.
- B. The University will inspect the project construction. Contractor shall provide the University's inspection representative full cooperation. The decisions from the University's inspection representative shall be final for any differences between the Contractor and the University's Representative.

3.02 ADDITIONAL TESTING AND INSPECTION

- A. If initial tests or inspections made by University's Testing Laboratory or Geotechnical Engineer reveal that any portion of the Work does not comply with Contract Documents, or if University's Representative determines that any portion of the Work requires additional testing or inspection, additional tests and inspections shall be made as directed.

- B. If such additional tests or inspections establish that such portion of the Work complies with the Contract Documents, all costs of such additional tests or inspections shall be paid by University.
- C. If such additional test or inspections establish that such portion of the Work fails to comply with the Contract Documents, all costs of such additional tests and inspections, and all other costs resulting from such failure, including compensation for University's Representative and University's Consultants, shall be deducted from the Contract Sum.

3.03 TEST REPORTS

- A. University's Testing Laboratory and Contractor's Testing Laboratory shall submit 1 copy of all reports to University's Representative, indicating observations and results of tests and indicating compliance or non-compliance with the Contract Documents.
- B. University's Representative will distribute 1 copy of the reports to University, University's Consultants, and Contractor.

3.04 GEOTECHNICAL ENGINEER

- A. University will retain and pay the expenses of a Geotechnical Engineer to perform inspection, testing, and observation functions specified by University. Geotechnical Engineer shall communicate only with University and University's Representative. University's Representative shall then give notice to Contractor, with a copy to University, of any action required of Contractor.

END OF SECTION

SECTION 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1. GENERAL

1.01 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. The drawings show, if applicable, existing above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, hot water, and other utilities which are known to University.
- B. Locate all know existing installations before proceeding with construction operations which may cause damage to such installations. Existing installations shall be kept in service where possible and damage to them shall be repaired with no adjustment of Contract Sum.
- C. If any other structures or utilities are encountered, request University's Representative to provide direction on how to proceed with the Work.
- D. If any structure or utility is damaged, take appropriate action to ensure the safety of persons and property.

1.02 INTERRUPTION OF BUILDING SERVICES

- A. Obtain University's approval at least 3 days prior to any service shutdown or cutover. Do not interrupt mechanical and electrical services to the building or Campus facilities except at such times as will cause the least inconvenience to the University and only with the approval of the University Representative.

1.03 TRENCHING AND EXCAVATION

- A. General Protection: Pursuant to Labor Code Sections 6705 and 6707, Contractor shall include in its base bid all costs incident to the provision of adequate sheeting, shoring, bracing or equivalent method for the protection of life and limb, which shall conform to the applicable Federal and State Safety Orders.
- B. Before beginning any excavation five feet or more in depth, Contractor shall submit to University's Representative a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during excavation in conformance with the California Construction Safety Orders and Title 24 of the California Code of Regulations (CCR). If the detailed plan varies from such shoring system standards, it shall be prepared by a registered civil or structural engineer whose name and registration number shall be indicated on the drawing. If a dispute arises as to whether the plan must be prepared

by a registered civil or structural engineer, University's Representative's determination of the matter shall be final and conclusive on Contractor. The cost of required engineering services shall be borne by Contractor and shall be deemed to have been included in the amount bid for the Work as stated in the Agreement.

- C. Comply with State of California Construction Safety Orders, Article 6 – Excavations, trenches earthwork, whether or not the excavation, trench, or earthwork is five feet or more in depth.

END OF SECTION

SECTION 01560

TEMPORARY STORMWATER POLLUTION PREVENTION

PART 1 - GENERAL

1.01 GENERAL

- A. Stormdrains at the University of California Santa Barbara Campus discharge directly to creeks, the Goleta Slough, the Campus Lagoon, and the Pacific Ocean without treatment. Discharge of Pollutants or Contaminants (any substance, material, or waste other than uncontaminated stormwater) from this Project into the stormdrain system is strictly prohibited by the State Water Resources Control Board (SWRCB) and the Central Coast Regional Water Quality Control Board (RWQCB).
- B. The Contractor is responsible for stormwater quality within the Project site (which includes the staging area, material storage, waste management areas, construction areas, on-site parking, site entrances and exists, and anywhere Project construction disturbs soil) and the quality of stormwater leaving the Project site.
- C. The Contractor is required to prevent erosion of disturbed areas during construction and ensure pollutants, including sediment, do not leave the Project site, either water-borne, air-borne, on the tires of vehicles, or by spillage from offsite hauling of soils.
- D. The Contractor is responsible for properly managing all construction debris, solid and construction waste materials including litter, liquid waste including fluids from vehicles, construction materials, hazardous materials and waste, and sanitary and septic waste.
- E. The requirements in this section are intended to be implemented on a year-round basis, not just during the part of year when there is a high probability of a rain event which results in stormwater runoff. The requirements and practices discussed in this Section should be implemented at the appropriate level and in a proactive manner during all seasons while construction is ongoing.
- F. The following terms and their definitions will be used throughout this Section.
 - 1. Best Management Practices (BMPs) – The term BMP is used to describe the controls and activities used to prevent stormwater pollution.
 - 2. BMP Site Map – A map typically 11"x17" including, but not limited to, the following: entire construction site, site perimeter, adjacent roadways, all existing and proposed stormdrains on and near the site, site entrances/exits, building footprint, construction trailer, topography including slope, all current BMPs, NOI, and the location of the Questionnaire or Stormwater Pollution Prevention Plan (SWPPP).
 - 3. Contaminants or Pollutants – Any substance, material, or waste other than uncontaminated stormwater, including, but not limited to materials such as acids, adhesives, asphalts, concrete compounds, curing compounds, detergents, fertilizers, glues, lime, paints, pesticides and herbicides, petroleum products, plaster, roofing tar, solvents, wood preservatives, soil and any materials that may be detrimental if released to the environment.

4. Contractor – The term "Contractor" refers to the person or firm responsible for performing the work and is identified as such in the Agreement. The Contractor may use subcontractors, and the subcontractors may use sub-subcontractors to perform parts of the work. However, the Agreement is between the University and the Contractor, and the Contractor alone is responsible for completing the Project.
5. Final Stabilization – Final stabilization is achieved when all construction activities are complete, all disturbed soil areas have been properly stabilized, all stormwater regulations have been achieved, and a uniform vegetative cover with 70 percent coverage has been established.
6. General Permit - National Pollutant Discharge Elimination System (NPDES) General Permit For Storm Water Discharges Associated with Construction Activity Water Quality Order 00-08-DWQ, Waste Discharge Requirements Order No. 99-08 DWQ (National Pollution Discharge Elimination System (NPDES) Permit No. CAS000002), Resolution No. 2001-046, Modification of Water Quality Order 99-08, State Water Resources Control Board, and any amendments or revisions of these permits or orders.
7. Hazardous Materials – Materials such as paints, solvents, petroleum products, pesticides, wood preservatives, treated wood, acids, roofing tar, batteries, Fluorescent lights, light ballasts, etc.
8. Maximum Extent Practicable (MEP) – Less-effective treatment or activities may not be substituted when it is practicable to provide more effective treatment or activities.
9. Notice of Intent (NOI) – Document that must be submitted to the State of California to obtain coverage under the General Permit and be permitted to develop property one acre or larger.
10. Notice of Termination (NOT) – Document that must be submitted to the State of California once the Project is complete and has achieved Final Stabilization, which certifies that all State and local requirements have been met in accordance with Special Provisions for Construction Activity, C.7, of the General Permit.
11. Post-Construction BMPs – Permanent features designed to minimize pollutant discharges, including sediment, from the site after construction has been completed. These features; such as bioswales, rain gardens, roof drains connected to landscaping, permeable pavement, etc.; will be installed and maintained by the Contractor during the construction of the Project until the Project has achieved Final Stabilization.
12. Project or Project site – All areas including the staging area, material storage, waste management areas, construction areas, on-site parking, site entrances and exits, and anywhere Project construction disturbs soil.
13. Questionnaire - UCSB Construction Stormwater Quality Questionnaire for Site Less than 1 Acre.
14. Storm drain System - Stormwater conduits, stormdrain inlets and other stormdrain structures, street gutters, channels, watercourses, creeks, the Goleta Slough, the Campus Lagoon, and the Pacific Ocean.
15. Stormwater Pollution Prevention Plan (SWPPP) Sites greater than or equal to one acre – A living document that is site specific and created by the

Contractor that specifies Best Management Practices that will prevent construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving off site into receiving waters. The SWPPP will be written to comply with all requirements of the State Water Resources Control Board (SWRCB) National Pollution Discharge Elimination System (NPDES) General Permit for Construction Stormwater Discharges (General Permit), and will be modified throughout the life of the Project, as needed, to maintain compliance with the General Permit.

1.02 RELATED SECTIONS

- A. Section 01010, "Summary of Work".
- B. Section 01150, "Environmental Protection Requirements".
- C. Section 01500, "Construction Facilities and Temporary Controls".
- D. Section 01565 Hazardous Materials Procedures
- E. Section 01710 Cleanup & Disposal
- F. Section 02210, "Earthwork".

1.03 GENERAL CONTRACTOR SCOPE

- A. Provide all material, labor, and equipment, for installation, implementation, and maintenance of all stormwater quality control measures. This work includes the following:
 - 1. Complying with applicable standards and regulations per Paragraph 1.04 REGULATIONS AND STANDARDS.
 - 2. Furnishing, placing, and installing effective measures for preventing erosion and runoff of soil, silts, gravel, hazardous chemicals, all construction materials including wastes, or other materials prohibited by the Central Coast RWQCB from leaving the site and/or entering the stormwater drainage system.
 - 3. Management of onsite construction materials and waste in such a manner as to prevent said materials and waste from contacting stormwater or wash water and running off site and/or into the stormdrain system.
- B. Contractor shall have stormdrain pollution prevention measures in place and follow this Specification at all times. It is the responsibility of the Contractor to be prepared for a rain event, and to be aware of weather predictions. The University is not responsible for informing the Contractor of rain predictions.
- C. Contractor shall not allow any unauthorized non-stormwater to enter the stormdrain system or leave the construction site. Non-stormwater includes domestic supply water used onsite to wash painting and drywall equipment, tools, equipment, or vehicles.
- D. Sanitary sewer discharge regulations are intended to provide protection of the sanitary sewer system and Goleta Sanitary District (GSD) and Goleta West Sanitary District's (GWSD) wastewater treatment plants. In this Section, "sanitary sewer" shall include any sanitary sewer manhole, clean-out, side sewer or other connection to the GSD and GWSD wastewater treatment plants.
- E. Sanitary sewer blockage will likely result in a back-up and overflow to the stormdrain system. The Contractor shall immediately notify the University's Representative if there is a clogged sanitary sewer.

1.04 REGULATIONS AND STANDARDS

- A. Contractor shall comply with the following applicable regulations:
1. Clean Water Act, United States Environmental Protection Agency.
 2. The Porter-Cologne Clean Water Act, State of California.
 3. Central Coast Basin (Region 3) Water Quality Control Plan (Basin Plan).
 4. National Pollutant Discharge Elimination System (NPDES) General Permit For Storm Water Discharges Associated with Construction Activity And Land Disturbance Activities Order No. 2009-0009-DWQ NPDES NO. CAS000002, and any amendments or revisions of these permits or orders. These orders are referred to as the General Permit.
- B. Contractor shall comply with the following standards and guidelines on stormwater pollution prevention:
1. [University of California, Santa Barbara BMP Handbook](#)
 2. California Stormwater Quality Association Handbooks – Construction, Municipal, Industrial and Commercial, and New Development and Redevelopment. These documents can be viewed and downloaded from the UCSB Environmental Health & Safety website, or at <http://www.cabmphandbooks.com/>.
 3. Caltrans Storm Water Quality Handbooks - This document can be viewed and downloaded from the UCSB Environmental Health & Safety website, or at <http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm>.

1.05 SUBMITTALS

- A. If the entire construction Project, including the staging area, material storage, waste management areas, construction areas, onsite parking, site entrances and exists, and anywhere Project construction disturbs soil, is less than 1 acre and is not part of a common plan of development, the Contractor shall comply with UCSB Construction Stormwater Quality Questionnaire for Site Less than 1 Acre (Questionnaire) which is available as Information available to bidders.
1. Submit the Questionnaire to the University's Representative for review 14 calendar days prior to scheduled implementation. At the completion of the review, a meeting will be conducted by the University's Representative and the Contractor to discuss and agree upon the implementation of the Questionnaire.
 2. No work shall begin until the Questionnaire has been approved by the University's Representative and the Questionnaire has been implemented.
 3. The Contractor shall bear all cost of design, installation, and maintenance of all stormwater quality control measures.
 4. The Contractor shall submit written reports of inspections and maintenance. Submit all completed inspection sheets from the previous week, to the University's Representative on the first day of each week. Written reports include:
 - a. Pre-rain event inspections.
 - b. Post-rain event inspections.

- c. Weekly inspections.
- d. Maintenance inspections.

1.06 Environmental Enforcement

The SWRCB and the RWQCB have the authority to enforce, through codified regulations, any portions of this Section that if not implemented may violate applicable regulations. Agency enforcement may include but is not limited to: citations, orders to abate, bills for cleanup costs and administration, civil suits, and/or criminal charges. Regulating agencies will cite UCSB for all violations which will be the Contractor's responsibility to correct, pay any fines issued, and remedy all violations as needed. The University's Representative may stop all construction activities as deemed necessary until such violations are remedied.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide products and materials as indicated in the Questionnaire/SWPPP, including Activity and Best Management Practice sheets and Drawings.
- B. Where product or material requirements are not specified in the Questionnaire/SWPPP, comply with other applicable sections of the Specifications and obtain approval of the University's Representative.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor will write and implement the Questionnaire/SWPPP and include a BMP Site Map and written description of pollution prevention methods. The intent of this requirement is to ensure Contractor compliance with applicable regulations for the discharge of stormwater from the Project. The Contractor will choose the best available performance-based technology and methods to prevent stormwater pollution from construction activities to the Maximum Extent Practicable (MEP). The method(s) chosen shall be appropriate for each specific site condition.
- B. The Contractor will implement the Questionnaire/SWPPP once it has been reviewed and approved by the University's Representative. Construction activities including clearing and grading will not begin until the Questionnaire/SWPPP has been implemented.
- C. The University's Representative and the Contractor will meet to discuss and agree upon implementation of the Questionnaire/SWPPP.
- D. The Contractor is required to maintain a standby crew for emergency work at all times during the rainy season, October 1 through May 1. Necessary materials shall be available on the Project site and stockpiled at convenient locations to facilitate rapid construction of temporary devices or to repair any damaged stormwater quality control measures when rain is imminent.

3.02 IMPLEMENTATION

- A. Stormwater Quality Control Measures
Comply with all requirements and stormwater quality control measures of the

Questionnaire/SWPPP including, but not limited to, the following approved BMPs referenced in the UCSB BMP Handbook. This list is not all inclusive and the Contractor should refer to the resources listed in Paragraph 1.04 REGULATIONS AND STANDARDS of this Section for additional information. The Contractor will consult the University's Representative before implementing a BMP that is not included in the UCSB BMP Handbook. The Contractor is required to, at a minimum, implement the following applicable BMPs. The Contractor may implement equivalent BMPs as long as the University's Representative approves. The Contractor is required to include BMP specification sheets for all BMPs that are not currently listed in the UCSB BMP Handbook.

1. Best Management Practices

a. Erosion Control (EC)

Provide a description of erosion control measures, including a time schedule, to be implemented during construction to minimize erosion on disturbed areas of the Project site, and identify the controls on the BMP Site Map. Areas requiring erosion control measures are exposed soil, such as soil piles, bare soil, sloped soil, and any area of disturbed soil. All inactive soil disturbed areas on the Project site and some active areas that are not experiencing high traffic, including relatively flat areas, must be protected from erosion. Both erosion and sediment control practices are designed to be implemented as an integrated system of pollution control. Without erosion controls, sediment controls are easily overwhelmed and will not prevent pollution. Preserve existing vegetation where feasible, limit disturbance of existing vegetation, and stabilize and revegetate disturbed areas as soon as possible after grading or construction. Stabilize exposed soil to the Maximum Extent Practicable (MEP) throughout the duration of the Project.

1. The Contractor is required to implement the following applicable BMPs, or equivalent BMPs with the approval of the University's Representative:

EC – 1 Scheduling of Activities

EC – 2 Preserving Existing Vegetation

EC – 3 Temporary Soil Stabilization: Erosion Control Blanket

b. Temporary Sediment Control (TSC)

Provide a description of temporary sediment control measures that will be used on the Project site, and identify the controls on the BMP Site Map. Temporary sediment control measures generally involve intercepting sediment laden runoff, slow the flow of stormwater, and cause suspended sediment particles to drop out of suspension to ensure contaminants do not leave the Project site and enter the waters of the United States. An example of temporary sediment control measures include stormdrain inlet protection and site perimeter controls. Do not use sand bags near the Project site perimeter or near stormdrain inlets. Install sediment control BMPs at appropriate locations along the site perimeter and at all operational inlets to the stormdrain system. All new and existing roadways, curbs, and gutters must be protected from sediment-laden runoff, are considered as perimeters of the site, and will need perimeter controls installed. Sediment control BMPs should be installed and

maintained according to specifications. Ensure that adequate erosion control, sediment control, and soil stabilization BMPs are available onsite throughout the life of the Project.

1. The Contractor is required to implement, at a minimum, at least one of the following applicable perimeter control BMPs, or equivalent BMPs with the approval of the University's Representative:

TSC – 1 Cut Back Curb (Perimeter Control)

TSC – 2 Fiber Roll (Perimeter Control)

TSC – 3 Gravel Bag Berm (Perimeter Control)

2. The Contractor is required to implement the following applicable BMPs, or equivalent BMPs with the approval of the University's Representative:

TSC – 4 Stormdrain Inlet Protection (Secondary Control)

TSC – 5 Slope BMP: Fiber Roll or Gravel Bag

c. Tracking Control (TC)

All new and existing roadways, curbs, and gutters must be protected from sediment-laden runoff, are considered as perimeters of the site, and will need to be swept and vacuumed daily to ensure sediment and pollutants from construction activities are not leaving the site and potentially entering the stormdrain system. Identify and clearly mark one or two locations where vehicles will enter and exit the construction site and focus stabilizing measures at these locations. Install and maintain a stabilized entrance at all Project site entrances and exits to prevent tracking of mud and sediment off site. Vacuum and sweep sidewalks, roadways, site entrance/exit, curb, and gutter daily. Do not use kick brooms or sweeper attachments. Dispose of sweeper waste at an approved disposal facility. If construction parking is permitted on the Project site, then the area needs to be properly maintained and free of tracking and trash.

1. The Contractor is required to implement the following applicable BMPs, or equivalent BMPs with the approval of the University's Representative:

TC – 1 Stabilized Construction Entrance: Rumble Strips

TC – 2 Sweeping and Vacuuming

d. Wind Erosion Control (WEC)

Contractor shall use best available dust suppression equipment and methods to control dust so that the dust does not cause discomfort or nuisance to occupants of the Project site neighboring property. Contractor shall control dust suppression water so that it is effective in controlling dust, but does not leave the Project site or enter the stormdrain system. Contractor shall describe their dust suppression water management methods in the Questionnaire/SWPPP

1. The Contractor is required to implement the following applicable BMP, or equivalent BMPs with the approval of the University's Representative:

WEC – 1 Dust Control

e. Non-Stormwater Management (NSM)

Non-stormwater discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Eliminate all unauthorized non-stormwater discharges to the Maximum Extent Practicable. Assign a qualified person the responsibility for ensuring that no materials other than stormwater, free of all contaminants, are discharged. Include the name, contact information, and qualifications of said person in the Questionnaire/SWPPP.

All workers on the Project site must be adequately trained on non-stormwater management procedures and be in compliance with procedures such as the following at all times:

- Washing in designated, contained areas only.
 - Eliminating discharges to the stormdrain system by infiltrating the wash water on site.
 - All washing activities must be approved by the University's Representative if there is a potential to discharge to the stormdrain system or for discharge to leave the Project site.
 - Do not wash paved areas.
 - Route water line flushing and water from water line repair to landscaped areas.
 - Avoid dewatering discharges by using water for dust control or allow to infiltrate onsite.
 - Unauthorized non-stormwater cannot be discharged without obtaining a permit from the Central Coast RWQCB.
 - Send vehicles/equipment offsite to be cleaned, fuelled, and repaired as much as possible. If it cannot be avoided, the Contractor is required to follow the practices described in NSM-3 Vehicle and Equipment Practices.
 - Inspect the site regularly for evidence of illicit connections, illegal dumping, or discharges.
 - Discharges of stormwater and non-stormwater exposed to concrete during curing and finishing may have a high pH and may contain chemicals, metals, and fines. Properly maintain all chemicals and wastes related to concrete curing and finishing as outlined in NSM-5 Concrete Curing and NSM-6 Concrete Finishing.
 - Prevent the discharge of pollutants from paving operations by following the practices described in NSM-7 Paving and Grinding Operations.
 - Minimize use of hazardous materials onsite. Store and dispose of all materials properly. Do not allow hazardous materials to come in contact with stormwater which could run off site and pollute the stormdrain system.
1. The Contractor is required to implement the following applicable BMPs, or equivalent BMPs with the approval of the University's Representative:
- NSM – 1 Water Conservation
 - NSM – 2 Dewatering Operations

- NSM – 3 Vehicle and Equipment Practices
- NSM – 4 Illicit Connection/Illegal Discharge Detection
- NSM – 5 Concrete Curing
- NSM – 6 Concrete Finishing
- NSM – 7 Paving and Grinding
- NSM – 8 Potable Water/Irrigation
- NSM – 9 Material Use

f. Waste Management (WM)

The Contractor is required to prevent the discharge of pollutants to stormwater from solid or liquid wastes that will be generated at the Project site. Dumpsters or disposal containers of sufficient size, number, complete with no holes or damage where waste could leak out, are watertight, and have proper covering will be provided and properly maintained by the Contractor. Littering on the Project site is prohibited. If necessary, the Contractor may provide and maintain trash receptacles at locations where workers congregate for lunch and breaks, as long as the trash receptacles have no holes or breaks where waste could leak out, are watertight, are properly covered, and are properly maintained. Construction debris and litter from work areas within the construction limits of the Project site shall be collected and placed in watertight dumpster at the end of every work day. Provide convenient, well-maintained, and properly located toilet facilities. All workers on the Project site must be adequately trained on proper material use, storage, and waste disposal. The Contractor is required to implement a comprehensive set of waste-management practices for hazardous or toxic materials including storage, handling, inventory, and clean-up procedures.

All workers on the Project site must be adequately trained on waster management procedures and be in compliance with procedures such as the following at all times:

- Temporary material storage should be covered, have secondary containment, and be located away from vehicular traffic, the Project perimeter, and stormdrains.
- The Contractor shall provide and properly maintain an adequate number of watertight, crack free, covered containers for all trash and waste related to the construction Project. Collect construction trash daily throughout the Project and from around the perimeter of the site.
- Store dry and wet concrete materials under cover, in secondary containment, away from drainage areas and the Project perimeter. Concrete washout is only permitted in a designated and properly maintained concrete washout bin. Concrete is not allowed to be dumped or spilled anywhere onsite except in the concrete washout bin.
- Temporary sanitary facilities should be located away from watercourses, stormdrain inlets, the Project site perimeter, and traffic circulation. If there is a risk of tipping over or being blown over, the temporary sanitary facility should be secured by stakes or ties to

prevent overturning. Wastewater should never be discharged or buried within or anywhere around the Project site.

- Locate stockpiles on a permeable surface a minimum of 50 feet away from concentrated flows of stormwater, stormdrain inlets, and the Project site perimeter. Do not place stockpiles on an impermeable surface. Completely cover all stockpiles with a tarp or some type of cover; anchor the cover to ensure the stockpile is completely covered at all times.
 - Spills of oil, petroleum products, substances listed under 40 CFR Parts 11, 117, and 302, and sanitary wastes should be contained and cleaned up immediately. Practice spill prevention procedures at all times including proper material handling and storage. Provide stockpiles of cleanup materials at key locations throughout the Project site.
1. The Contractor is required to implement the following applicable BMPs, or equivalent BMPs with the approval of the University's Representative:
 - WM – 1 Material Delivery and Storage
 - WM – 2 Trash Containment
 - WM – 3 Temporary Concrete Washout and Waste Management
 - WM – 4 Sanitary Waste Management
 - WM – 5 Stockpile Management
 - WM – 6 Spill Prevention and Control
 - WM – 7 Hazardous Waste Management
 - WM – 8 Contaminated Soil Management

B. Monitoring and Maintenance

Throughout the life of the Project and especially during the rainy season, all protective devices shall be in place at the end of each working day including those protective devices removed during the day's activities. Please note: no protective devices shall be removed during a rain event.

1. Do not move or modify stormwater quality control devices without the approval of the University's Representative.
2. All removable protective devices indicated on the Questionnaire/SWPPP shall be in place at the end of each day and especially any time rain is predicted in the Santa Barbara area.
3. After a rain event, manage and repair all stormwater quality control devices to ensure they are in good working condition. Equipment, materials, and workers must be available for rapid response to failures and emergencies. All corrective maintenance to BMPs shall be performed as soon as possible, depending upon worker safety.

C. Water Main and Sanitary Sewer Line Break Contingency Plan

If working on or near a water main line or sanitary sewer line, the Contractor shall have a written emergency response plan that states procedures for responding to a break and release of supply water or waste water to the stormdrain system. The Contractor shall meet the following requirements:

1. Water Main Work

- a. Determine the direction of water flow if the main were to break.
- b. Divert water from entering the storm drain system and contain when possible.
- c. If there is a water main break, pump the water that is collected or diverted to a sanitary sewer, based on the approval of the University Representative.
- d. Put in place, before digging, sediment control structures upstream of drain inlets and at drain inlets.
- e. If a break occurs contact the University's Representative or inspector of record immediately. Include in the Plan the phone number of the University's Representative.

2. Sanitary Sewer Line Work

- a. Determine where the sewage will flow if the work could cause a blockage.
- b. Contain any sewage spill from entering the storm drain system.
- c. If a sewage blockage occurs, pump it to a sanitary sewer, and do not allow it to flow into the stormdrain system.
- d. If a sewage blockage or spill occurs contact the University's Representative or inspector of record immediately. Include in the Plan the phone number of the University's Representative contact.

3. Excavation Work

This Paragraph applies to Contractors that excavate in the vicinity of sanitary sewer lines and cause or discover a sewage spill, leak or blockage.

- a. Immediately notify the University's Representative. Include in the Plan the phone number of the University's Representative.

D. Good Housekeeping Practices

The Contractor shall implement the following applicable good housekeeping practices:

1. Store materials that have the potential to be transported to the stormdrain system by stormwater runoff or spillage away from areas of heavy traffic and under cover in a contained area or in sealed waterproof containers.
2. Use tarps on the ground to collect fallen debris or splatters that could contribute to stormwater pollution.
3. Secure opened bags of powdered materials (if any) that could contribute to stormwater pollution and visible dust emissions.
4. Pick up litter, construction debris, and other waste generated by Project activities daily from the Project site and adjacent areas, including the sidewalk area, gutter, street pavement, and stormdrains impacted by the Project. All wastes shall be stored in watertight covered containers, disposed of, or recycled immediately.
5. Clean sidewalks, driveways, or other paved areas within and around the construction site to eliminate or prevent mud-tracking conditions. Dispose of sweepings in a place that will not pollute the stormdrain system. If wash-water is used in the interior of the site ensure it does not leave the site perimeter or enter a stormdrain inlet. The discharge of wash-water to the

stormdrain system is prohibited.

6. Inspect vehicles and equipment arriving on-site for leaking fluids, and promptly repair leaking vehicles and equipment. Use drip pans to catch leaks until repairs are made.
7. Avoid spills by handling materials carefully. Keep a stockpile of appropriate spill clean-up materials, such as rags or absorbent materials, readily accessible on site. Clean up all spills of materials brought on site for Project activities.
8. Train employees regularly on good housekeeping practices and procedures. Assign responsibility to specific employees for inspecting good housekeeping and responding to spills.

E. Post-Construction Stormwater Run-Off Control Measures

1. All permanent structural and nonstructural control measures that are planned for the Project to control pollutants in stormwater discharges after construction is completed shall be delineated on a post-construction BMP Site Map. Post-construction BMPs include, but are not limited to:
 - a. Minimization of land disturbance.
 - b. Minimization of impervious surfaces.
 - c. Treatment of stormwater run-off using infiltration.
 - d. Water detention/retention, bioswales, or rain gardens.
 - e. Bio-filter BMPs.
 - f. Efficient irrigation systems.
 - g. Ensuring that interior building drains and trash enclosures are tied to the sanitary sewer system, and not the stormdrain system.
 - h. Appropriately designed and constructed energy dissipation devices.
 - i. Ensuring that roof drains are directed to rain gardens or landscaped areas, not the stormdrain system.
 - j. Use permeable pavement and permeable surfaces where possible.
2. Post construction BMPs must be consistent with all University's and local post-construction stormwater management requirements, policies, and guidelines.
3. Contractor shall refer to construction drawings for post-construction BMPs and include them in the SWPPP and on the post-construction BMP Site Map.

F. Personnel Training

1. The Contractor shall train its employees working on the site on the requirements contained in this Section. Training should be both formal and informal, occur on an ongoing basis when it is appropriate and convenient, and should include training/workshops offered by the SWRCB, RWQCB, and other locally recognized agencies or professional organizations.
2. The Contractor shall document this training in writing. The University's Representative for the site will request to see the training materials and records at the onset of work. All training records will be included in the SWPPP.
3. The Contractor shall inform all subcontractors (if any) of the water pollution prevention requirements contained in this specification and include

appropriate subcontract provisions to ensure that these requirements are met.

3.03 Final Stabilization

- A. All disturbed areas of the construction site must be stabilized before the Project is deemed complete. Final Stabilization for the purposes of submitting a NOT is satisfied when all disturbing soil activities are completed, all construction materials and waste have been disposed of properly, the site is in compliance with all stormwater regulations, and a uniform vegetative cover with 70 percent coverage has been established.
- B. When construction is complete, the Project site has achieved Final Stabilization, all construction materials and waste have been disposed of properly, the site is in compliance with all stormwater regulations, and the Project is deemed complete by the University's Representative, submit the completed Notice of Termination (NOT) form to the University's Representative. The NOT will be signed by the University's Representative.
- C. When construction is complete, the Project site has achieved Final Stabilization, all construction materials and waste have been disposed of properly, the site is in compliance with all stormwater regulations, and the Project is deemed complete by the University's Representative, submit the completed SWPPP with all necessary documents including but not limited to inspections, annual certifications, SWPPP amendments, training certificates, schedules, qualifications, BMP Site Maps, NOI, and NOT to the University's Representative.
- D. When construction is complete, the Project site has achieved Final Stabilization, all construction materials and waste have been disposed of properly, the site is in compliance with all stormwater regulations, and the Project is deemed complete by the University's Representative, if the stormwater protections are no longer required and upon obtaining approval from the University's Representative and the University's Representative, remove the protections and restore the site or structure to the required condition.

END OF SECTION 01560

SECTION 01565HAZARDOUS MATERIAL PROCEDURESPART 1. GENERAL

1.01 HAZARDOUS MATERIALS PROCEDURES

- A. Except as otherwise specified, in the event Contractor encounters on the project site material reasonably believed to be asbestos, polychlorinated biphenyl (pcb), or other hazardous materials which have not been rendered harmless, Contractor shall immediately stop Work in the area affected and report the condition to University and University's Representative in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of University and Contractor if in fact the material is asbestos, pcb, or other hazardous materials and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos, pcb, or other hazardous materials, or when such materials have been rendered harmless.
- B. Lead-based paint. It is known that the project area contains lead-based paint on various painted components in concentrations in excess of the Consumer Product Safety Commission's (CPSC) established standard for lead in residential paint of 600 parts per million of 0.06 percent by weight. The Contractor shall take whatever necessary steps he/she deem necessary to comply with 29 Code of Federal Regulations, Part 1926.62 and Title 8, Code of California Regulations, Section 1532.1, pertaining to environmental and worker protection, and lead abatement methods and procedures.

END OF SECTION

UNIVERSITY OF CALIFORNIA
SANTA BARBARA, CALIFORNIA

JOB ORDER CONTRACT ENERGY MANAGEMENT & CONTROLS
PROJECT No. FM110462JOC

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1. GENERAL

1.01 ALL MATERIAL AND EQUIPMENT INCORPORATED IN THE WORK SHALL BE:

- A. New
- B. In condition acceptable to University's Representative.
- C. Suitable for intended use.
- D. Keep materials clean, dry, and undamaged.

1.02 TRANSPORTATION AND HANDLING

- A. Deliver manufactured products in their original unbroken containers or bundles, clearly labeled with manufacturer's name, brand, and grade seal or model number.
 - 1. Handle materials and equipment in a manner to avoid damage to products and their finishes.
 - 2. Promptly remove damaged or defective products from the project site and replace with no adjustment of contract sum.

1.03 STORAGE AND PROTECTION

- A. Store manufactured products in accordance with manufacturers' instructions and with seals and labels intact and legible.
- B. Store products subject to damage by the elements in weathertight enclosures.
- C. Maintain temperature and humidity in accordance with manufacturer's recommendations.

1.04 EXTERIOR STORAGE:

- A. Store materials and equipment above ground on blocking or skids to prevent soiling, staining, and damage.
- B. Cover products which are subject to damage by the elements with impervious protective sheet coverings. Provide adequate ventilation to prevent condensation.

- C. Store sand, rock, or aggregate material in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- D. Arrange storage to allow adequate inspection.
- E. Periodically inspect stored products to assure that products are maintained under specified conditions and are free from damage and deterioration.
- F. Protection after installation.
 - 1. Prevent damage to materials and equipment.
 - 2. Use whatever protective materials or methods are necessary to prevent damage to installed products from traffic, construction operations, and weather. Remove protection when no longer required.
 - 3. Maintain temperature and humidity conditions in interior spaces for the Work in accordance with manufacturers' instructions for the materials and equipment being protected.

1.05 UL LABEL

- A. Materials and equipment, for which Underwriter's Laboratories, Inc. standards have been established and their label service is available, shall bear the appropriate UL label.

1.06 MANUFACTURER'S TRADE MARKS AND NAMES

- A. University's Representative reserves the right to review and request the removal or redesign of manufacturer's trade marks and names on items of materials and equipment which will be exposed to view in the completed Work. Such removal or redesign shall be with no adjustment of Contract Sum.

END OF SECTION

SECTION 01620
ANCHORS AND FASTENERS

PART 1. GENERAL

1.01 SUMMARY

- A. This Section specifies requirements for anchors and fasteners, including power- or powder-activated tools, for permanent and temporary fastening of materials and products.

1.02 REFERENCES

- A. California Code of Regulations, Title 8.
- B. California Occupational Safety and Health Administration (CAL/OSHA) Requirements.
- C. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) requirements for low velocity shot pin installation.
- D. American National Standards Institute (ANSI) a10.3.

1.03 SUBMITTALS.

- A. Submit manufacturer's product data for expansion anchors, drilled-in fasteners, and powder-activated tools and fasteners.
- B. Submit load calculations and minimum spacing for each specific use to substantiate selection of each type of powder-activated fastener. Calculations shall be prepared and signed by a structural engineer currently registered in California.
- C. Submit certification indicating training of designated and certified operators using powder-activated tools.
- D. Submit ICBO evaluation reports when requested by University's Representative.

PART 2. QUALITY ASSURANCE.

2.01 OPERATORS OF POWDER-ACTIVATED TOOLS SHALL BE TRAINED AND CERTIFIED IN THE USE OF THE SPECIFIC TOOL USED.

- A. Comply with the applicable requirements of:
 - 1. California Code of Regulations, Title 8.

2. CAL/OSHA
 3. SMACNA
- B. Obtain approval from University's Representative prior to the use of powder-activated tools.
 - C. Post and continuously maintain warning signs and observe applicable safety regulations whenever powder-activated tools are in use.

PART 3. PRODUCTS.

3.01 FOR CONCRETE OR MASONRY USE

- A. use only two-piece expansion anchors or drilled-in fasteners of the types and manufacturers indicated on the drawings or as specified in the specifications.
- B. Concrete nails are not permitted.
- C. Low-velocity powder-activated fasteners (PAF) are not permitted.
- D. Seismic bracing anchorage shall be accomplished using only drilled-in anchors. PAF are not permitted for anchoring seismic bracing wires for suspended ceiling systems.

PART 4. EXECUTION.

4.01 EXAMINATION AND PREPARATION.

- A. Verify conditions prior to use of tools. Correct deficiencies before proceeding. Verify that safety procedures are in place.
- B. Prepare surfaces to receive fasteners. Clean area and remove materials or equipment that will hinder the proper use of tools.

4.02 INSTALLATION OF NON-POWDER-ACTIVATED FASTENERS.

- A. Install in strict compliance with manufacturer's recommendations and current ICBO evaluation reports where applicable.

4.03 FIELD QUALITY CONTROL.

- A. The University's testing laboratory will test drilled-in anchors as follows:
- B. One out of every ten installed hanger wire support assemblies will be tested to verify its capacity to resist two times the design load.
- C. Additional testing as required by University's Representative.

- D. Failure of the fastener, clip, or suspension may require testing of all installed assemblies.
- E. Items or assemblies that fail shall be replaced by Contractor at no cost to the University.

END OF SECTION

SECTION 01640

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1. GENERAL

1.01 GENERAL PROVISIONS REGARDING SPECIFICATION OF PRODUCTS,
MATERIAL OR EQUIPMENT BY BRAND OR TRADE NAME.

- A. Products, material or equipment specified by both brand or trade name and model number are approved for use, provided that Contractor complies with all Contract requirements. Specification of a product, material or equipment by brand or trade name and model number is not a representation or warranty that the product, material or equipment can be used without modification, to meet the requirements of the plans and specifications; Contractor shall, at its sole cost, modify such products, material, or equipment so that they comply with all requirements of the plans and specifications.
- B. The first-named product, material or equipment specified by brand or trade name and model number is the basis for the Project design and the use of any item other than the first-named one may require modifications of that design. If Contractor uses any product, material or equipment other than the first-named one, Contractor shall, at its sole cost:
 - 1. Make all revisions and modifications to the design and construction of the Work necessitated by the use the product, material or equipment.
 - 2. Be responsible for all costs of any changes resulting from the use of the product, material or equipment including without limitation, costs or changes which affect other parts of the Work, the work of Separate Contractors, or any other property or operations of the University.
- C. When a product, material or equipment specified by brand or trade name is followed by the words "or equal," a substitution may be permitted if the substitution is equal to or superior to the first-named product, material or equipment in quality, utility and appearance and if the substitution complies with all other requirements of the plans and specifications.
- D. A product, material or equipment specified by brand or trade name followed by the words "or equal, no known equal," signifies that University does not have sufficient knowledge to specify a product, material or equipment, other than the one specified by brand or trade name, that is suitable for use on the Project. The use of the words "no known equal" is not intended to discourage substitution requests in accordance with the requirements specified herein.
- E. When catalog numbers and specific brands or trade names not followed by the designation "or equal" are used in conjunction with a product, material or equipment required by the specifications, substitutions will not be allowed and the named product, material or equipment must be used.

- F. Specification of a product, material or equipment by brand or trade name and model number is not a representation or warranty that the product, material or equipment is available; Contractor should confirm, prior to submitting its Bid, the availability of any product, material or equipment specified by brand or trade name and model number.

1.02 SPECIAL REQUIREMENTS FOR PRODUCTS, MATERIAL OR EQUIPMENT, OTHER THAN THE FIRST-NAMED PRODUCT, MATERIAL OR EQUIPMENT, SPECIFIED BY BOTH BRAND OR TRADE NAME AND MODEL NUMBER.

- A. In addition to complying with all other submittal requirements of the Contract, submit within **30 days** after the date of commencement specified in the Notice to Proceed, for review and approval by the University's Representative, Contractor prepared specifications and drawings, including design and engineering calculations, prepared by an appropriate licensed professional, depicting all revisions and modifications to the design and construction of the Work necessitated by the use of the product, material or equipment. If no revisions or modifications are necessary, submit within **30 days** after the date of commencement specified in the Notice to Proceed, a written representation that no revisions or modifications to the design or construction of the Work are necessitated by the use of the product, material or equipment. Contractor shall utilize the first-named product, material or equipment if Contractor fails to make the appropriate required submittal pursuant to this paragraph within the **30-day** period.
- B. A product, material or equipment, other than the first-named product, material or equipment, specified by both brand or trade name and model number may be used if no revisions or modifications to the design or construction of the Work are necessitated by the use of the product, material or equipment. If such revisions or modifications are necessary, the product, material or equipment may be used only if the revisions or modifications are approved in writing by the University's Representative. Contractor has the burden of demonstrating, through the procedures specified herein, that any such revisions or modifications will not be detrimental to the quality, utility or appearance of the Project or any portion of the Project. The University's Representative may refuse to approve any such proposed revisions or modifications where, in the reasonable opinion of the University's Representative, Contractor has failed to demonstrate, through the procedures specified herein, that the revisions or modifications are not detrimental to the quality, utility or appearance of the Project or any portion of the Project.

1.03 SPECIAL REQUIREMENTS FOR SUBSTITUTIONS.

- A. In addition to complying with all other submittal requirements of the Contract, submit written data demonstrating that the proposed substitution is equal to or superior to the first-named product, material or equipment in quality, utility and appearance and otherwise complies with all requirements of the plans and specifications, including:
1. Complete technical data including drawings, performance specifications, samples, and test reports of the article proposed for substitution.
 2. Statement by Contractor that the proposed substitution is in full compliance with the requirements of the Contract Documents and Applicable Code Requirements.

3. List of Subcontractors, if any, that may be affected by the substitution.
 4. Contractor prepared specifications and drawings, including design and engineering calculations, prepared by an appropriately licensed professional, depicting all revisions and modifications to the design and construction of the Work necessitated by the use of the substitution. If no revisions or modifications are necessary, submit a written representation that no revisions or modifications to the design or construction of the Work are necessitated by the use of the product, material or equipment.
- B. At the request of and within the timeframes specified by the University's Representative:
1. Submit samples as deemed necessary by the University's Representative to evaluate the proposed substitution.
 2. Submit proposed substitution to tests deemed necessary by the University's Representative to evaluate the proposed substitution. Such tests shall be made by an independent Testing Laboratory and at the sole expense of Contractor, after review and approval of the test procedures by University's Representative. If re-testing is deemed necessary by the University's Representative to evaluate the proposed substitution, such re-testing shall be made by an independent Testing Laboratory at the sole expense of the Contractor.
 3. Provide any additional information deemed necessary by the University's Representative to evaluate the proposed substitution.
- C. If University's Representative, in reviewing a proposed substitution, requires revisions or corrections to be made to previously accepted shop drawings and supplemental supporting data to be resubmitted, Contractor shall do so within the time period specified by the University's Representative. A proposed substitution may be rejected if Contractor fails to submit such revisions, corrections, or supplemental supporting data within the specified time period.
- D. Except for products, material or equipment designated in the Bidding Documents for evaluation of substitutions prior to award, requests for substitution, including the data required by Paragraph 1.03 A, must be submitted to the University's Representative not later than **15 days** after the date of commencement specified in the Notice to Proceed. No requests for substitutions of products, material or equipment subject to the **15-day** deadline shall be considered unless the request and supporting data is submitted on or before the deadline, except those deemed, in University's Representative's sole opinion, to be necessary because (i) previously specified or approved manufactured products, material or equipment are no longer manufactured, (ii) of University initiated change orders, or (iii) it is in the best interest of University to accept such substitution.
- E. If a product, material or equipment is designated in the Bidding Documents for evaluation of substitutions prior to award, then a request for substitution of the product, material or equipment, including the data required by Paragraph 1.3.A, must be submitted by the deadline specified in the Bidding Documents. Because of time

constraints, only one submittal will be allowed for each such substitution request. Requests for substitutions of products, material or equipment designated for evaluation prior to award may not be made after the deadline specified in the Bidding Documents, and such requests shall not be considered unless the request and supporting data is submitted on or before the deadline specified in the Bidding Documents. Notwithstanding the forgoing, the University may consider, after award of the Contract, requests for substitution of a product, material or equipment designated for evaluation prior to award where, in University's Representative's sole opinion, a substitution is necessary because (i) previously specified or approved manufactured products, material or equipment are no longer manufactured, (ii) of University initiated change orders, or (iii) it is in the best interest of University to accept such substitution.

- F. In reviewing the supporting data submitted for substitutions, University's Representative will use, for purposes of comparison, all the characteristics of the specified material or equipment as they appear in the manufacturer's published data even though all the characteristics may not have been particularly mentioned in the Specifications. If more than 2 submissions of supporting data are required, the cost of reviewing the additional supporting data shall be at Contractor's expense.
- G. Contractor has the burden of demonstrating, through the procedures specified herein, that its proposed substitution is equal to or superior to the first-named product, material or equipment in quality, utility and appearance and complies with all other requirements of the plans and specifications. If revisions or modifications to the design or construction of the work are necessitated by the use of the substitution, Contractor also has the burden of demonstrating, through the procedures specified herein, that the use of the substitution will not be detrimental to the quality, utility or appearance of the Project or any portion of the Project.
- H. The University's Representative may refuse to approve any requested substitution where, in the reasonable opinion of the University's Representative, Contractor has failed to demonstrate, through the procedures specified herein, that the proposed substitution is equal to, or superior to, the first-named product, material or equipment, in quality, utility and appearance and that the proposed substitution complies with all other requirements of the plans and specifications.
- I. University's Representative may reject any substitution not proposed in the manner and within the time limits prescribed herein.
- J. Substitutions are not allowed unless approved in writing by the University's Representative. Any such approval shall not relieve Contractor from the requirements of the Contract Documents.
- K. The **15-day** and **30-day** submittal periods do not excuse Contractor from completing the Work within the Contract Time or excuse Contractor from paying liquidated damages if Final Completion is delayed.
- L. If revisions or modifications to the design or construction of the Work are necessitated by the use of a substitution, the substitution may be used only if the

revisions and modifications are approved in writing by the University's Representative. The University's Representative may refuse to approve any such proposed revisions or modifications where, in the reasonable opinion of the University's Representative, Contractor has failed to demonstrate, through the procedures specified herein, that the revisions or modifications are not detrimental to the quality, utility and appearance of the Project or any portion of the Project.

- M. If a substitution request is finally rejected by the University Representative, Contractor shall furnish and install:
1. the first-named product, material, or equipment; or
 2. a product, material, or equipment, other than the first-named product, material or equipment, specified by both brand or trade name and model number, provided Contractor complies with the submittal requirements (including deadlines) of specification section 01640-1.02

END OF SECTION

SECTION 01700
PROJECT CLOSE OUT

PART 1. GENERAL

1.01 PROJECT CLOSE-OUT SCHEDULE AND PROCEDURE

- A. Notify the University's Representative, three days in advance, to perform a preliminary final inspection for the purpose of determining the state of completion of the project. A "punch list" shall be prepared by the University's Representative of Work to be performed, corrected, or completed before the project will be accepted. All Work on the "punch list" shall be completed by the Contractor prior to a scheduled final inspection.
- B. Thoroughly clean the project area and site.
- C. Complete "as-built" record drawings, sign, and issue same to University's Representative.
- D. Final inspection shall be performed by the University's Representative after the Contractor has corrected all the items on the "punch list". The University's Representative shall be notified three days in advance to perform this final inspection.
- E. The Contractor, or his Superintendent authorized to act on behalf of the Contractor, shall accompany the University's Representative on the final inspection tour. Principal Subcontractors, if requested by the University's Representative, shall also be present.
- F. A new "punch list" may be prepared, if required, and the Contractor shall be required to complete this Work and then call for another final inspection.
- G. Complete the following before requesting the University's Representative's inspection for certification of substantial completion, either for the entire Work or for portions of the Work. List known exceptions in the request.
 - 1. Advise University of pending insurance change-over requirements.
 - 2. Assign guarantees, warranties, final certifications and similar documents to University.
 - 3. Obtain and submit releases enabling the University the full, unrestricted use of the Work.
 - 4. Submit record documents, maintenance manuals, and similar file record information.

END OF SECTION

SECTION 01710
CLEAN-UP & DISPOSAL

PART 1. GENERAL

1.01 CLEANING

- A. Special cleaning requirements for specific units of Work are included in the appropriate sections of Divisions 2 through 16.
- B. General cleaning during the regular progress of the Work is required by the general conditions and is included under SECTION 01700 and this Section.
- C. Employ experienced workers or professional cleaners for final cleaning.
- D. Clean each surface or unit of Work to the condition expected from a normal, commercial building cleaning and maintenance program which shall permit immediate occupancy for intended use. Comply with the manufacturer's instructions for operations.
- E. Complete the following cleaning and restoration operations before requesting University's Representative's inspection for certification of substantial completion:
 - 1. Remove labels which are not required as permanent labels.
 - 2. Clean transparent materials, including glass and fixture lenses to a polished condition. Replace chipped or broken materials.
 - 3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of dust, stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean.
 - 4. Wipe surfaces from mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
 - 5. Clean the project site of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.
 - 6. Restore staging and storage areas to condition existing prior to the Work of this Project. Restoration includes re-sodding, repair of irrigation, replacement of landscaping, and repair of paved or unpaved surfaces.
 - 7. Removal of protection: except as otherwise indicated or requested by University's Representative, remove temporary protection devices and facilities which were installed during the course of the Work to protect previously completed Work during the remainder of the construction period.

F. Compliance

1. Comply with safety standard and governing regulations for cleaning operations. Do not burn waste materials at the site. Do not bury debris or excess materials on University property. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

END OF SECTION

SECTION 01720
CONTRACTOR'S AS-BUILT DOCUMENTS

PART 1. GENERAL

1.01 AS-BUILT DOCUMENTS

- A. Maintain a record set of Contract Documents and Shop Drawings in a clean, undamaged condition. Record the following kinds of information:
1. Locations of significant Work concealed inside the building, the locations of which are changed by the Contractor from those shown on the drawings.
 2. Locations of items, not necessary concealed, which vary from the locations shown on the drawings.
 3. Changes in the project as a result of change orders, field orders, and letters of instruction during construction, with such changes annotated and cross-referenced and clouded or otherwise distinguished, and with the identification number of each change order, field order, or letter of instruction indicated.
 4. Specific requirements for record documents may also be indicated in the individual technical sections of the specifications.
- B. Before substantial completion furnish the University's Representative a copy of Record Documents, signed and dated by the Contractor. The Record Documents shall be prepared carefully and neatly in an accurate and legible manner by a competent drafter familiar with the trade involved and using methods acceptable to the University's Representative.
1. Record Drawings shall be submitted on mylar film to the University Representative in one neat, properly organized set. The mylar tracings shall be the same sheet size as the contract drawings. The contractor shall be responsible to transcribe the record drawing information to original mylar tracings, which will then be for University's permanent record. Contractor's record drawings will also be turned over to University.
 2. Submit letter to the University's Representative certifying that record drawings are accurate, comply with requirements specified and have been completed.

1.02 SHOP DRAWINGS

- A. Provide reproducible record drawings, made from final Shop Drawings that have been updated to show actual conditions for Work specified in the individual sections.

1.03 BIDDING DOCUMENTS

- A. Maintain one complete copy of the Bidding Documents, including addenda, and the following items, neatly and permanently marked to show variations in the actual Work:
- B. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed, indicating substitutions, selection of options, etc.
- C. Changes made by Addenda, Change Order, or Field Order, and Clarifications and interpretations made by the University's Representative.

1.04 RECORD PRODUCT DATA

- A. maintain one copy of each product data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.

END OF SECTION

SECTION 01740

GUARANTEES, BONDS, AND SERVICE AND MAINTENANCE CONTRACTS

PART 1. GENERAL

1.01 GUARANTEES

- A. Guarantees from Subcontractors shall not limit Contractor's warranties and guarantees to University. Whenever possible, Contractor shall cause warranties of Subcontractors to be made directly to University. If such warranties are made to Contractor, Contractor shall assign such warranties to University prior to final payment.

1.02 FORM OF GUARANTEE

- A. Submit written guarantees, in the form contained at the end of this section.

1.03 SUBMITTAL REQUIREMENTS:

- A. Assemble required guarantees, bonds, and service and maintenance contracts.
- B. Two (2) copies of each are required.
- C. Table of Contents: Neatly typed and in orderly sequence. Provide complete information for each item as follows:
 - 1. Product or Work item.
 - 2. Firm name, address, and telephone number; and name of principal.
 - 3. Scope.
 - 4. Date of beginning of guarantee, bond, or service and maintenance contract.
 - 5. Contractor's name, address, and telephone number; and name of principal.
 - 6. Provide information for University's personnel:
 - a) Proper procedure in case of failure.
 - b) Circumstances which might affect the validity of guarantee or bond.

1.04 FORM OF SUBMITTALS.

- A. Prepare in duplicate packets.

- B. Format: 8-1/2 inch x 11 inch sheets punched for 3-ring binder. Fold larger sheets to fit into binder.
 - C. Identify each packet on the cover with typed or printed title, "GUARANTEES AND BONDS" and the following:
 - 1. Title of Project.
 - 2. Name of Contractor.
 - D. Binders: Commercial quality, 3-ring, with durable and cleanable plastic covers.
- 1.05 TIME OF SUBMITTALS:
- A. Within ten (10) days after date of Beneficial Completion, prior to request for final payment.

the undersigned, collectively and separately, do hereby authorize University to undertake such correction, repair, or replacement at the expense of the undersigned; and Contractor will pay to University promptly upon demand all costs and expenses incurred by University in connection therewith.

SUBCONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor License Classification and License Number: _____

Address: _____

Telephone number: _____

CONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor License Number: _____

END OF SECTION

SECTION 02110
DEMOLITION

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A.
- B.
- C.
- D.
- E.
- F.
- G.
- H.
- I.

1.02 JOB CONDITIONS

- A. The Contractor shall accept the premises as found.
- B. Lead-based paint. It is known that the project area contains lead-based paint on various painted components in concentrations in excess of the Consumer Product Safety Commission's (CPSC) established standard for lead in residential paint of 600 parts per million of 0.06 percent by weight. The Contractor shall take whatever necessary steps he/she deem necessary to comply with 29 Code of Federal Regulations, Part 1926.62 and Title 8, Code of California Regulations, Section 1532.1, pertaining to environmental and worker protection, and lead abatement methods and procedures.
- C. Enclose, cover, or otherwise protect existing areas not scheduled to receive new Work and subject to injury by new work.
- D. Replace any existing construction, equipment, site improvements, and landscaping damaged because of operations under this Work. Finish shall match original look and texture.

- E. Do not obstruct passageways or normal use of adjacent spaces used by occupants of the buildings.

PART 2. MATERIALS

- A. After checking with the University and unless otherwise requested by the University's Representative, materials to be removed shall become the property of the Contractor.
- B. On a daily basis, remove from the site materials, rubbish, and debris promptly.

PART 3. EXECUTION

3.01 CONTRACTOR'S OPERATIONS

- A. Demolition Work that is not specifically indicated, but necessary to complete a required function, shall be performed. Cutting and patching for all phases of the Work shall be included.
- B. Demolition coordination: The Contractor shall coordinate and schedule the demolition Work with the University's Representative.
- C. Patching: Patching shall achieve security and protection where exposed to weather. Patching shall successfully duplicate undisturbed adjacent finish, texture, and profile.
- D. Disposal: The Contractor shall remove salvage and debris from the job site on a daily basis, or as it accumulates.
 - 1. All materials shall be disposed or shall be loaded directly into trucks or disposal containers for prompt removal from the site and disposal in accordance with local ordinances. Removal activities shall be limited to areas receiving new work. No "free-fall" of debris to lower areas shall be permitted.
 - 2. Material shall not be thrown or dropped from floor levels above grade. Removed material shall not be stockpiled on the roof nor interior of building. Use enclosed chutes to slide materials directly into disposal containers or vehicles.
- E. Leave premises clean and orderly ready for the new Work.
- F. Maintaining watertight integrity.

END OF SECTION

SECTION 02225
TRENCHING, BACKFILLING AND COMPACTING

PART 1. GENERAL

1.01 SECTION INCLUDES

- A. Excavating trenches for waterline construction.
- B. Trench backfill materials.
- C. Backfilling and compacting requirements.

1.02 REFERENCES

- A. Standard Specifications for Public Works Construction (Green Book).
- B. State of California Department of Transportation Standard Specifications.
- C. CAL/OSHA Construction Safety Orders Requirements.

1.03 SUBMITTALS

- A. Materials source.
- B. Sand equivalent test reports per ASTM D2419.
- C. Certificates.
- D. Drawings for shoring, bracing, sloping, or other provisions for worker protection for any excavation shall conform to the requirements of the CAL/OSHA Construction Safety Orders Requirements.

1.04 EXISTING UTILITIES

- A. Drawings show existing major underground utilities from the Campus ATLAS reference drawings. Prior to excavation, the Contractor shall notify the University's Representative to obtain any additional available information that may be applicable to the Work.
- B. Any incident of a utility being inadvertently damaged by the Contractor shall be immediately called in to Office of Physical Facilities Services for shutoff at (893-2661) and then be immediately repaired by the Contractor at no cost to the University.

-
- C. The Contractor shall pothole for all utilities prior to the installation of any Work. The Contractor shall identify and mark all existing utilities prior to trenching or boring at no cost to the University. Existing Campus ATLAS drawings are guideline drawings for existing utilities, but there are other smaller utility systems; i.e., irrigation piping and wiring, street light conduits, 120 volt conduits, gas lines and other systems that are not shown on the Campus ATLAS drawings and have to be located prior to digging. Existing irrigation systems, control wiring, conduits, etc. need to be repaired if damaged by the Contractor at no cost to the University.

PART 2. MATERIALS

2.01 APPROVALS

- A. Imported material shall be approved by the University's Representative prior to being brought to the site. Provide a sample of the material in sufficient quantity for the University's Representative use in evaluating the material in accordance with Section 01340.

2.02 TRENCH BACKFILL MATERIAL

- A. Bedding shall be sand, have a sand equivalent of 30 or greater, and conformity to the standards for Class 1 backfill.
- B. Class 1 Backfill shall be sand and have a sand equivalent of 30 or greater, and have the following gradation: 100% passing a 2" sieve; 15% to 100% passing a No. 30 sieve; 0% to 10% passing a No. 100 sieve; and 0% to 4% passing a No. 200 sieve.
- C. Class 2 Backfill shall be a native or import material and shall have a sand equivalent of 20 or greater and shall not contain rocks larger than 3" in greatest dimension. Rocks of maximum allowed size shall not total more than 30% of the Class 2 Backfill. No rocks larger than 2-1/2" will be permitted within 18" of the bottom of a building structural section.
- D. Slurry Backfill shall conform to the requirements of the State of California Department of Transportation, Standard Specifications Section 19, Earthwork, Subsection 19-3.062 Slurry Cement Backfill.

2.03 SOURCE QUALITY CONTROL

- A. Inspection and testing shall be performed under the provisions of Section 01400.

PART 3. EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.02 TRENCHING

-
- A. Before beginning any trenching five feet or more in depth, Contractor shall submit to University's Representative, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during excavation. The proposed plan shall comply with the standards established by the CAL/OSHA Construction Safety Orders. If the detailed plan varies from such shoring system standards, it shall be prepared by a registered civil or structural engineer whose name and registration number shall be indicated on the drawing. If a dispute arises as to whether the plan must be prepared by a registered civil or structural engineer, the University's Representative's determination of the matter shall be final and conclusive on Contractor. The cost of required engineering services shall be borne by the Contractor and shall be deemed to have been included in the amount bid for the Work as stated in the Agreement.
 - B. Neither the review nor approval of any plan showing the design of shoring, bracing, sloping, or other provisions for worker protection, shall relieve Contractor from its obligation to comply with CAL/OSHA Construction Safety Orders for design and construction of such protective Work. Contractor shall indemnify University and University's Representative from any and all claims, liability, costs, actions, and causes of action arising out of or related to, the failure of such protective systems. Contractor shall defend University's officers, employees, agents and University's Representative in any litigation or proceeding brought with respect to the failure of such protective systems.
 - C. All trenches are to be backfilled to finish grade within 24 hours of opening or plated at the end of each workday.
 - D. All trenches, holes, etc. are to be completely protected using solid barricades, and steel plates both during construction and during off hours, including night time.
 - E. Flashing warning light barricades are required on bike paths, sidewalks, roads, and any other critical areas that require nighttime protection.
 - F. The Contractor shall comply with additional trenching and excavation procedures in the Contract Documents.
 - G. Pursuant to Labor Code 6707, the Contractor shall include in the Base Bid, all costs incidental to the provision of adequate sheeting, shoring, bracing or equivalent method for the protection of life or limb, which shall conform to applicable Federal and State Safety Orders.
 - H. Contractor shall maintain trench continually free from water. Contractor shall be responsible for performing dewatering as requested by the University's Representative during utility trench excavation at no extra cost.
 - I. Trench under tree dripline shall be hand dug.

3.03 STOCKPILING

- A. Stockpiling of imported materials on site shall be in accordance with Section 01600 of this specification.

- B. After stockpiles are removed, leave area in a clean and neat condition.

3.04 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed under the provisions of Section 01400 of this specification.

END OF SECTION



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**University of California
Santa Barbara**

Energy Management and Controls - ADDENDUM

JOB ORDER CONTRACT
Technical Specifications

CSI DIVISIONS 01000 - 16000

February 2012

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01 General Requirements

01204 No Specification Required

15 Mechanical

15905 See Section 15910 - Instrumentation and Controls
15910 Instrumentation And Controls
15910a Enclosed Controllers
15915 General-Service Packaged Air Compressors and Receivers

16 Electrical

16101 Electrical Identification
16101a Electrical Renovation
16101b Panelboards
16102 Medium-Voltage Cables
16120 Wire And Cable
16120a Undercarpet Cables
16120b Control-Voltage Electrical Power Cables
16130 Raceways And Boxes
16130a Underfloor Raceways For Electrical Systems
16131 Common Work Results for Electrical
16131a Common Work Results for Communications
16131b Common Work Results for Electronic Safety and Security
16131c Communications Equipment Room Fittings
16131d Communications Backbone Cabling
16131e Communications Horizontal Cabling
16131f Conductors and Cables for Electronic Safety and Security
16139 Cable Trays
16140 Wiring Devices

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SECTION 01204 - NO SPECIFICATION REQUIRED

1.1 GENERAL

- A. A separate specification is not required for this item. The description given in the line item of the Construction Task Catalog completely defines the item.

1.2 PRODUCTS - (Not Used)

1.3 EXECUTION - (Not Used)

END OF SECTION 01204

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Task	Specification	Specification Description
01352	01204	No Specification Required

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Task	Specification	Specification Description
02119	01204	No Specification Required

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SECTION 15905 - SEE SECTION 15910 - INSTRUMENTATION AND CONTROLS

End of Section 15905

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SECTION 15910 - INSTRUMENTATION AND CONTROLS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for HVAC instrumentation and controls. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

C. Definitions

1. DDC: Direct digital control.
2. I/O: Input/output.
3. LonWorks: A control network technology platform for designing and implementing interoperable control devices and networks.
4. MS/TP: Master slave/token passing.
5. PC: Personal computer.
6. PID: Proportional plus integral plus derivative.
7. RTD: Resistance temperature detector.

D. System Performance

1. Comply with the following performance requirements:
 - a. Graphic Display: Display graphic with minimum 20 dynamic points with current data within 10 seconds.
 - b. Graphic Refresh: Update graphic with minimum 20 dynamic points with current data within 8 seconds.
 - c. Object Command: Reaction time of less than two seconds between operator command of a binary object and device reaction.
 - d. Object Scan: Transmit change of state and change of analog values to control units or workstation within six seconds.
 - e. Alarm Response Time: Annunciate alarm at workstation within 45 seconds. Multiple workstations must receive alarms within five seconds of each other.
 - f. Program Execution Frequency: Run capability of applications as often as five seconds, but selected consistent with mechanical process under control.
 - g. Performance: Programmable controllers shall execute DDC PID control loops, and scan and update process values and outputs at least once per second.
 - h. Reporting Accuracy and Stability of Control: Report values and maintain measured variables within tolerances as follows:
 - 1) Water Temperature: Plus or minus 1 deg F (0.5 deg C).
 - 2) Water Flow: Plus or minus 5 percent of full scale.
 - 3) Water Pressure: Plus or minus 2 percent of full scale.
 - 4) Space Temperature: Plus or minus 1 deg F (0.5 deg C).
 - 5) Ducted Air Temperature: Plus or minus 1 deg F (0.5 deg C).
 - 6) Outside Air Temperature: Plus or minus 2 deg F (1.0 deg C).
 - 7) Dew Point Temperature: Plus or minus 3 deg F (1.5 deg C).
 - 8) Temperature Differential: Plus or minus 0.25 deg F (0.15 deg C).
 - 9) Relative Humidity: Plus or minus 5 percent.
 - 10) Airflow (Pressurized Spaces): Plus or minus 3 percent of full scale.
 - 11) Airflow (Measuring Stations): Plus or minus 5 percent of full scale.
 - 12) Airflow (Terminal): Plus or minus 10 percent of full scale.
 - 13) Air Pressure (Space): Plus or minus 0.01-inch wg (2.5 Pa).
 - 14) Air Pressure (Ducts): Plus or minus 0.1-inch wg (25 Pa).

- 15) Carbon Monoxide: Plus or minus 5 percent of reading.
- 16) Carbon Dioxide: Plus or minus 50 ppm.
- 17) Electrical: Plus or minus 5 percent of reading.

E. Submittals

1. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.
 - a. DDC System Hardware: Bill of materials of equipment indicating quantity, manufacturer, and model number. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.
 - b. Control System Software: Include technical data for operating system software, operator interface, color graphics, and other third-party applications.
 - c. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.
2. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - a. Bill of materials of equipment indicating quantity, manufacturer, and model number.
 - b. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
 - c. Wiring Diagrams: Power, signal, and control wiring.
 - d. Details of control panel faces, including controls, instruments, and labeling.
 - e. Written description of sequence of operation.
 - f. Schedule of dampers including size, leakage, and flow characteristics.
 - g. Schedule of valves including flow characteristics.
 - h. DDC System Hardware:
 - 1) Wiring diagrams for control units with termination numbers.
 - 2) Schematic diagrams and floor plans for field sensors and control hardware.
 - 3) Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations.
 - i. Control System Software: List of color graphics indicating monitored systems, data (connected and calculated) point addresses, output schedule, and operator notations.
 - j. Controlled Systems:
 - 1) Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
 - 2) Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
 - 3) Written description of sequence of operation including schematic diagram.
 - 4) Points list.
3. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with ASHRAE 135.
4. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with LonWorks.
5. Software and Firmware Operational Documentation: Include the following:
 - a. Software operating and upgrade manuals.
 - b. Program Software Backup: On a magnetic media or compact disc, complete with data files.
 - c. Device address list.
 - d. Printout of software application and graphic screens.
 - e. Software license required by and installed for DDC workstations and control systems.
6. Software Upgrade Kit: For Owner to use in modifying software to suit future systems revisions or monitoring and control revisions.
7. Field quality-control test reports.
8. Operation and maintenance data.

- F. Quality Assurance
 - 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 2. Comply with ASHRAE 135 for DDC system components.

- G. Delivery, Storage, And Handling
 - 1. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.
 - 2. System Software: Update to latest version of software at Project completion.

1.2 PRODUCTS

- A. Control System
 - 1. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, and accessories to control mechanical systems.
 - 2. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multiuser, multitasking environment on token-passing network and programmed to control mechanical systems. An operator workstation permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.
 - 3. Control system shall include the following:
 - a. Building intrusion detection system specified in Division 13 Section "Intrusion Detection".
 - b. Building clock control system specified in Division 13 Section "Clock And Program Control".
 - c. Building lighting control system specified in Division 13 Section "Lighting Controls".
 - d. Fire alarm system specified in Division 13 Section(s) "Digital, Addressable Fire-alarm System" OR "Zoned (dc Loop) Fire-alarm System", **as directed**.

- B. DDC Equipment
 - 1. Operator Workstation: One **OR** Two, **as directed**, PC-based microcomputer(s) with minimum configuration as follows:
 - a. Motherboard: With 8 integrated USB 2.0 ports, integrated Intel Pro 10/100 (Ethernet), integrated audio, bios, and hardware monitoring.
 - b. Processor: Intel Pentium 4, **<Insert clock speed>** MHz.
 - c. Random-Access Memory: 512 MB.
 - d. Graphics: Video adapter, minimum 1280 x 1024 **OR** 1600 x 1200, **as directed**, pixels, 64-MB video memory, with TV out.
 - e. Monitor: 17 inches (430 mm) **OR** 19 inches (480 mm), **as directed**, LCD color.
 - f. Keyboard: QWERTY, 105 keys in ergonomic shape.
 - g. Floppy-Disk Drive: 1.44 MB.
 - h. Hard-Disk Drive: 80 GB.
 - i. CD-ROM Read/Write Drive: 48x24x48.
 - j. Mouse: Three button, optical.
 - k. Uninterruptible Power Supply: 2 kVa.
 - l. Operating System: Microsoft Windows XP Professional with high-speed Internet access.
 - 1) ASHRAE 135 Compliance: Workstation shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
 - 2) LonWorks Compliance: Control units shall use LonTalk protocol and communicate using EIA/CEA 709.1 datalink/physical layer protocol.
 - m. Printer: Black-and-white, laser-jet type as follows:
 - 1) Print Head: 1200 x 1200 dpi resolution.
 - 2) Paper Handling: Minimum of 250 sheet trays.
 - 3) Print Speed: Minimum of 120 characters per second.
 - n. Printer: Color, ink-jet type as follows:

- 1) Print Head: 4800 x 1200 dpi optimized color resolution.
- 2) Paper Handling: Minimum of 100 sheets.
- 3) Print Speed: Minimum of 17 ppm in black and 12 ppm in color.
- o. Application Software:
 - 1) I/O capability from operator station.
 - 2) System security for each operator via software password and access levels.
 - 3) Automatic system diagnostics; monitor system and report failures.
 - 4) Database creation and support.
 - 5) Automatic and manual database save and restore.
 - 6) Dynamic color graphic displays with up to 10 screen displays at once.
 - 7) Custom graphics generation and graphics library of HVAC equipment and symbols.
 - 8) Alarm processing, messages, and reactions.
 - 9) Trend logs retrievable in spreadsheets and database programs.
 - 10) Alarm and event processing.
 - 11) Object and property status and control.
 - 12) Automatic restart of field equipment on restoration of power.
 - 13) Data collection, reports, and logs. Include standard reports for the following:
 - a) Current values of all objects.
 - b) Current alarm summary.
 - c) Disabled objects.
 - d) Alarm lockout objects.
 - e) Logs.
 - 14) Custom report development.
 - 15) Utility and weather reports.
 - 16) Workstation application editors for controllers and schedules.
 - 17) Maintenance management.
- p. Custom Application Software:
 - 1) English language oriented.
 - 2) Full-screen character editor/programming environment.
 - 3) Allow development of independently executing program modules with debugging/simulation capability.
 - 4) Support conditional statements.
 - 5) Support floating-point arithmetic with mathematic functions.
 - 6) Contains predefined time variables.
2. Diagnostic Terminal Unit: Portable notebook-style, PC-based microcomputer terminal capable of accessing system data by connecting to system network with minimum configuration as follows:
 - a. System: With one integrated USB 2.0 port, integrated Intel Pro 10/100 (Ethernet), integrated audio, bios, and hardware monitoring.
 - b. Processor: Intel Pentium 4, <Insert clock speed> MHz.
 - c. Random-Access Memory: 128 MB.
 - d. Graphics: Video adapter, minimum 800 x 600 **OR** 1024 x 768, **as directed**, pixels, 64-MB video memory.
 - e. Monitor: 17 inches (430 mm) **OR** 19 inches (480 mm), **as directed**, LCD color.
 - f. Keyboard: QWERTY 105 keys in ergonomic shape.
 - g. Floppy-Disk Drive: 1.44 MB.
 - h. Hard-Disk Drive: 800 MB.
 - i. CD-ROM Read/Write Drive: 48x24x48.
 - j. Pointing Device: Touch pad or other internal device.
3. Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access and display panel; integral interface equipment; and backup power source.
 - a. Units monitor or control each I/O point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator workstation or diagnostic terminal unit.
 - b. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 - 1) Global communications.

- 2) Discrete/digital, analog, and pulse I/O.
 - 3) Monitoring, controlling, or addressing data points.
 - 4) Software applications, scheduling, and alarm processing.
 - 5) Testing and developing control algorithms without disrupting field hardware and controlled environment.
- c. Standard Application Programs:
- 1) Electric Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, night setback/setup, on-off control with differential sequencing, staggered start, antishort cycling, PID control, DDC with fine tuning, and trend logging.
 - 2) HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy switchover.
 - 3) Chiller Control Programs: Control function of condenser-water reset, chilled-water reset, and equipment sequencing.
 - 4) Programming Application Features: Include trend point; alarm processing and messaging; weekly, monthly, and annual scheduling; energy calculations; run-time totalization; and security access.
 - 5) Remote communications.
 - 6) Maintenance management.
 - 7) Units of Measure: Inch-pound and SI (metric).
- d. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
- e. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
- f. LonWorks Compliance: Control units shall use LonTalk protocol and communicate using EIA/CEA 709.1 datalink/physical layer protocol.
4. Local Control Units: Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.
- a. Units monitor or control each I/O point, process information, and download from or upload to operator workstation or diagnostic terminal unit.
 - b. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 - 1) Global communications.
 - 2) Discrete/digital, analog, and pulse I/O.
 - 3) Monitoring, controlling, or addressing data points.
 - c. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
 - d. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
 - e. LonWorks Compliance: Control units shall use LonTalk protocol and communicate using EIA/CEA 709.1 datalink/physical layer protocol.
5. I/O Interface: Hardwired inputs and outputs may tie into system through controllers. Protect points so that shorting will cause no damage to controllers.
- a. Binary Inputs: Allow monitoring of on-off signals without external power.
 - b. Pulse Accumulation Inputs: Accept up to 10 pulses per second.
 - c. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.
 - d. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation with three-position (on-off-auto) override switches and status lights, **as directed**.
 - e. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA) with status lights, two-position (auto-manual) switch, and manually adjustable potentiometer, **as directed**.
 - f. Tri-State Outputs: Provide two coordinated binary outputs for control of three-point, floating-type electronic actuators.
 - g. Universal I/Os: Provide software selectable binary or analog outputs.

15 - Mechanical

6. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:
 - a. Output ripple of 5.0 mV maximum peak to peak.
 - b. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.
 - c. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.
 7. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:
 - a. Minimum dielectric strength of 1000 V.
 - b. Maximum response time of 10 nanoseconds.
 - c. Minimum transverse-mode noise attenuation of 65 dB.
 - d. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.
- C. Unitary Controllers
1. Unitized, capable of stand-alone operation with sufficient memory to support its operating system, database, and programming requirements, and with sufficient I/O capacity for the application.
 - a. Configuration: Local keypad and display; diagnostic LEDs for power, communication, and processor; wiring termination to terminal strip or card connected with ribbon cable; memory with bios; and 72-hour battery backup.
 - b. Operating System: Manage I/O communication to allow distributed controllers to share real and virtual object information and allow central monitoring and alarms. Perform scheduling with real-time clock, **as directed**. Perform automatic system diagnostics; monitor system and report failures.
 - c. ASHRAE 135 Compliance: Communicate using read (execute and initiate) and write (execute and initiate) property services defined in ASHRAE 135. Reside on network using MS/TP datalink/physical layer protocol and have service communication port for connection to diagnostic terminal unit.
 - d. LonWorks Compliance: Communicate using EIA/CEA 709.1 datalink/physical layer protocol using LonTalk protocol.
 - e. Enclosure: Dustproof rated for operation at 32 to 120 deg F (0 to 50 deg C).
 - f. Enclosure: Waterproof rated for operation at 40 to 150 deg F (5 to 65 deg C).
- D. Alarm Panels
1. Unitized cabinet with suitable brackets for wall or floor mounting. Fabricate of 0.06-inch- (1.5-mm-) thick, furniture-quality steel or extruded-aluminum alloy, totally enclosed, with hinged doors and keyed lock and with manufacturer's standard shop-painted finish. Provide common keying for all panels, **as directed**.
 2. Indicating light for each alarm point, single horn, acknowledge switch, and test switch, mounted on hinged cover.
 - a. Alarm Condition: Indicating light flashes and horn sounds.
 - b. Acknowledge Switch: Horn is silent and indicating light is steady.
 - c. Second Alarm: Horn sounds and indicating light is steady.
 - d. Alarm Condition Cleared: System is reset and indicating light is extinguished.
 - e. Contacts in alarm panel allow remote monitoring by independent alarm company.
- E. Analog Controllers
1. Step Controllers: 6- or 10-stage type, with heavy-duty switching rated to handle loads and operated by electric motor.
 2. Electric, Outdoor-Reset Controllers: Remote-bulb or bimetal rod-and-tube type, proportioning action with adjustable throttling range, adjustable set point, scale range minus 10 to plus 70 deg F (minus 23 to plus 21 deg C), and single- or double-pole contacts.
 3. Electronic Controllers: Wheatstone-bridge-amplifier type, in steel enclosure with provision for remote-resistance readjustment. Identify adjustments on controllers, including proportional band and authority.

- a. Single controllers can be integral with control motor if provided with accessible control readjustment potentiometer.
 4. Fan-Speed Controllers: Solid-state model providing field-adjustable proportional control of motor speed from maximum to minimum of 55 percent and on-off action below minimum fan speed. Controller shall briefly apply full voltage, when motor is started, to rapidly bring motor up to minimum speed. Equip with filtered circuit to eliminate radio interference.
 5. Receiver Controllers: Single- or multiple-input models with control-point adjustment, direct or reverse acting with mechanical set-point adjustment with locking device, proportional band adjustment, authority adjustment, and proportional control mode.
 - a. Remote-control-point adjustment shall be plus or minus 20 percent of sensor span, input signal of 3 to 13 psig (21 to 90 kPa).
 - b. Proportional band shall extend from 2 to 20 percent for 5 psig (35 kPa).
 - c. Authority shall be 20 to 200 percent.
 - d. Air-supply pressure of 18 psig (124 kPa), input signal of 3 to 15 psig (21 to 103 kPa), and output signal of zero to supply pressure.
 - e. Gages: 1-1/2 inches (38 mm) **OR** 2-1/2 inches (64 mm) **OR** 3-1/2 inches (89 mm), **as directed**, in diameter, 2.5 percent wide-scale accuracy, and range to match transmitter input or output pressure.
- F. Time Clocks
1. Seven-day, programming-switch timer with synchronous-timing motor and seven-day dial; continuously charged, nickel-cadmium-battery-driven, eight-hour, power-failure carryover; multiple-switch trippers; minimum of two and maximum of eight signals per day with two normally open and two normally closed output contacts.
 2. Solid-state, programmable time control with 4 **OR** 8, **as directed**, separate programs each with up to 100 on-off operations; 1-second resolution; lithium battery backup; keyboard interface and manual override; individual on-off-auto switches for each program; 365-day calendar with 20 programmable holidays; choice of fail-safe operation for each program; system fault alarm; and communications package allowing networking of time controls and programming from PC.
- G. Electronic Sensors
1. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.
 2. Thermistor Temperature Sensors and Transmitters:
 - a. Accuracy: Plus or minus 0.5 deg F (0.3 deg C) **OR** 0.36 deg F (0.2 deg C), **as directed**, at calibration point.
 - b. Wire: Twisted, shielded-pair cable.
 - c. Insertion Elements in Ducts: Single point, 8 inches (200 mm) **OR** 18 inches (460 mm), **as directed**, long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft. (0.84 sq. m).
 - d. Averaging Elements in Ducts: 36 inches (915 mm) long, flexible **OR** 72 inches (1830 mm) long, flexible **OR** 18 inches (460 mm) long, rigid, **as directed**; use where prone to temperature stratification or where ducts are larger than 10 sq. ft. (1 sq. m).
 - e. Insertion Elements for Liquids: Brass or stainless-steel socket with minimum insertion length of 2-1/2 inches (64 mm).
 - f. Room Sensor Cover Construction: Manufacturer's standard locking covers.
 - 1) Set-Point Adjustment: Concealed **OR** Exposed, **as directed**.
 - 2) Set-Point Indication: Concealed **OR** Keyed **OR** Exposed, **as directed**.
 - 3) Thermometer: Concealed **OR** Exposed **OR** Red-reading glass **OR** Spiral bimetal, **as directed**.
 - 4) Color: As selected from manufacturer's full range.
 - 5) Orientation: Vertical **OR** Horizontal, **as directed**.
 - g. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
 - h. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.
 3. RTDs and Transmitters:
 - a. Accuracy: Plus or minus 0.2 percent at calibration point.
 - b. Wire: Twisted, shielded-pair cable.

- c. Insertion Elements in Ducts: Single point, 8 inches (200 mm) **OR** 18 inches (460 mm), **as directed**, long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft. (0.84 sq. m).
 - d. Averaging Elements in Ducts: 18 inches (460 mm) long, rigid **OR** 24 inches (610 mm) long, rigid **OR** 48 inches (1200 mm) long, rigid **OR** 24 feet (7.3 m) long, flexible, **as directed**; use where prone to temperature stratification or where ducts are larger than 9 sq. ft. (0.84 sq. m); length as required.
 - e. Insertion Elements for Liquids: Brass socket with minimum insertion length of 2-1/2 inches (64 mm).
 - f. Room Sensor Cover Construction: Manufacturer's standard locking covers.
 - 1) Set-Point Adjustment: Concealed **OR** Exposed, **as directed**.
 - 2) Set-Point Indication: Concealed **OR** Keyed **OR** Exposed, **as directed**.
 - 3) Thermometer: Concealed **OR** Exposed **OR** Red-reading glass **OR** Spiral bimetal, **as directed**.
 - 4) Color: As selected from manufacturer's full range.
 - 5) Orientation: Vertical **OR** Horizontal, **as directed**.
 - g. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
 - h. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.
4. Humidity Sensors: Bulk polymer sensor element.
- a. Accuracy: 5 **OR** 2, **as directed**, percent full range with linear output.
 - b. Room Sensor Range: 20 to 80 percent relative humidity.
 - c. Room Sensor Cover Construction: Manufacturer's standard locking covers.
 - 1) Set-Point Adjustment: Concealed **OR** Exposed, **as directed**.
 - 2) Set-Point Indication: Concealed **OR** Keyed **OR** Exposed, **as directed**.
 - 3) Thermometer: Concealed **OR** Exposed **OR** Red-reading glass **OR** Spiral bimetal, **as directed**.
 - 4) Color: As selected from manufacturer's full range.
 - 5) Orientation: Vertical **OR** Horizontal, **as directed**.
 - d. Duct Sensor: 20 to 80 percent relative humidity range with element guard and mounting plate.
 - e. Outside-Air Sensor: 20 to 80 percent relative humidity range with mounting enclosure, suitable for operation at outdoor temperatures of 32 to 120 deg F (0 to 50 deg C) **OR** minus 22 to plus 185 deg F (minus 30 to plus 85 deg C) **OR** minus 40 to plus 170 deg F (minus 40 to plus 76 deg C), **as directed**.
 - f. Duct and Sensors: With element guard and mounting plate, range of 0 to 100 percent relative humidity.
5. Pressure Transmitters/Transducers:
- a. Static-Pressure Transmitter: Nondirectional sensor with suitable range for expected input, and temperature compensated.
 - 1) Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
 - 2) Output: 4 to 20 mA.
 - 3) Building Static-Pressure Range: 0- to 0.25-inch wg (0 to 62 Pa).
 - 4) Duct Static-Pressure Range: 0- to 5-inch wg (0 to 1240 Pa).
 - b. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig (1034-kPa) operating pressure; linear output 4 to 20 mA.
 - c. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig (1034-kPa) operating pressure and tested to 300-psig (2070-kPa); linear output 4 to 20 mA.
 - d. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.
 - e. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; linear output 4 to 20 mA.
6. Room Sensor Cover Construction: Manufacturer's standard locking covers.
- a. Set-Point Adjustment: Concealed **OR** Exposed, **as directed**.
 - b. Set-Point Indication: Concealed **OR** Keyed **OR** Exposed, **as directed**.

- c. Thermometer: Concealed **OR** Exposed **OR** Red-reading glass **OR** Spiral bimetal, **as directed**.
 - d. Color: As selected from manufacturer's full range.
 - e. Orientation: Vertical **OR** Horizontal, **as directed**.
7. Room sensor accessories include the following:
- a. Insulating Bases: For sensors located on exterior walls.
 - b. Guards: Locking; heavy-duty, transparent plastic; mounted on separate base **OR** Metal wire, tamperproof **OR** Locking, solid metal, ventilated, **as directed**.
 - c. Adjusting Key: As required for calibration and cover screws.
- H. Pneumatic Sensors
- 1. Pneumatic Transmitters: Vibration and corrosion resistant.
 - a. Space-Temperature Sensors: Linear-output type, 50 to 100 deg F (10 to 38 deg C) range, with blank locking covers matching room thermostats.
 - b. Room Return-Air Temperature Sensors: Linear-output type with bimetal sensing element and corrosion-proof construction, 50 to 100 deg F (10 to 38 deg C) range, designed to be mounted in light troffers.
 - c. Duct-Mounted or Immersion-Type Temperature Sensors: Range as required for 3- to 15-psig (21- to 103-kPa) output signal.
 - d. Temperature Transmitters: Rigid-stem type with bimetal sensing elements unless averaging is required, 3- to 15-psig (21- to 103-kPa) output signal.
 - 1) Averaging-Element Sensors: Single- or multiple-unit capillary elements.
 - 2) Tamperproof Sensors: Corrosion-resistant construction, suitable for mounting on vibrating surface with exposed capillary protected with temperature-compensated armor or protective tubing.
 - 3) Pipe-Mounted Temperature-Sensing Elements: Rod-and-tube type; with separable wells filled with heat-conductive compound.
 - 4) Outdoors: Provide bulb shield with mounting bracket.
 - e. Space and Duct Humidity Transmitters: One pipe, directly proportional, with minimum sensing span of 20 to 80 percent relative humidity for 3- to 15-psig (21- to 103-kPa) output signal, corrosion resistant and temperature compensated, and with factory-calibrated adjustment.
 - 1) Space Mounting: With covers to match thermostats.
 - f. Differential-Pressure Transmitters: One pipe, direct acting for gas, liquid, or steam service; pressure sensor and transmitter of linear-output type; with range of 0 to 50 psig (0 to 344 kPa), and 3- to 15-psig (21- to 103-kPa) output signal.
 - g. Differential-Air-Pressure Transmitters: One pipe, direct acting, double bell; unidirectional with suitable range for expected input; and temperature compensated.
 - 1) Accuracy: 5 percent of full range and 2 percent of full scale at midrange.
 - 2) Output Signal: 3 to 15 psig (21 to 103 kPa).
 - 2. Digital-to-Pneumatic Transducers: Convert plus or minus 12-V dc pulse-width-modulation outputs, or continuous proportional current or voltage to 0 to 20 psig (0 to 140 kPa).
 - 3. Pneumatic Valve/Damper Position Indicator: Potentiometer mounted in enclosure with adjustable crank-arm assembly connected to damper to transmit 0 to 100 percent valve/damper travel.
- I. Status Sensors
- 1. Status Inputs for Fans: Differential-pressure switch with pilot-duty rating and with adjustable range of 0- to 5-inch wg (0 to 1240 Pa).
 - 2. Status Inputs for Pumps: Differential-pressure switch with pilot-duty rating and with adjustable pressure-differential range of 8 to 60 psig (55 to 414 kPa), piped across pump.
 - 3. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current.
 - 4. Voltage Transmitter (100- to 600-V ac): Comply with ISA 50.00.01, single-loop, self-powered transmitter, adjustable, with suitable range and 1 percent full-scale accuracy.
 - 5. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.

15 - Mechanical

6. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements.
 7. Electronic Valve/Damper Position Indicator: Visual scale indicating percent of travel and 2- to 10-V dc, feedback signal.
 8. Water-Flow Switches: Bellows-actuated mercury or snap-acting type with pilot-duty rating, stainless-steel or bronze paddle, with appropriate range and differential adjustment, in NEMA 250, Type 1 enclosure.
- J. Gas Detection Equipment
1. Carbon Monoxide Detectors: Single or multichannel, dual-level detectors using solid-state plug-in sensors with a 3-year minimum life; suitable over a temperature range of 32 to 104 deg F (0 to 40 deg C); with 2 factory-calibrated alarm levels at 50 and 100 **OR** 35 and 200, **as directed**, ppm.
 2. Carbon Dioxide Sensor and Transmitter: Single detectors using solid-state infrared sensors; suitable over a temperature range of 23 to 130 deg F (minus 5 to plus 55 deg C) and calibrated for 0 to 2 percent, with continuous or averaged reading, 4- to 20-mA output; for wall mounting.
 3. Oxygen Sensor and Transmitter: Single detectors using solid-state zircon cell sensing; suitable over a temperature range of minus 32 to plus 1100 deg F (0 to 593 deg C) and calibrated for 0 to 5 percent, with continuous or averaged reading, 4- to 20-mA output; for wall mounting.
 4. Occupancy Sensor: Passive infrared, with time delay, daylight sensor lockout, sensitivity control, and 180-degree field of view with vertical sensing adjustment; for flush mounting.
- K. Flow Measuring Stations
1. Duct Airflow Station: Combination of air straightener and multiport, self-averaging pitot tube station.
 - a. Casing: Galvanized-steel frame.
 - b. Flow Straightener: Aluminum honeycomb, 3/4-inch (20-mm) parallel cell, 3 inches (75 mm) deep.
 - c. Sensing Manifold: Copper manifold with bullet-nosed static pressure sensors positioned on equal area basis.
- L. Thermostats
1. Combination Thermostat and Fan Switches: Line-voltage thermostat with push-button or lever-operated fan switch.
 - a. Label switches "FAN ON-OFF" **OR** "FAN HIGH-LOW-OFF" **OR** "FAN HIGH-MED-LOW-OFF", **as directed**.
 - b. Mount on single electric switch box.
 2. Electric, solid-state, microcomputer-based room thermostat with remote sensor.
 - a. Automatic switching from heating to cooling.
 - b. Preferential rate control to minimize overshoot and deviation from set point.
 - c. Set up for four separate temperatures per day.
 - d. Instant override of set point for continuous or timed period from 1 hour to 31 days.
 - e. Short-cycle protection.
 - f. Programming based on weekday, Saturday, and Sunday **OR** every day of week, **as directed**.
 - g. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, remote sensor, and fan on-auto.
 - h. Battery replacement without program loss.
 - i. Thermostat display features include the following:
 - 1) Time of day.
 - 2) Actual room temperature.
 - 3) Programmed temperature.
 - 4) Programmed time.
 - 5) Duration of timed override.
 - 6) Day of week.
 - 7) System mode indications include "heating," "off," "fan auto," and "fan on."

3. Low-Voltage, On-Off Thermostats: NEMA DC 3, 24-V, bimetal-operated, mercury-switch type, with adjustable or fixed anticipation heater, concealed set-point adjustment, 55 to 85 deg F (13 to 30 deg C) set-point range, and 2 deg F (1 deg C) maximum differential.
4. Line-Voltage, On-Off Thermostats: Bimetal-actuated, open contact or bellows-actuated, enclosed, snap-switch or equivalent solid-state type, with heat anticipator; listed for electrical rating; with concealed set-point adjustment, 55 to 85 deg F (13 to 30 deg C) set-point range, and 2 deg F (1 deg C) maximum differential.
 - a. Electric Heating Thermostats: Equip with off position on dial wired to break ungrounded conductors.
 - b. Selector Switch: Integral, manual on-off-auto.
5. Remote-Bulb Thermostats: On-off or modulating type, liquid filled to compensate for changes in ambient temperature; with copper capillary and bulb, unless otherwise indicated.
 - a. Bulbs in water lines with separate wells of same material as bulb.
 - b. Bulbs in air ducts with flanges and shields.
 - c. Averaging Elements: Copper tubing with either single- or multiple-unit elements, extended to cover full width of duct or unit; adequately supported.
 - d. Scale settings and differential settings are clearly visible and adjustable from front of instrument.
 - e. On-Off Thermostat: With precision snap switches and with electrical ratings required by application.
 - f. Modulating Thermostats: Construct so complete potentiometer coil and wiper assembly is removable for inspection or replacement without disturbing calibration of instrument.
6. Fire-Protection Thermostats: Listed and labeled by an NRTL acceptable to authorities having jurisdiction; with fixed or adjustable settings to operate at not less than 75 deg F (24 deg C) above normal maximum operating temperature, and the following:
 - a. Reset: Manual.
OR
Reset: Automatic, with control circuit arranged to require manual reset at central control panel; with pilot light and reset switch on panel labeled to indicate operation.
7. Pneumatic Room Thermostats: One **OR** Two **OR** Three, **as directed**, pipe(s), fully proportional with adjustable throttling range and tamperproof locking settings, direct or reverse acting as required. Factory calibrated at 2.5 psig/deg F (17.2 kPa/deg C).
 - a. Factory Calibration: 2.5 psig/deg F (17.2 kPa/deg C).
 - b. Range: 45 to 85 deg F (7 to 30 deg C).
 - c. Sensitivity Adjustment Range: 1 to 4 psig/deg F (7 to 27.6 kPa/deg C).
 - d. Dual-Temperature Thermostats: Automatic changeover from normal setting to lower setting for unoccupied cycles, with manual-reset lever to permit return to normal temperatures during unoccupied cycles, with automatic reset to normal during next cycle of operation.
 - e. Limits: Field adjustable, to limit setting cooling set point below 75 deg F (24 deg C), and heating set point above 75 deg F (24 deg C).
 - f. Room Thermostat Cover Construction: Manufacturer's standard locking covers.
 - 1) Set-Point Adjustment: Concealed **OR** Exposed, **as directed**.
 - 2) Set-Point Indication: Concealed **OR** Keyed **OR** Exposed, **as directed**.
 - 3) Thermometer: Concealed **OR** Exposed **OR** Red-reading glass **OR** Spiral bimetal, **as directed**.
 - 4) Color: As selected from manufacturer's full range.
 - 5) Orientation: Vertical **OR** Horizontal, **as directed**.
 - g. Room thermostat accessories include the following:
 - 1) Insulating Bases: For thermostats located on exterior walls.
 - 2) Thermostat Guards: Locking; heavy-duty, transparent plastic; mounted on separate base **OR** Metal wire, tamperproof **OR** Locking, solid metal, ventilated, **as directed**.
 - 3) Adjusting Key: As required for calibration and cover screws.
 - 4) Aspirating Boxes: For flush-mounted aspirating thermostats.
 - 5) Set-Point Adjustment: 1/2-inch- (13-mm-) diameter, adjustment knob.
8. Immersion Thermostat: Remote-bulb or bimetal rod-and-tube type, proportioning action with adjustable throttling range and adjustable set point.

15 - Mechanical

9. Airstream Thermostats: Two-pipe, fully proportional, single-temperature type; with adjustable set point in middle of range, adjustable throttling range, plug-in test fitting or permanent pressure gage, remote bulb, bimetal rod and tube, or averaging element.
10. Electric, Low-Limit Duct Thermostat: Snap-acting, single-pole, single-throw, manual- or automatic-, **as directed**, reset switch that trips if temperature sensed across any 12 inches (300 mm) of bulb length is equal to or below set point.
 - a. Bulb Length: Minimum 20 feet (6 m).
 - b. Quantity: One thermostat for every 20 sq. ft. (2 sq. m) of coil surface.
11. Electric, High-Limit Duct Thermostat: Snap-acting, single-pole, single-throw, manual- or automatic-, **as directed**, reset switch that trips if temperature sensed across any 12 inches (300 mm) of bulb length is equal to or above set point.
 - a. Bulb Length: Minimum 20 feet (6 m).
 - b. Quantity: One thermostat for every 20 sq. ft. (2 sq. m) of coil surface.
12. Heating/Cooling Valve-Top Thermostats: Proportional acting for proportional flow, with molded-rubber diaphragm, remote-bulb liquid-filled element, direct and reverse acting at minimum shutoff pressure of 25 psig (172 kPa), and cast housing with position indicator and adjusting knob.

M. Humidistats

1. Pneumatic Room Humidistats: Wall-mounting, proportioning type with adjustable throttling range, 20 to 90 **OR** 55 to 95 **OR** 25 to 65, **as directed**, percent operating range, and cover matching room thermostat cover.
2. Duct-Mounting Humidistats: Electric insertion, 2-position type with adjustable, 2 percent throttling range, 20 to 80 percent operating range, and single- or double-pole contacts.
3. Pneumatic Duct-Mounting Humidistats: Proportioning type with adjustable throttling range, 20 to 90 **OR** 55 to 95 **OR** 25 to 65, **as directed**, percent operating range, in galvanized-steel duct box.

N. Actuators

1. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.
 - a. Comply with requirements in Division 15 Section "Common Motor Requirements For Hvac Equipment".
 - b. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.
 - c. Nonspring-Return Motors for Valves Larger Than NPS 2-1/2 (DN 65): Size for running torque of 150 in. x lbf (16.9 N x m) and breakaway torque of 300 in. x lbf (33.9 N x m).
 - d. Spring-Return Motors for Valves Larger Than NPS 2-1/2 (DN 65): Size for running and breakaway torque of 150 in. x lbf (16.9 N x m).
 - e. Nonspring-Return Motors for Dampers Larger Than 25 Sq. Ft. (2.3 sq. m): Size for running torque of 150 in. x lbf (16.9 N x m) and breakaway torque of 300 in. x lbf (33.9 N x m).
 - f. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft. (2.3 sq. m): Size for running and breakaway torque of 150 in. x lbf (16.9 N x m).
2. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque.
 - a. Valves: Size for torque required for valve close off at maximum pump differential pressure.
 - b. Dampers: Size for running torque calculated as follows:
 - 1) Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. (86.8 kg-cm/sq. m) of damper.
 - 2) Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. (62 kg-cm/sq. m) of damper.
 - 3) Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft. (49.6 kg-cm/sq. m) of damper.
 - 4) Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. (37.2 kg-cm/sq. m) of damper.
 - 5) Dampers with 2- to 3-Inch wg (500 to 750 Pa) of Pressure Drop or Face Velocities of 1000 to 2500 fpm (5 to 13 m/s): Increase running torque by 1.5.

- 6) Dampers with 3- to 4-Inch wg (750 to 1000 Pa) of Pressure Drop or Face Velocities of 2500 to 3000 fpm (13 to 15 m/s): Increase running torque by 2.0.
 - c. Coupling: V-bolt and V-shaped, toothed cradle.
 - d. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
 - e. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on nonspring-return actuators.
 - f. Power Requirements (Two-Position Spring Return): 24 **OR** 120 **OR** 230, **as directed**, -V ac.
 - g. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.
 - h. Proportional Signal: 2- to 10-V dc or 4 to 20 mA, and 2- to 10-V dc position feedback signal.
 - i. Temperature Rating: Minus 22 to plus 122 deg F (Minus 30 to plus 50 deg C) **OR** 40 to 104 deg F (5 to 40 deg C), **as directed**.
 - j. Temperature Rating (Smoke Dampers): Minus 22 to plus 250 deg F (Minus 30 to plus 121 deg C).
 - k. Run Time: 12 seconds open, 5 seconds closed **OR** 30 seconds **OR** 60 seconds **OR** 120 seconds, **as directed**.
3. Pneumatic Valve Operators: Rolling-diaphragm, spring-loaded, piston type with spring range as required and start-point adjustment and positioning relay, **as directed**. Operator shall maintain full shutoff at maximum pump differential pressure.
 4. Pneumatic Damper Operators: Rolling-diaphragm, piston type with adjustable stops and spring return, sized to operate with sufficient reserve power to provide smooth modulating action or two-position action. Where actuators operate in sequence, provide pilot positioners.
 - a. Pilot Positioners: With the following characteristics:
 - 1) Start Point: Adjustable from 2 to 12 psig (14 to 83 kPa).
 - 2) Operating Span: Adjustable from 5 to 13 psig (35 to 90 kPa).
 - 3) Linearity: Plus or minus 10 percent of output signal span.
 - 4) Hysteresis: 3 percent of span.
 - 5) Response: 0.25-psig (1723-Pa) input change.
 - 6) Maximum Pilot Signal Pressure: 20 psig (140 kPa).
 - 7) Maximum Control Air-Supply Pressure: 60 psig (410 kPa).
 - b. Actuator Housing: Molded or die-cast zinc or aluminum. Terminal unit actuators may be high-impact plastic with ambient temperature rating of 50 to 140 deg F (10 to 60 deg C) unless located in return-air plenums, **as directed**.
 - c. Inlet-Vane Operators: High pressure, with pilot positioners.
- O. Control Valves
1. Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated.
 2. Hydronic system globe valves shall have the following characteristics:
 - a. NPS 2 (DN 50) and Smaller: Class 125 **OR** 250, **as directed**, bronze body, bronze trim, rising stem, renewable composition disc, and screwed ends with backseating capacity repackageable under pressure.
 - b. NPS 2-1/2 (DN 65) and Larger: Class 125 iron body, bronze trim, rising stem, plug-type disc, flanged ends, and renewable seat and disc.
 - c. Internal Construction: Replaceable plugs and stainless-steel or brass seats.
 - 1) Single-Seated Valves: Cage trim provides seating and guiding surfaces for plug on top and bottom.
 - 2) Double-Seated Valves: Balanced plug; cage trim provides seating and guiding surfaces for plugs on top and bottom.
 - d. Sizing: 3-psig (21-kPa) **OR** 5-psig (35-kPa), **as directed**, maximum pressure drop at design flow rate or the following:
 - 1) Two Position: Line size.
 - 2) Two-Way Modulating: Either the value specified above or twice the load pressure drop, whichever is more.
 - 3) Three-Way Modulating: Twice the load pressure drop, but not more than value specified above.

- e. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.
 - f. Close-Off (Differential) Pressure Rating: Combination of actuator and trim shall provide minimum close-off pressure rating of 150 percent of total system (pump) head for two-way valves and 100 percent of pressure differential across valve or 100 percent of total system (pump) head.
3. Steam system globe valves shall have the following characteristics:
- a. NPS 2 (DN 50) and Smaller: Class 125 bronze body, bronze trim, rising stem, renewable composition disc, and screwed ends with backseating capacity repackable under pressure.
 - b. NPS 2-1/2 (DN 65) and Larger: Class 125 iron body, bronze trim, rising stem, plug-type disc, flanged ends, and renewable seat and disc.
 - c. Internal Construction: Replaceable plugs and stainless-steel seats.
 - 1) Single-Seated Valves: Cage trim provides seating and guiding surfaces for plug on top and bottom of guided plugs.
 - 2) Double-Seated Valves: Balanced plug; cage trim provides seating and guiding surfaces for plugs on top and bottom of guided plugs.
 - d. Sizing: For pressure drop based on the following services:
 - 1) Two Position: 20 percent of inlet pressure.
 - 2) Modulating 15-psig (103-kPa) Steam: 80 percent of inlet steam pressure.
 - 3) Modulating 16- to 50-psig (110- to 350-kPa) Steam: 50 percent of inlet steam pressure.
 - 4) Modulating More Than 50-psig (350-kPa) Steam: As indicated.
 - e. Flow Characteristics: Modified linear characteristics.
 - f. Close-Off (Differential) Pressure Rating: Combination of actuator and trim shall provide minimum close-off pressure rating of 150 percent of operating (inlet) pressure.
4. Butterfly Valves: 200-psig (1380-kPa), 150-psig (1034-kPa) maximum pressure differential, ASTM A 126 cast-iron or ASTM A 536 ductile-iron body and bonnet, extended neck, stainless-steel stem, field-replaceable EPDM or Buna N sleeve and stem seals.
- a. Body Style: Wafer **OR** Lug **OR** Grooved, **as directed**.
 - b. Disc Type: Nickel-plated ductile iron **OR** Aluminum bronze **OR** Elastomer-coated ductile iron **OR** Epoxy-coated ductile iron, **as directed**.
 - c. Sizing: 1-psig (7-kPa) maximum pressure drop at design flow rate.
5. Terminal Unit Control Valves: Bronze body, bronze trim, two or three ports as indicated, replaceable plugs and seats, and union and threaded ends.
- a. Rating: Class 125 for service at 125 psig (860 kPa) and 250 deg F (121 deg C) operating conditions.
 - b. Sizing: 3-psig (21-kPa) maximum pressure drop at design flow rate, to close against pump shutoff head.
 - c. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.
6. Self-Contained Control Valves: Bronze body, bronze trim, two or three ports as indicated, replaceable plugs and seats, and union and threaded ends.
- a. Rating: Class 125 for service at 125 psig (860 kPa) and 250 deg F (121 deg C) operating conditions.
 - b. Thermostatic Operator: Wax **OR** Liquid, **as directed**,-filled integral **OR** remote, **as directed**, sensor with integral **OR** remote, **as directed**, adjustable dial.

P. Dampers

- 1. Dampers: AMCA-rated, parallel **OR** opposed, **as directed**,-blade design; 0.108-inch- (2.8-mm-) minimum thick, galvanized-steel or 0.125-inch- (3.2-mm-) minimum thick, extruded-aluminum frames with holes for duct mounting; damper blades shall not be less than 0.064-inch- (1.6-mm-) thick galvanized steel with maximum blade width of 8 inches (200 mm) and length of 48 inches (1220 mm).
 - a. Secure blades to 1/2-inch- (13-mm-) diameter, zinc-plated axles using zinc-plated hardware, with oil-impregnated sintered bronze **OR** nylon, **as directed**, blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.

- b. Operating Temperature Range: From minus 40 to plus 200 deg F (minus 40 to plus 93 deg C).
- c. Edge Seals, Standard Pressure Applications: Closed-cell neoprene.
OR
Edge Seals, Low-Leakage Applications: Use inflatable blade edging or replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft. (50 L/s per sq. m) of damper area, at differential pressure of 4-inch wg (1000 Pa) when damper is held by torque of 50 in. x lbf (5.6 N x m); when tested according to AMCA 500D.

Q. Air Supply

1. Control and Instrumentation Tubing: Copper tubing complying with ASTM B 88, Type K (ASTM B 88M, Type A) or ASTM B 280 Type ACR.
 - a. Fittings: Cast-bronze solder fittings complying with ASME B16.18; or wrought-copper solder fittings complying with ASME B16.22, except forged-brass compression-type fittings at connections to equipment.
 - b. Joining Method: Soldered or brazed.

OR

Control and Instrumentation Tubing: ASTM D 2737 Type FR plenum-rated polyethylene, flame-retardant, nonmetallic tubing rated for 30 psig (207 kPa) and ambient temperature range of 10 to 150 deg F (minus 13 to plus 65 deg C) with flame-retardant harness for multiple tubing.
 - c. Fittings: Compression or push-on polyethylene fittings.
2. Tank: ASME storage tank with drain test cock, automatic moisture removal trap, tank relief valve, and rubber-cork vibration isolation mounting pads.
 3. Duplex Air Compressor: Capacity to supply compressed air to temperature-control system.
 - a. Pressure control with adjustable electric contacts, set to start and stop both compressors at different pressures.
 - b. Electrical alternation set with motor starters and disconnect to operate compressors alternately or on time schedule.
 4. Simplex Air Compressor: Tank-mounting compressor with capacity to supply compressed air to temperature-control system, with starter and disconnect.
 - a. Pressure control with adjustable electric contacts, set to start and stop compressor.
 5. Compressor Type: Reciprocating **OR** Scroll, **as directed**.
 6. Size compressor and tank to operate compressor not more than 20 **OR** 30, **as directed**, minutes during a 60-minute period.
 7. Compressor Accessories: Low-resistance intake-air filter, and belt guards.
 8. System Accessories: Air filter rated for 97 percent efficiency at rated airflow, and combination filter/pressure-reducing station or separate filter and pressure-reducing station.
 9. Refrigerated Air Dryer: Self-contained, refrigerated air dryer complete with heat exchangers, moisture separator, internal wiring and piping, and with manual bypass valve.
 - a. Heat Exchangers: Air-to-refrigerant coils with centrifugal-type moisture separator and automatic trap assembly.
 - b. Refrigeration Unit: Hermetically sealed, operating to maintain dew point of 13 deg F (minus 11 deg C) at 20 psig (140 kPa), housed in steel cabinet with access door and panel.
 - c. Accessories: Air-inlet temperature gage, air-inlet pressure gage, on-off switch, high-temperature light, power-on light, refrigerant gage on back, air-outlet temperature gage, air-outlet pressure gage, and with contacts for remote indication of power status and high-temperature alarm.
 10. Desiccant Dryer: Obtains dew point in pneumatic air piping between compressor and tank at least 15 deg F (minus 9 deg C) below inlet-air dew point at design conditions.
 11. Pressure Gages: Black letters on white background, 2-1/2 inches (64 mm) in diameter, flush or surface mounting, with front calibration screw to match sensor, and having a graduated scale in psig (kPa).
 12. Instrument Pressure Gages: Black letters on white background, 1-1/2 inches (38 mm) in diameter, stem mounted, with suitable dial range.
 13. Diaphragm Control and Instrument Valves: 1/4-inch (6-mm) forged-brass body with reinforced polytetrafluoroethylene diaphragm, stainless-steel spring, and color-coded phenolic handle.

15 - Mechanical

14. Gage Cocks: Tee or level handle, bronze, rated for 125 psig (860 kPa).
15. Relays: For summing, reversing, and amplifying highest or lowest pressure selection; with adjustable I/O ratio.
16. Switches: With indicating plates and accessible adjustment; calibrated and marked.
17. Pressure Regulators: Zinc or aluminum castings with elastomeric diaphragm, balanced construction to automatically prevent pressure buildup, and producing flat reduced-pressure curve.
18. Particle Filters: Zinc or aluminum castings with 97 percent filtration efficiency at rated airflow, quick-disconnect service devices, and aluminum or plastic bowl with metal guard and manual drain cock.
19. Combination Filter/Regulators: Zinc or aluminum castings with elastomeric diaphragm, balanced construction to automatically prevent pressure buildup, and producing flat reduced-pressure curve; with threaded pipe connections, quick-disconnect service devices, and aluminum or plastic bowl with metal guard and manual drain cock.
20. Airborne Oil Filter: Filtration efficiency of 99.9 percent for airborne lubricating oil particles of 0.025 micron or larger.
21. Pressure Relief Valves: ASME rated and labeled.
 - a. High Pressure: Size for installed capacity.
 - b. Low Pressure: Size for installed capacity of pressure regulators and set at 20 percent above low pressure.
22. Pressure-Reducing Stations: Two parallel pressure regulators.

R. Control Cable

1. Electronic and fiber-optic cables for control wiring are specified in Division 16 Section "Communications Horizontal Cabling".

1.3 EXECUTION

A. Installation

1. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.
2. Connect and configure equipment and software to achieve sequence of operation specified.
3. Mount compressor and tank unit on elastomeric mounts **OR** spring isolators with 1-inch (25 mm) static deflection **OR** restrained spring isolators with 1-inch (25-mm) static deflection, **as directed**. Vibration isolators are specified in Division 15 Section "Vibration And Seismic Controls For Hvac Piping And Equipment". Isolate air supply with wire-braid-reinforced rubber hose. Secure and anchor according to manufacturer's written instructions and seismic-control requirements.
 - a. Pipe manual and automatic drains to nearest floor drain.
 - b. Supply instrument air from compressor units through filter, pressure-reducing valve, and pressure relief valve, with pressure gages and shutoff and bypass valves.
4. Verify location of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches (1220 mm) **OR** 60 inches (1530 mm), **as directed**, above the floor.
 - a. Install averaging elements in ducts and plenums in crossing or zigzag pattern.
5. Install guards on thermostats in the following locations:
 - a. Entrances.
 - b. Public areas.
 - c. Where indicated.
6. Install automatic dampers according to Division 15 Section "Duct Accessories".
7. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.
8. Install labels and nameplates to identify control components according to Division 15 Section "Identification For Hvac Piping And Equipment".
9. Install hydronic instrument wells, valves, and other accessories according to Division 15 Section "Hydronic Piping".

10. Install steam and condensate instrument wells, valves, and other accessories according to Division 15 Section "Steam And Condensate Piping".
11. Install refrigerant instrument wells, valves, and other accessories according to Division 15 Section "Refrigerant Piping".
12. Install duct volume-control dampers according to Division 15 specifying air ducts.
13. Install electronic and fiber-optic cables according to Division 16 Section "Communications Horizontal Cabling".

B. Pneumatic Piping Installation

1. Install piping in mechanical equipment rooms inside mechanical equipment enclosures, in pipe chases, or suspended ceilings with easy access.
 - a. Install copper tubing with maximum unsupported length of 36 inches (915 mm), for tubing exposed to view.
 - b. Install polyethylene tubing in metallic raceways or electrical metallic tubing. Electrical metallic tubing materials and installation requirements are specified in Division 16 Section "Underfloor Raceways For Electrical Systems".
2. Install terminal single-line connections, less than 18 inches (460 mm) in length, with copper or polyethylene tubing run inside flexible steel protection.
3. In concealed locations such as pipe chases and suspended ceilings with easy access, install copper **OR** polyethylene bundled and sheathed **OR** polyethylene tubing in electrical metallic, **as directed**, tubing. Electrical metallic tubing materials and installation requirements are specified in Division 16 Section "Raceways And Boxes".
4. In concrete slabs, furred walls, or ceilings with no access, install copper or polyethylene tubing in electrical metallic tubing or vinyl-jacketed polyethylene tubing.
 - a. Protect embedded-copper and vinyl-jacketed polyethylene tubing with electrical metallic tubing extending 6 inches (150 mm) above finished slab and 6 inches (150 mm) into slab. Pressure test tubing before and after pour for leak and pinch.
 - b. Install polyethylene tubing in electrical metallic tubing extending 6 inches (150 mm) above floor line; pull tubing into electrical metallic tubing after pour.
5. Install tubing with sufficient slack and flexible connections to allow for vibration of piping and equipment.
6. Purge tubing with dry, oil-free compressed air before connecting control instruments.
 - a. Bridge cabinets and doors with flexible connections fastened along hinge side; protect against abrasion. Tie and support tubing.
7. Number-code or color-code control air piping for future identification and service of control system, except local individual room control tubing.
8. Pressure Gages or Test Plugs: Install on branch lines at each receiver controller and on signal lines at each transmitter, except individual room controllers.

C. Electrical Wiring And Connection Installation

1. Install raceways, boxes, and cabinets according to Division 16 Section "Raceways And Boxes".
2. Install building wire and cable according to Division 16 Section "Conductors And Cables".
3. Install signal and communication cable according to Division 16 Section "Communications Horizontal Cabling".
 - a. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
 - b. Install exposed cable in raceway.
 - c. Install concealed cable in raceway.
 - d. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
 - e. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
 - f. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.
 - g. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.
4. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.

5. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

D. Field Quality Control

1. Perform the following field tests and inspections and prepare test reports:
 - a. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
 - b. Test and adjust controls and safeties.
 - c. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - d. Pressure test control air piping at 30 psig (207 kPa) or 1.5 times the operating pressure for 24 hours, with maximum 5-psig (35-kPa) loss.
 - e. Pressure test high-pressure control air piping at 150 psig (1034 kPa) and low-pressure control air piping at 30 psig (207 kPa) for 2 hours, with maximum 1-psig (7-kPa) loss.
 - f. Test calibration of pneumatic **OR** electronic, **as directed**, controllers by disconnecting input sensors and stimulating operation with compatible signal generator.
 - g. Test each point through its full operating range to verify that safety and operating control set points are as required.
 - h. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
 - i. Test each system for compliance with sequence of operation.
 - j. Test software and hardware interlocks.
2. DDC Verification:
 - a. Verify that instruments are installed before calibration, testing, and loop or leak checks.
 - b. Check instruments for proper location and accessibility.
 - c. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
 - d. Check instrument tubing for proper fittings, slope, material, and support.
 - e. Check installation of air supply for each instrument.
 - f. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
 - g. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.
 - h. Check temperature instruments and material and length of sensing elements.
 - i. Check control valves. Verify that they are in correct direction.
 - j. Check air-operated dampers. Verify that pressure gages are provided and that proper blade alignment, either parallel or opposed, has been provided.
 - k. Check DDC system as follows:
 - 1) Verify that DDC controller power supply is from emergency power supply, if applicable.
 - 2) Verify that wires at control panels are tagged with their service designation and approved tagging system.
 - 3) Verify that spare I/O capacity has been provided.
 - 4) Verify that DDC controllers are protected from power supply surges.
3. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

E. Adjusting

1. Calibrating and Adjusting:
 - a. Calibrate instruments.
 - b. Make three-point calibration test for both linearity and accuracy for each analog instrument.
 - c. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
 - d. Control System Inputs and Outputs:
 - 1) Check analog inputs at 0, 50, and 100 percent of span.
 - 2) Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
 - 3) Check digital inputs using jumper wire.

- 4) Check digital outputs using ohmmeter to test for contact making or breaking.
 - 5) Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.
- e. Flow:
- 1) Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
 - 2) Manually operate flow switches to verify that they make or break contact.
- f. Pressure:
- 1) Calibrate pressure transmitters at 0, 50, and 100 percent of span.
 - 2) Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.
- g. Temperature:
- 1) Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
 - 2) Calibrate temperature switches to make or break contacts.
- h. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
- i. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
- j. Provide diagnostic and test instruments for calibration and adjustment of system.
- k. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.
2. Adjust initial temperature and humidity set points.
 3. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to Project during other than normal occupancy hours for this purpose.
- F. Demonstration
1. Train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls.

END OF SECTION 15910

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SECTION 15910a - ENCLOSED CONTROLLERS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for enclosed controllers. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section includes the following enclosed controllers rated 600 V and less:
 - a. Full-voltage manual.
 - b. Full-voltage magnetic.
 - c. Reduced-voltage magnetic.
 - d. Reduced-voltage solid state.
 - e. Multispeed.

C. Definitions

1. CPT: Control power transformer.
2. MCCB: Molded-case circuit breaker.
3. MCP: Motor circuit protector.
4. N.C.: Normally closed.
5. N.O.: Normally open.
6. OCPD: Overcurrent protective device.
7. SCR: Silicon-controlled rectifier.

D. Performance Requirements

1. Seismic Performance: Enclosed controllers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

E. Submittals

1. Product Data: For each type of enclosed controller. Include manufacturer's technical data on features, performance, electrical characteristics, ratings, and enclosure types and finishes.
2. Shop Drawings: For each enclosed controller. Include dimensioned plans, elevations, sections, details, and required clearances and service spaces around controller enclosures.
 - a. Show tabulations of the following:
 - 1) Each installed unit's type and details.
 - 2) Factory-installed devices.
 - 3) Nameplate legends.
 - 4) Short-circuit current rating of integrated unit.
 - 5) Listed and labeled for integrated short-circuit current (withstand) rating of OCPDs in combination controllers by an NRTL acceptable to authorities having jurisdiction.
 - 6) Features, characteristics, ratings, and factory settings of individual OCPDs in combination controllers.
 - b. Wiring Diagrams: For power, signal, and control wiring.
3. Qualification Data: For qualified testing agency.
4. Seismic Qualification Certificates: For enclosed controllers, accessories, and components, from manufacturer.
 - a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

15 - Mechanical

- b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 5. Field quality-control reports.
 6. Operation and Maintenance Data: For enclosed controllers to include in emergency, operation, and maintenance manuals. Include the following:
 - a. Routine maintenance requirements for enclosed controllers and installed components.
 - b. Manufacturer's written instructions for testing and adjusting circuit breaker and MCP trip settings.
 - c. Manufacturer's written instructions for setting field-adjustable overload relays.
 - d. Manufacturer's written instructions for testing, adjusting, and reprogramming reduced-voltage solid-state controllers.
 7. Load-Current and Overload-Relay Heater List: Compile after motors have been installed, and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.
 8. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed, and arrange to demonstrate that switch settings for motor running overload protection suit actual motors to be protected.
- F. Quality Assurance
1. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - a. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
 2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 3. Comply with NFPA 70.
 4. IEEE Compliance: Fabricate and test enclosed controllers according to IEEE 344 to withstand seismic forces defined in Division 16 Section "Vibration And Seismic Controls For Electrical Systems".
- G. Delivery, Storage, And Handling
1. Store enclosed controllers indoors in clean, dry space with uniform temperature to prevent condensation. Protect enclosed controllers from exposure to dirt, fumes, water, corrosive substances, and physical damage.
 2. If stored in areas subject to weather, cover enclosed controllers to protect them from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside controllers; install temporary electric heating, with at least 250 W per controller **OR** connect factory-installed space heaters to temporary electrical service, **as directed**.
- H. Project Conditions
1. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
 - b. Altitude: Not exceeding 6600 feet (2010 m).
 2. Interruption of Existing Electrical Systems: Do not interrupt electrical systems in facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - a. Notify Owner no fewer than two days in advance of proposed interruption of electrical systems.
 - b. Indicate method of providing temporary utilities.
 - c. Do not proceed with interruption of electrical systems without Owner's written permission.
 - d. Comply with NFPA 70E.
- I. Coordination

1. Coordinate layout and installation of enclosed controllers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
2. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.
3. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

1.2 PRODUCTS

A. Full-Voltage Controllers

1. General Requirements for Full-Voltage Controllers: Comply with NEMA ICS 2, general purpose, Class A.
2. Motor-Starting Switches: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off or on.
 - a. Configuration: Nonreversing **OR** Reversing **OR** Two speed, **as directed**.
 - b. Flush **OR** Surface, **as directed**, mounting.
 - c. Red **OR** Green, **as directed**, pilot light.
 - d. Additional Nameplates: FORWARD and REVERSE for reversing switches **OR** HIGH and LOW for two-speed switches, **as directed**.
3. Fractional Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
 - a. Configuration: Nonreversing **OR** Two speed, **as directed**.
 - b. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button; bimetallic type **OR** melting alloy type, **as directed**.
 - c. Flush **OR** Surface, **as directed**, mounting.
 - d. Red **OR** Green, **as directed**, pilot light.
 - e. Additional Nameplates: HIGH and LOW for two-speed controllers.
4. Integral Horsepower Manual Controllers: "Quick-make, quick-break" toggle or push-button action; marked to show whether unit is off, on, or tripped.
 - a. Configuration: Nonreversing **OR** Reversing **OR** Two speed, **as directed**.
 - b. Overload Relays: Inverse-time-current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters and sensors in each phase, matched to nameplate full-load current of actual protected motor and having appropriate adjustment for duty cycle; external reset push button; bimetallic type **OR** melting alloy type, **as directed**.
 - c. Flush **OR** Surface, **as directed**, mounting.
 - d. Red **OR** Green, **as directed**, pilot light.
 - e. Additional Nameplates: FORWARD and REVERSE for reversing controllers **OR** HIGH and LOW for two-speed controllers, **as directed**.
 - f. N.O. **OR** N.C., **as directed**, auxiliary contact.
5. Magnetic Controllers: Full voltage, across the line, electrically held.
 - a. Configuration: Nonreversing **OR** Reversing, **as directed**.
 - b. Contactor Coils: Pressure-encapsulated type with coil transient suppressors, **as directed**.
 - 1) Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.
 - c. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
 - d. Control Circuits: 24 **OR** 120, **as directed**, -V ac; obtained from integral CPT, with primary and secondary fuses, **as directed**, with CPT **OR** control power source, **as directed**, of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
 - 1) CPT Spare Capacity: 50 **OR** 100 **OR** 200, **as directed**, VA.
 - e. Melting Alloy Overload Relays:
 - 1) Inverse-time-current characteristic.
 - 2) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.

- 3) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
- f. Bimetallic Overload Relays:
 - 1) Inverse-time-current characteristic.
 - 2) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.
 - 3) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - 4) Ambient compensated.
 - 5) Automatic resetting.
- g. Solid-State Overload Relay:
 - 1) Switch or dial selectable for motor running overload protection.
 - 2) Sensors in each phase.
 - 3) Class 10 **OR** Class 20 **OR** Class 10/20 selectable, **as directed**, tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
 - 4) Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
 - 5) Analog communication module.
- h. N.C. **OR** N.O., **as directed**, isolated overload alarm contact.
- i. External overload reset push button.
6. Combination Magnetic Controller: Factory-assembled combination of magnetic controller, OCPD, and disconnecting means.
 - a. Fusible Disconnecting Means:
 - 1) NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class J **OR** Class R **OR** indicated, **as directed**, fuses.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 - b. Nonfusible Disconnecting Means:
 - 1) NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 - c. MCP Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents, instantaneous-only circuit breaker with front-mounted, field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary contacts "a" and "b" arranged to activate with MCP handle.
 - 4) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCP has tripped.
 - 5) Current-limiting module to increase controller short-circuit current (withstand) rating to 100 kA.
 - d. MCCB Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents; thermal-magnetic MCCB, with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
 - 2) Front-mounted, adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 3) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 4) Auxiliary contacts "a" and "b" arranged to activate with MCCB handle.
 - 5) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCCB has tripped.

B. Reduced-Voltage Magnetic Controllers

1. General Requirements for Reduced-Voltage Magnetic Controllers: Comply with NEMA ICS 2, general purpose, Class A; closed-transition; adjustable time delay on transition.
2. Reduced-Voltage Magnetic Controllers: Reduced voltage, electrically held.
 - a. Configuration:
 - 1) Wye-Delta Controller: Four contactors, with a three-phase starting resistor/reactor bank.
 - 2) Part-Winding Controller: Separate START and RUN contactors, field-selectable for 1/2- or 2/3-winding start mode, with either six- or nine-lead motors; with separate overload relays for starting and running sequences.
 - 3) Autotransformer Reduced-Voltage Controller: Medium-duty service, with integral overtemperature protection; taps for starting at 50, 65, and 80 percent of line voltage; two START and one RUN contactors.
 - b. Contactor Coils: Pressure-encapsulated type with coil transient suppressors, **as directed**.
 - 1) Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.
 - c. Power Contacts: Totally enclosed, double-break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
 - d. Control Circuits: 24 **OR** 120, **as directed**, -V ac; obtained from integral CPT, with primary and secondary fuses, **as directed**, with CPT **OR** control power source, **as directed**, of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
 - 1) CPT Spare Capacity: 50 **OR** 100 **OR** 200, **as directed**, VA.
 - e. Melting Alloy Overload Relays:
 - 1) Inverse-time-current characteristic.
 - 2) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.
 - 3) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - f. Bimetallic Overload Relays:
 - 1) Inverse-time-current characteristic.
 - 2) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.
 - 3) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - 4) Ambient compensated.
 - 5) Automatic resetting.
 - g. Solid-State Overload Relay:
 - 1) Switch or dial selectable for motor running overload protection.
 - 2) Sensors in each phase.
 - 3) Class 10 **OR** Class 20 **OR** Class 10/20 selectable, **as directed**, tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
 - 4) Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
 - 5) Analog communication module.
 - h. N.C. **OR** N.O., **as directed**, isolated overload alarm contact.
 - i. External overload reset push button.
3. Combination Reduced-Voltage Magnetic Controller: Factory-assembled combination of reduced-voltage magnetic controller, OCPD, and disconnecting means.
 - a. Fusible Disconnecting Means:
 - 1) NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class J **OR** Class R **OR** indicated, **as directed**, fuses.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 - b. Nonfusible Disconnecting Means:
 - 1) NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.

- c. MCP Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents, instantaneous-only circuit breaker with front-mounted, field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary contacts "a" and "b" arranged to activate with MCP handle.
 - 4) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCP has tripped.
 - 5) Current-limiting module to increase controller short-circuit current (withstand) rating to 100 kA.
 - d. MCCB Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents; thermal-magnetic MCCB, with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
 - 2) Front-mounted, adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 3) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 4) Auxiliary contacts "a" and "b" arranged to activate with MCCB handle.
 - 5) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCCB has tripped.
- C. Reduced-Voltage Solid-State Controllers
- 1. General Requirements for Reduced-Voltage Solid-State Controllers: Comply with UL 508.
 - 2. Reduced-Voltage Solid-State Controllers: An integrated unit with power SCRs, heat sink, microprocessor logic board, door-mounted digital display and keypad, bypass contactor, and overload relay; suitable for use with NEMA MG 1, Design B, polyphase, medium induction motors.
 - a. Configuration: Standard duty **OR** Severe duty, **as directed**; nonreversible **OR** reversible, **as directed**.
 - b. Starting Mode: Voltage ramping **OR** Current limit **OR** Torque control **OR** Torque control with voltage boost, **as directed**; field selectable, **as directed**.
 - c. Stopping Mode: Coast to stop **OR** Adjustable torque deceleration **OR** Adjustable braking, **as directed**; field selectable, **as directed**.
 - d. Shorting (Bypass) Contactor: Operates automatically when full voltage is applied to motor, and bypasses the SCRs. Solid-state controller protective features shall remain active when the shorting contactor is in the bypass mode.
 - e. Shorting and Input Isolation, **as directed**, Contactor Coils: Pressure-encapsulated type; manufacturer's standard operating voltage, matching control power or line voltage, depending on contactor size and line-voltage rating. Provide coil transient suppressors, **as directed**.
 - f. Logic Board: Identical for all ampere ratings and voltage classes, with environmental protective coating.
 - g. Control Circuits: 24 **OR** 120, **as directed**, -V ac; obtained from integral CPT, with primary and secondary fuses, **as directed**, with CPT **OR** control power source, **as directed**, of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
 - 1) CPT Spare Capacity: 100 **OR** 200, **as directed**, VA.
 - h. Adjustable acceleration-rate control using voltage or current ramp, and adjustable starting torque control with up to 400 percent current limitation for 20 seconds.
 - i. SCR bridge shall consist of at least two SCRs per phase, providing stable and smooth acceleration with **OR** without, **as directed**, external feedback from the motor or driven equipment.
 - j. Keypad, front accessible; for programming the controller parameters, functions, and features; shall be manufacturer's standard and include not less than the following functions:
 - 1) Adjusting motor full-load amperes, as a percentage of the controller's rating.

- 2) Adjusting current limitation on starting, as a percentage of the motor full-load current rating.
 - 3) Adjusting linear acceleration and deceleration ramps, in seconds.
 - 4) Initial torque, as a percentage of the nominal motor torque.
 - 5) Adjusting torque limit, as a percentage of the nominal motor torque.
 - 6) Adjusting maximum start time, in seconds.
 - 7) Adjusting voltage boost, as a percentage of the nominal supply voltage.
 - 8) Selecting stopping mode, and adjusting parameters.
 - 9) Selecting motor thermal overload protection class between 5 and 30.
 - 10) Activating and de-activating protection modes.
 - 11) Selecting or activating communication modes.
- k. Digital display, front accessible; for showing motor, controller, and fault status; shall be manufacturer's standard and include not less than the following:
- 1) Controller Condition: Ready, starting, running, stopping.
 - 2) Motor Condition: Amperes, voltage, power factor, power, and thermal state.
 - 3) Fault Conditions: Controller thermal fault, motor overload alarm and trip, motor underload, overcurrent, shorted SCRs, line or phase loss, phase reversal, and line frequency over or under normal.
- l. Controller Diagnostics and Protection:
- 1) Microprocessor-based thermal protection system for monitoring SCR and motor thermal characteristics, and providing controller overtemperature and motor-overload alarm and trip; settings selectable via the keypad.
 - 2) Protection from line-side reverse phasing; line-side and motor-side phase loss; motor jam, stall, and underload conditions; and line frequency over or under normal.
 - 3) Input isolation contactor that opens when the controller diagnostics detect a faulted solid-state component or when the motor is stopped.
- OR**
- Shunt trip that opens the disconnecting means when the controller diagnostics detect a faulted solid-state component.
- m. Remote Output Features:
- 1) All outputs prewired to terminal blocks.
 - 2) Form C status contacts that change state when controller is running.
 - 3) Form C alarm contacts that change state when a fault condition occurs.
- n. Optional Features:
- 1) Analog output for field-selectable assignment of motor operating characteristics; 0 to 10-V dc **OR** 4 to 20-mA dc, **as directed**.
 - 2) Additional field-assignable Form C contacts, as indicated, for alarm outputs.
 - 3) Surge suppressors in solid-state power circuits providing three-phase protection against damage from supply voltage surges 10 percent or more above nominal line voltage.
 - 4) Full-voltage bypass contactor operating automatically **OR** manually, with NORMAL/BYPASS selector switch, **as directed**. Power contacts shall be totally enclosed, double break, and silver-cadmium oxide; and assembled to allow inspection and replacement without disturbing line or load wiring.
 - 5) Melting Alloy Overload Relays:
 - a) Inverse-time-current characteristic.
 - b) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.
 - c) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - 6) Bimetallic Overload Relays:
 - a) Inverse-time-current characteristic.
 - b) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.
 - c) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - d) Ambient compensated.
 - e) Automatic resetting.
 - 7) Solid-State Overload Relay:
 - a) Switch or dial selectable for motor running overload protection.

- b) Sensors in each phase.
 - c) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
 - d) Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
 - e) Analog communication module.
 - 8) N.C. **OR** N.O., **as directed**, isolated overload alarm contact.
 - 9) External overload reset push button.
3. Combination Reduced-Voltage Solid-State Controller: Factory-assembled combination of reduced-voltage solid-state controller, OCPD, and disconnecting means.
- a. Fusible Disconnecting Means:
 - 1) NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class J **OR** Class L **OR** indicated, **as directed**, fuses.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 - b. MCP Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents, instantaneous-only circuit breaker with front-mounted, field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary contacts "a" and "b" arranged to activate with MCP handle.
 - 4) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCP has tripped.
 - 5) Current-limiting module to increase controller short-circuit current (withstand) rating to 100 kA.
 - c. MCCB Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents; thermal-magnetic MCCB, with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
 - 2) Front-mounted, adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 3) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 4) Auxiliary contacts "a" and "b" arranged to activate with MCCB handle.
 - 5) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCCB has tripped.
 - d. Molded-Case Switch Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with in-line fuse block for Class J or L power fuses (depending on ampere rating), providing an interrupting capacity to comply with available fault currents; MCCB with fixed, high-set instantaneous trip only.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary contacts "a" and "b" arranged to activate with molded-case switch handle.
 - 4) N.C. **OR** N.O., **as directed**, alarm contact that operates only when molded-case switch has tripped.
- D. Multispeed Magnetic Controllers
- 1. General Requirements for Multispeed Magnetic Controllers: Comply with NEMA ICS 2, general purpose, Class A.
 - 2. Multispeed Magnetic Controllers: Two speed, full voltage, across the line, electrically held.
 - a. Configuration: Nonreversing **OR** Reversing, **as directed**; consequent pole **OR** two winding, **as directed**.
 - b. Contactor Coils: Pressure-encapsulated type with coil transient suppressors, **as directed**.
 - 1) Operating Voltage: Depending on contactor NEMA size and line-voltage rating, manufacturer's standard matching control power or line voltage.

- c. Power Contacts: Totally enclosed, double break, silver-cadmium oxide; assembled to allow inspection and replacement without disturbing line or load wiring.
 - d. Control Circuits: 24 **OR** 120, **as directed**, -V ac; obtained from integral CPT, with primary and secondary fuses, **as directed**, with CPT **OR** control power source, **as directed**, of sufficient capacity to operate integral devices and remotely located pilot, indicating, and control devices.
 - 1) CPT Spare Capacity: 50 **OR** 100 **OR** 200, **as directed**, VA.
 - e. Compelling relays shall ensure that motor will start only at low speed.
 - f. Accelerating timer relays shall ensure properly timed acceleration through speeds lower than that selected.
 - g. Decelerating timer relays shall ensure automatically timed deceleration through each speed.
 - h. Antiplugging timer relays shall ensure a time delay when transferring from FORWARD to REVERSE and back.
 - i. Melting Alloy Overload Relays:
 - 1) Inverse-time-current characteristic.
 - 2) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.
 - 3) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - j. Bimetallic Overload Relays:
 - 1) Inverse-time-current characteristic.
 - 2) Class 10 **OR** Class 20 **OR** Class 30, **as directed**, tripping characteristic.
 - 3) Heaters in each phase matched to nameplate full-load current of actual protected motor and with appropriate adjustment for duty cycle.
 - 4) Ambient compensated.
 - 5) Automatic resetting.
 - k. Solid-State Overload Relay:
 - 1) Switch or dial selectable for motor running overload protection.
 - 2) Sensors in each phase.
 - 3) Class 10 **OR** Class 20 **OR** Class 10/20 selectable, **as directed**, tripping characteristic selected to protect motor against voltage and current unbalance and single phasing.
 - 4) Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.
 - 5) Analog communication module.
 - l. N.C. **OR** N.O., **as directed**, isolated overload alarm contact.
 - m. External overload reset push button.
3. Combination Multispeed Magnetic Controller: Factory-assembled combination of reduced-voltage magnetic controller, OCPD, and disconnecting means.
- a. Fusible Disconnecting Means:
 - 1) NEMA KS 1, heavy-duty, horsepower-rated, fusible switch with clips or bolt pads to accommodate Class J **OR** Class R **OR** indicated, **as directed**, fuses.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 - b. Nonfusible Disconnecting Means:
 - 1) NEMA KS 1, heavy-duty, horsepower-rated, nonfusible switch.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary Contacts: N.O./N.C., arranged to activate before switch blades open.
 - c. MCP Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents, instantaneous-only circuit breaker with front-mounted, field-adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
 - 2) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 3) Auxiliary contacts "a" and "b" arranged to activate with MCP handle.
 - 4) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCP has tripped.

- 5) Current-limiting module to increase controller short-circuit current (withstand) rating to 100 kA.
- d. MCCB Disconnecting Means:
 - 1) UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents; thermal-magnetic MCCB, with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.
 - 2) Front-mounted, adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 3) Lockable Handle: Accepts three padlocks and interlocks with cover in closed position.
 - 4) Auxiliary contacts "a" and "b" arranged to activate with MCCB handle.
 - 5) N.C. **OR** N.O., **as directed**, alarm contact that operates only when MCCB has tripped.

E. Enclosures

1. Enclosed Controllers: NEMA ICS 6, to comply with environmental conditions at installed location.
 - a. Dry and Clean Indoor Locations: Type 1.
 - b. Outdoor Locations: Type 3R **OR** Type 4X, **as directed**.
 - c. Kitchen **OR** Wash-Down, **as directed**, Areas: Type 4X, stainless steel.
 - d. Other Wet or Damp Indoor Locations: Type 4.
 - e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: Type 12.
 - f. Hazardous Areas Indicated on Drawings: Type 7 **OR** Type 9, **as directed**.

F. Accessories

1. General Requirements for Control Circuit and Pilot Devices: NEMA ICS 5; factory installed in controller enclosure cover unless otherwise indicated.
 - a. Push Buttons, Pilot Lights, and Selector Switches: Heavy **OR** Standard, **as directed**, -duty, oiltight, **as directed**, type.
 - 1) Push Buttons: Covered **OR** Lockable **OR** Recessed **OR** Shielded **OR** Shrouded **OR** Unguarded, **as directed**, types; maintained **OR** momentary, **as directed**, as indicated.
 - 2) Pilot Lights: Incandescent **OR** LED **OR** Neon **OR** Resistor **OR** Transformer, **as directed**, types; colors as indicated; push to test, **as directed**.
 - 3) Selector Switches: Rotary type.
 - b. Elapsed Time Meters: Heavy duty with digital readout in hours; nonresettable **OR** resettable, **as directed**.
 - c. Meters: Panel type, 2-1/2-inch (64-mm) minimum size with 90- or 120-degree scale and plus or minus two percent accuracy. Where indicated, provide selector switches with an off position.
2. N.C. **OR** N.O. **OR** Reversible N.C./N.O., **as directed**, auxiliary contact(s).
3. Control Relays: Auxiliary and adjustable pneumatic **OR** solid-state, **as directed**, time-delay relays.
4. Phase-Failure, Phase-Reversal, and Undervoltage and Overvoltage Relays: Solid-state sensing circuit with isolated output contacts for hard-wired connections. Provide adjustable undervoltage, overvoltage, and time-delay settings.
5. Breather and drain assemblies, to maintain interior pressure and release condensation in Type 4 **OR** Type 4X **OR** Type 7 **OR** Type 9, **as directed**, enclosures installed outdoors or in unconditioned interior spaces subject to humidity and temperature swings.
6. Space heaters, with N.C. auxiliary contacts, to mitigate condensation in Type 3R **OR** Type 4X **OR** Type 12, **as directed**, enclosures installed outdoors or in unconditioned interior spaces subject to humidity and temperature swings.
7. Sun shields installed on fronts, sides, and tops of enclosures installed outdoors and subject to direct and extended sun exposure.
8. Cover gaskets for Type 1 enclosures.
9. Terminals for connecting power factor correction capacitors to the line **OR** load, **as directed**, side of overload relays.

10. Spare control wiring terminal blocks, quantity as indicated; unwired **OR** wired, **as directed**.

1.3 EXECUTION

A. Examination

1. Examine areas and surfaces to receive enclosed controllers, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
2. Examine enclosed controllers before installation. Reject enclosed controllers that are wet, moisture damaged, or mold damaged.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Installation

1. Wall-Mounted Controllers: Install enclosed controllers on walls with tops at uniform height unless otherwise indicated, and by bolting units to wall or mounting on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks complying with Division 16 Section "Hangers And Supports For Electrical Systems".
2. Floor-Mounted Controllers: Install enclosed controllers on 4-inch (100-mm) nominal-thickness concrete base. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-place Concrete".
 - a. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - b. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - c. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - d. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Seismic Bracing: Comply with requirements specified in Division 16 Section "Vibration And Seismic Controls For Electrical Systems".
4. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
5. Install fuses in each fusible-switch enclosed controller.
6. Install fuses in control circuits if not factory installed. Comply with requirements in Division 16 Section "Fuses".
7. Install heaters in thermal overload relays. Select heaters based on actual nameplate full-load amperes after motors have been installed.
8. Install, connect, and fuse thermal-protector monitoring relays furnished with motor-driven equipment.
9. Install power factor correction capacitors. Connect to the line **OR** load, **as directed**, side of overload relays. If connected to the load side of overload relays, adjust overload heater sizes to accommodate the reduced motor full-load currents.
10. Comply with NECA 1.

C. Identification

1. Identify enclosed controllers, components, and control wiring. Comply with requirements for identification specified in Division 16 Section "Electrical Identification".
 - a. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - b. Label each enclosure with engraved nameplate.
 - c. Label each enclosure-mounted control and pilot device.

D. Control Wiring Installation

1. Install wiring between enclosed controllers and remote devices and facility's central control system, **as directed**. Comply with requirements in Division 16 Section "Control-voltage Electrical Power Cables".
2. Bundle, train, and support wiring in enclosures.
3. Connect selector switches and other automatic-control selection devices where applicable.

15 - Mechanical

- a. Connect selector switches to bypass only those manual- and automatic-control devices that have no safety functions when switch is in manual-control position.
- b. Connect selector switches with enclosed-controller circuit in both manual and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

E. Field Quality Control

1. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
2. Perform tests and inspections.
3. Acceptance Testing Preparation:
 - a. Test insulation resistance for each enclosed controller, component, connecting supply, feeder, and control circuit.
 - b. Test continuity of each circuit.
4. Tests and Inspections:
 - a. Inspect controllers, wiring, components, connections, and equipment installation. Test and adjust controllers, components, and equipment, **as directed**.
 - b. Test insulation resistance for each enclosed-controller element, component, connecting motor supply, feeder, and control circuits.
 - c. Test continuity of each circuit.
 - d. Verify that voltages at controller locations are within plus or minus 10 percent of motor nameplate rated voltages. If outside this range for any motor, notify Owner before starting the motor(s).
 - e. Test each motor for proper phase rotation.
 - f. Perform each electrical test and visual and mechanical inspection stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - g. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - h. Perform the following infrared (thermographic) scan tests and inspections and prepare reports:
 - 1) Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each multi-pole enclosed controller. Remove front panels so joints and connections are accessible to portable scanner.
 - 2) Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each multi-pole enclosed controller 11 months after date of Substantial Completion.
 - 3) Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - i. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
5. Enclosed controllers will be considered defective if they do not pass tests and inspections.
6. Prepare test and inspection reports including a certified report that identifies enclosed controllers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

F. Adjusting

1. Set field-adjustable switches, auxiliary relays, time-delay relays, timers, and overload-relay pickup and trip ranges.
2. Adjust overload-relay heaters or settings if power factor correction capacitors are connected to the load side of the overload relays.
3. Adjust the trip settings of MCPs and thermal-magnetic circuit breakers with adjustable instantaneous trip elements. Initially adjust to six times the motor nameplate full-load ampere ratings and attempt to start motors several times, allowing for motor cooldown between starts. If tripping occurs on motor inrush, adjust settings in increments until motors start without tripping. Do not exceed eight times the motor full-load amperes (or 11 times for NEMA Premium Efficient motors if required). Where these maximum settings do not allow starting of a motor, notify Owner before increasing settings.

4. Set the taps on reduced-voltage autotransformer controllers at 50 **OR** 65 **OR** 80, **as directed**, percent.
 5. Set field-adjustable switches and program microprocessors for required start and stop sequences in reduced-voltage solid-state controllers.
 6. Set field-adjustable circuit-breaker trip ranges as specified in Division 16 Section "Overcurrent Protective Device Coordination", **as directed**.
- G. Protection
1. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions until enclosed controllers are ready to be energized and placed into service.
 2. Replace controllers whose interiors have been exposed to water or other liquids prior to Substantial Completion.
- H. Demonstration
1. Train Owner's maintenance personnel to adjust, operate, and maintain enclosed controllers, and to use and reprogram microprocessor-based, reduced-voltage solid-state controllers, **as directed**.

END OF SECTION 15910a

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SECTION 15915 - GENERAL-SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for general-service packaged air compressors and receivers. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Lubricated, reciprocating air compressors.
 - b. Oil-free, reciprocating air compressors.
 - c. Oilless, reciprocating air compressors.
 - d. Oil-free, rotary-screw air compressors.
 - e. Oil-flooded, rotary-screw air compressors.
 - f. Oil-free, rotary, sliding-vane air compressors.
 - g. Oil-sealed, rotary, sliding-vane air compressors.
 - h. Inlet-air filters.
 - i. Air-cooled, compressed-air aftercoolers.
 - j. Water-cooled, compressed-air aftercoolers.
 - k. Refrigerant compressed-air dryers.
 - l. Desiccant compressed-air dryers.
 - m. Computer interface cabinet.

C. Definitions

1. Actual Air: Air delivered from air compressors. Flow rate is delivered compressed air measured in acfm (actual L/s).
2. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
3. Standard Air: Free air at 68 deg F (20 deg C) and 1 atmosphere (29.92 in. Hg) before compression or expansion and measured in scfm (standard L/s).

D. Performance Requirements

1. Delegated Design: Design compressed-air equipment mounting, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Seismic Performance: Compressed-air equipment shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

E. Submittals

1. Product Data: For each type of product indicated.
 - a. Wiring Diagrams: For power, signal, and control wiring.
2. Delegated-Design Submittal: For compressed-air equipment mounting indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - a. Detail fabrication and assembly of supports.
 - b. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Seismic Qualification Certificates: For compressed-air equipment, accessories, and components, from manufacturers.

15 - Mechanical

4. Operation and Maintenance Data.

F. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. ASME Compliance: Fabricate and label receivers to comply with ASME Boiler and Pressure Vessel Code.

1.2 PRODUCTS

A. General Requirements For Packaged Air Compressors And Receivers

1. General Description: Factory-assembled, -wired, -piped, and -tested; electric-motor-driven; air-cooled; continuous-duty air compressors and receivers that deliver air of quality equal to intake air.
2. Control Panels: Automatic control station with load control and protection functions. Comply with NEMA ICS 2 and UL 508.
 - a. Enclosure: NEMA ICS 6, Type 12 control panel unless otherwise indicated.
 - b. Motor Controllers: Full-voltage, combination magnetic type with undervoltage release feature and motor-circuit-protector-type disconnecting means and short-circuit protective device.
 - c. Control Voltage: 120-V ac or less, using integral control power transformer.
 - d. Motor Overload Protection: Overload relay in each phase.
 - e. Starting Devices: Hand-off-automatic selector switch in cover of control panel, plus pilot device for automatic control.
 - f. Automatic control switches to alternate lead-lag compressors for duplex **OR** sequence lead-lag compressors for multiplex, **as directed**, air compressors.
 - g. Instrumentation: Include discharge-air pressure gage, air-filter maintenance indicator, hour meter, compressor discharge-air and coolant temperature gages, and control transformer.
 - h. Alarm Signal Device: For connection to alarm system to indicate when backup air compressor is operating.
3. Receivers: Steel tank constructed according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
 - a. Pressure Rating: At least as high as highest discharge pressure of connected compressors, and bearing appropriate code symbols.
 - b. Interior Finish: Corrosion-resistant coating.
 - c. Accessories: Include safety valve, pressure gage, drain, and pressure-reducing valve.
4. Mounting Frame: Fabricate mounting and attachment to pressure vessel with reinforcement strong enough to resist packaged equipment movement during a seismic event when base is anchored to building structure.

B. Lubricated, Reciprocating Air Compressors

1. Compressor(s): Lubricated, reciprocating-piston type with lubricated compression chamber and crankcase.
 - a. Submerged gear-type oil pump.
 - b. Oil filter.
 - c. Combined high discharge-air temperature and low lubrication-oil pressure switch.
 - d. Belt guard totally enclosing pulleys and belts.

C. Oil-Free, Reciprocating Air Compressors

1. Compressor(s): Oil-free, reciprocating-piston type with nonlubricated compression chamber, lubricated crankcase, and of construction that prohibits oil from entering compression chamber.
 - a. Submerged gear-type oil pump.
 - b. Oil filter.
 - c. Combined high discharge-air temperature and low lubrication-oil pressure switch.

- d. Belt guard totally enclosing pulleys and belts.
- D. Oilless, Reciprocating Air Compressors
- 1. Compressor(s): Oilless (nonlubricated), reciprocating-piston type, with sealed oil-free bearings, that will deliver air of quality equal to intake air.
 - a. High discharge-air temperature switch.
 - b. Belt guard totally enclosing pulleys and belts.
- E. Oil-Free, Rotary-Screw Air Compressors
- 1. Compressor(s): Oil-free, rotary-screw type with nonlubricated helical screws and lubricated gear box, and of construction that prohibits oil from entering compression chamber.
 - a. Coupling: Nonlubricated, flexible type.
 - b. Cooling/Lubrication System: Unit-mounted, air-cooled exchanger package prepiped to unit; with air pressure circulation system with coolant stop valve, full-flow coolant filter, and thermal bypass valve.
 - c. Air Filter: Dry type, with maintenance indicator and cleanable replaceable filter element.
 - d. Air/Coolant Receiver and Separation System: 150-psig- (1035-kPa-) rated steel tank with ASME safety valve, coolant-level gage, multistage air-coolant separator element, minimum pressure valve, blowdown valve, discharge check valve, coolant stop valve, full-flow coolant filter, and thermal bypass valve.
 - e. Capacity Control: Capacity modulation between zero and 100 percent air delivery, with operating pressures between 50 and 100 psig (345 and 690 kPa). Include necessary control to hold constant pressure. When air demand is zero, unload compressor by using pressure switch and blowdown valve.
- F. Oil-Flooded, Rotary-Screw Air Compressors
- 1. Compressor(s): Oil-flooded, rotary-screw type with lubricated helical screws and lubricated gear box.
 - a. Coupling: Nonlubricated, flexible type.
 - b. Cooling/Lubrication System: Unit-mounted, air-cooled exchanger package prepiped to unit; with air pressure circulation system with coolant stop valve, full-flow coolant filter, and thermal bypass valve.
 - c. Air Filter: Dry type, with maintenance indicator and cleanable replaceable filter element.
 - d. Air/Coolant Receiver and Separation System: 150-psig- (1035-kPa-) rated steel tank with ASME safety valve, coolant-level gage, multistage air-coolant separator element, minimum pressure valve, blowdown valve, discharge check valve, coolant stop valve, full-flow coolant filter, and thermal bypass valve.
 - e. Capacity Control: Capacity modulation between zero and 100 percent air delivery, with operating pressures between 50 and 100 psig (345 and 690 kPa). Include necessary control to hold constant pressure. When air demand is zero, unload compressor by using pressure switch and blowdown valve.
- G. Oil-Free, Rotary, Sliding-Vane Air Compressors
- 1. Compressor(s): Oil-free, nonpulsating, rotary, sliding-vane type with nonlubricated sliding vanes.
 - a. Cleanable inlet screens.
 - b. Outlet silencers on discharge connections.
- H. Oil-Sealed, Rotary, Sliding-Vane Air Compressors
- 1. Compressor(s): Nonpulsating, rotary, sliding-vane type with oil-sealed sliding vanes.
 - a. Cleanable inlet screens.
 - b. Outlet silencers and oil-mist separators on discharge connections.
- I. Inlet-Air Filters
- 1. Description: Combination inlet-air filter-silencer, suitable for remote installation, for each air compressor.
 - a. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.

15 - Mechanical

- b. Capacity: Match capacity of air compressor, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.
 - 2. Description: Combination inlet-air filter-silencer, suitable for remote installation, for multiple air compressors.
 - a. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.
 - b. Capacity: Match total capacity of connected air compressors, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.

- J. Air-Cooled, Compressed-Air Aftercoolers
 - 1. Description: Electric-motor-driven, fan-operation, finned-tube unit; rated at 250 psig (1725 kPa) and leak tested at 350-psig (2415-kPa) minimum air pressure; in capacities indicated. Size units to cool compressed air in compressor-rated capacities to 10 deg F (6 deg C) above summertime maximum ambient temperature. Include moisture separator and automatic drain.

- K. Water-Cooled, Compressed-Air Aftercoolers
 - 1. Description: Shell and tube unit, rated at 250 psig (1725 kPa) and leak tested at 350-psig (2415-kPa) minimum air pressure, in capacities indicated. Include moisture separator and automatic drain.

- L. Refrigerant Compressed-Air Dryers
 - 1. Description: Noncycling, air-cooled, electric-motor-driven unit with steel enclosure and capability to deliver 35 deg F (2 deg C), 100-psig (690-kPa) air at dew point. Include automatic ejection of condensate from airstream, step-down transformers, disconnect switches, inlet and outlet pressure gages, thermometers, automatic controls, and filters.

- M. Desiccant Compressed-Air Dryers
 - 1. Description: Twin-tower unit with purge system, mufflers, and capability to deliver plus 10 deg F (minus 12 deg C), 100-psig (690-kPa) air at dew point. Include dew point controlled purge, step-down transformers, disconnect switches, inlet and outlet pressure gages, thermometers, automatic controls, and filters.

- N. Computer Interface Cabinet
 - 1. Description:
 - a. Wall mounting.
 - b. Welded steel with white enamel finish.
 - c. Gasketed door.
 - d. Grounding device.
 - e. Factory-installed, signal circuit boards.
 - f. Power transformer.
 - g. Circuit breaker.
 - h. Wiring terminal board.
 - i. Internal wiring capable of interfacing 20 alarm signals.

- O. Motors
 - 1. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 15 Section "Common Motor Requirements For Plumbing Equipment".
 - a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 - b. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 15.

1.3 EXECUTION

A. Equipment Installation

1. Equipment Mounting:

- a. Install air compressors, aftercoolers, and air dryers on concrete bases using elastomeric pads **OR** elastomeric mounts **OR** restrained spring isolators, **as directed**. Comply with requirements in Division 03 Section "Cast-in-place Concrete". Comply with requirements for vibration isolation devices specified in Division 15 Section "Vibration And Seismic Controls For Plumbing Piping And Equipment".
 - 1) Minimum Deflection: 1/4 inch (6 mm) **OR** 1 inch (25 mm), **as directed**.
 - 2) Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 3) For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 4) Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5) Install anchor bolts to elevations required for proper attachment to supported equipment.
 - b. Install air compressors, aftercoolers, and air dryers using elastomeric pads **OR** elastomeric mounts **OR** restrained spring isolators, **as directed**. Comply with requirements for vibration isolation devices specified in Division 15 Section "Vibration And Seismic Controls For Plumbing Piping And Equipment".
 - 1) Minimum Deflection: 1/4 inch (6 mm) **OR** 1 inch (25 mm), **as directed**.
 - c. Install air compressors, aftercoolers, and air dryers on vibration isolation inertia bases. Comply with requirements specified in Division 15 Section "Vibration And Seismic Controls For Plumbing Piping And Equipment".
 - d. Install air compressors, aftercoolers, and air dryers on concrete bases. Comply with requirements in Division 03 Section "Cast-in-place Concrete".
 - 1) Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 2) For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3) Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4) Install anchor bolts to elevations required for proper attachment to supported equipment.
 - e. Install water-cooled, compressed-air aftercoolers and desiccant compressed-air dryers on concrete bases. Comply with requirements in Division 03 Section "Cast-in-place Concrete".
 - 1) Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 2) For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 3) Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4) Install anchor bolts to elevations required for proper attachment to supported equipment.
2. Install compressed-air equipment anchored to substrate.
 3. Arrange equipment so controls and devices are accessible for servicing.
 4. Maintain manufacturer's recommended clearances for service and maintenance.
 5. Install the following devices on compressed-air equipment:
 - a. Thermometer, Pressure Gage, and Safety Valve: Install on each compressed-air receiver.
 - b. Pressure Regulators: Install downstream from air compressors and dryers.
 - c. Automatic Drain Valves: Install on aftercoolers, receivers, and dryers. Discharge condensate over nearest floor drain.

15 - Mechanical

- B. Connections
 - 1. Comply with requirements for piping specified in Division 15 Section "General-service Compressed-air Piping". Drawings indicate general arrangement of piping, fittings, and specialties.
 - 2. Install piping adjacent to machine to allow service and maintenance.

- C. Identification
 - 1. Identify general-service air compressors and components. Comply with requirements for identification specified in Division 15 Section "Identification For Plumbing Piping And Equipment".

- D. Startup Service
 - 1. Perform startup service.
 - a. Complete installation and startup checks according to manufacturer's written instructions.
 - b. Check for lubricating oil in lubricated-type equipment.
 - c. Check belt drives for proper tension.
 - d. Verify that air-compressor inlet filters and piping are clear.
 - e. Check for equipment vibration-control supports and flexible pipe connectors and verify that equipment is properly attached to substrate.
 - f. Check safety valves for correct settings. Ensure that settings are higher than air-compressor discharge pressure but not higher than rating of system components.
 - g. Check for proper seismic restraints.
 - h. Drain receiver tanks.
 - i. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - j. Test and adjust controls and safeties.

- E. Demonstration
 - 1. Train Owner's maintenance personnel to adjust, operate, and maintain air compressors, aftercoolers, and air dryers.

END OF SECTION 15915

Task	Specification	Specification Description
15915	15910	Instrumentation And Controls
15917	15910	Instrumentation And Controls

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SECTION 16101 - ELECTRICAL IDENTIFICATION

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for electrical identification. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Identification for raceways.
 - b. Identification of power and control cables.
 - c. Identification for conductors.
 - d. Underground-line warning tape.
 - e. Warning labels and signs.
 - f. Instruction signs.
 - g. Equipment identification labels.
 - h. Miscellaneous identification products.

C. Submittals

1. Product Data: For each electrical identification product indicated.
2. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.
3. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

D. Quality Assurance

1. Comply with ANSI A13.1 and IEEE C2, **as directed**.
2. Comply with NFPA 70.
3. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
4. Comply with ANSI Z535.4 for safety signs and labels.
5. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.2 PRODUCTS

A. Power Raceway Identification Materials

1. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
2. Colors for Raceways Carrying Circuits at 600 V or Less:
 - a. Black letters on an orange field.
 - b. Legend: Indicate voltage and system or service type, **as directed**.
3. Colors for Raceways Carrying Circuits at More Than 600 V:
 - a. Black letters on an orange field.
 - b. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high letters on 20-inch (500-mm) centers.
4. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
5. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

16 - Electrical

6. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
 7. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers diagonally over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stop stripes at legends.
 8. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
 9. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) **OR** 0.015 inch (0.38 mm), **as directed**, thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - a. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

OR

Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.
- B. Armored And Metal-Clad Cable Identification Materials
1. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
 2. Colors for Raceways Carrying Circuits at 600 V and Less:
 - a. Black letters on an orange field.
 - b. Legend: Indicate voltage and system or service type, **as directed**.
 3. Colors for Raceways Carrying Circuits at More Than 600 V:
 - a. Black letters on an orange field.
 - b. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high letters on 20-inch (500-mm) centers.
 4. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

OR

Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.
- C. Power And Control Cable Identification Materials
1. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
 2. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
 3. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
 4. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) **OR** 0.015 inch (0.38 mm), **as directed**, thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - a. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

OR

Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.
 5. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
 6. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- D. Conductor Identification Materials

1. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
 2. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
 3. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
 4. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
 5. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
 6. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) **OR** 0.015 inch (0.38 mm), **as directed**, thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - a. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
OR
Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.
- E. Floor Marking Tape
1. 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.
- F. Underground-Line Warning Tape
1. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
 2. Color and Printing:
 - a. Comply with ANSI Z535.1 through ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: **ELECTRIC LINE, HIGH VOLTAGE.**
 - c. Inscriptions for Orange-Colored Tapes: **TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.**
 3. Tag: Type I:
 - a. Pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Thickness: 4 mils (0.1 mm).
 - c. Weight: 18.5 lb/1000 sq. ft. (9.0 kg/100 sq. m).
 - d. 3-Inch (75-mm) Tensile According to ASTM D 882: 30 lbf (133.4 N), and 2500 psi (17.2 MPa).
 4. Tag: Type II:
 - a. Multilayer laminate consisting of high-density polyethylene scrim coated with pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Thickness: 12 mils (0.3 mm).
 - c. Weight: 36.1 lb/1000 sq. ft. (17.6 kg/100 sq. m).
 - d. 3-Inch (75-mm) Tensile According to ASTM D 882: 400 lbf (1780 N), and 11,500 psi (79.2 MPa).
 5. Tag: Type ID:
 - a. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Overall Thickness: 5 mils (0.125 mm).

- c. Foil Core Thickness: 0.35 mil (0.00889 mm).
 - d. Weight: 28 lb/1000 sq. ft. (13.7 kg/100 sq. m).
 - e. 3-Inch (75-mm) Tensile According to ASTM D 882: 70 lbf (311.3 N), and 4600 psi (31.7 MPa).
6. Tag: Type IID:
- a. Reinforced, detectable three-layer laminate, consisting of a printed pigmented woven scrim, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Overall Thickness: 8 mils (0.2 mm).
 - c. Foil Core Thickness: 0.35 mil (0.00889 mm).
 - d. Weight: 34 lb/1000 sq. ft. (16.6 kg/100 sq. m).
 - e. 3-Inch (75-mm) Tensile According to ASTM D 882: 300 lbf (1334 N), and 12,500 psi (86.1 MPa).
- G. Warning Labels And Signs
1. Comply with NFPA 70 and 29 CFR 1910.145.
 2. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
 3. Baked-Enamel Warning Signs:
 - a. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
 - b. 1/4-inch (6.4-mm) grommets in corners for mounting.
 - c. Nominal size, 7 by 10 inches (180 by 250 mm).
 4. Metal-Backed, Butyrate Warning Signs:
 - a. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application.
 - b. 1/4-inch (6.4-mm) grommets in corners for mounting.
 - c. Nominal size, 10 by 14 inches (250 by 360 mm).
 5. Warning label and sign shall include, but are not limited to, the following legends:
 - a. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - b. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."
- H. Instruction Signs
1. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.
 - a. Engraved legend with black letters on white face.
 - b. Punched or drilled for mechanical fasteners.
 - c. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
 2. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
 3. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.
- I. Equipment Identification Labels
1. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
 2. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.
 3. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

4. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).
5. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

J. Cable Ties

1. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - c. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - d. Color: Black except where used for color-coding.
2. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - c. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - d. Color: Black.
3. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
 - a. Minimum Width: 3/16 inch (5 mm).
 - b. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
 - c. UL 94 Flame Rating: 94V-0.
 - d. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - e. Color: Black.

K. Miscellaneous Identification Products

1. Paint: Comply with requirements in Division 07 for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
2. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

1.3 EXECUTION

A. Installation

1. Verify identity of each item before installing identification products.
2. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
3. Apply identification devices to surfaces that require finish after completing finish work.
4. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
5. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
6. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
7. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
8. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - a. Outdoors: UV-stabilized nylon.
 - b. In Spaces Handling Environmental Air: Plenum rated.
9. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use

multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.

10. Painted Identification: Comply with requirements in Division 07 for surface preparation and paint application.

B. Identification Schedule

1. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high black letters on 20-inch (500-mm) centers. Stop stripes at legends. Apply to the following finished surfaces:
 - a. Floor surface directly above conduits running beneath and within 12 inches (300 mm) of a floor that is in contact with earth or is framed above unexcavated space.
 - b. Wall surfaces directly external to raceways concealed within wall.
 - c. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
2. Accessible Raceways, Armored and Metal-Clad Cables, More Than 600 V: Self-adhesive vinyl **OR** Snap-around, **as directed**, labels. Install labels at 10-foot (3-m) **OR** 30-foot (10-m), **as directed**, maximum intervals.
3. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label **OR** self-adhesive vinyl tape applied in bands, **as directed**. Install labels at 10-foot (3-m) **OR** 30-foot (10-m), **as directed**, maximum intervals.
4. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
 - a. Emergency Power.
 - b. Power.
 - c. UPS.
5. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
 - a. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - 1) Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
 - 2) Colors for 208/120-V Circuits:
 - a) Phase A: Black.
 - b) Phase B: Red.
 - c) Phase C: Blue.
 - 3) Colors for 480/277-V Circuits:
 - a) Phase A: Brown.
 - b) Phase B: Orange.
 - c) Phase C: Yellow.
 - 4) Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
6. Power-Circuit Conductor Identification, More than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use write-on tags **OR** nonmetallic plastic tag holder with adhesive-backed phase tags, and a separate tag with the circuit designation, **as directed**.
7. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
8. Conductors to Be Extended in the Future: Attach write-on tags **OR** marker tape, **as directed**, to conductors and list source.
9. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

- a. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - b. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - c. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
10. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
- a. Limit use of underground-line warning tape to direct-buried cables.
 - b. Install underground-line warning tape for both direct-buried cables and cables in raceway.
11. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
12. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels **OR** Baked-enamel warning signs **OR** Metal-backed, butyrate warning signs, **as directed**.
- a. Comply with 29 CFR 1910.145.
 - b. Identify system voltage with black letters on an orange background.
 - c. Apply to exterior of door, cover, or other access.
 - d. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - 1) Power transfer switches.
 - 2) Controls with external control power connections.
13. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
14. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer **OR** load shedding, **as directed**.
15. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
- a. Labeling Instructions:
 - 1) Indoor Equipment: Adhesive film label **OR** Adhesive film label with clear protective overlay **OR** Self-adhesive, engraved, laminated acrylic or melamine label **OR** Engraved, laminated acrylic or melamine label, **as directed**. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
 - 2) Outdoor Equipment: Engraved, laminated acrylic or melamine label **OR** Stenciled legend 4 inches (100 mm) high, **as directed**.
 - 3) Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - 4) Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - b. Equipment to Be Labeled:
 - 1) Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved **OR** engraved, **as directed**, laminated acrylic or melamine label.
 - 2) Enclosures and electrical cabinets.
 - 3) Access doors and panels for concealed electrical items.
 - 4) Switchgear.
 - 5) Switchboards.

16 - Electrical

- 6) Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- 7) Substations.
- 8) Emergency system boxes and enclosures.
- 9) Motor-control centers.
- 10) Enclosed switches.
- 11) Enclosed circuit breakers.
- 12) Enclosed controllers.
- 13) Variable-speed controllers.
- 14) Push-button stations.
- 15) Power transfer equipment.
- 16) Contactors.
- 17) Remote-controlled switches, dimmer modules, and control devices.
- 18) Battery-inverter units.
- 19) Battery racks.
- 20) Power-generating units.
- 21) Monitoring and control equipment.
- 22) UPS equipment.

END OF SECTION 16101

SECTION 16101a - ELECTRICAL RENOVATION

DESCRIPTION OF WORK

This specification covers the furnishing and installation of materials for electrical renovation. Products shall be as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

GENERAL

Quality Assurance

1. Regulatory Requirements: Comply with following:
 - a. Electrical: National Fire Protection Association (NFPA): NFPA 70 - National Electrical Code (NEC).
 - b. Accessibility:
 - 1) Architectural Barriers Act of 1968 as amended (42 USC 4152-4157) and HUD implementing regulations (24 CFR Part 40).
 - a) Uniform Federal Accessibility Standards (UFAS).
 - 2) Section 504 of the Rehabilitation Act of 1973 as amended (29 USC 794) and HUD implementing regulations 24 CFR Part 8.
 - 3) Fair Housing Accessibility Guidelines (24 CFR Chapter 1).
 - 4) Americans with Disabilities Act of 1990 (ADA) (28 CFR Part 35).

Project Conditions

2. Existing Conditions: Buildings will be occupied during construction. See Division 1 Section "Summary of Work." Do not interfere with use of occupied portions of building. Maintain free and safe passage to and from occupied areas.

Scheduling And Sequencing

3. Scheduling and Completion: Comply with requirements of Detailed Scope of Work.

Alterations, Cutting And Protection

4. Protection: Protect existing finishes, equipment, utilities and adjacent work, which is scheduled to remain, from damage.
5. Existing Operating Facilities: Confine operations to immediate vicinity of new work and do not interfere with or obstruct ingress or egress to and from adjacent facilities.

PRODUCTS

Materials

6. Electrical Materials and Devices: Comply with NFPA 70 (NEC):
 - a. Boxes: Galvanized steel, not less than 1.6 mm (0.0625 inch) thickness (NEC 370-20) grounded in accordance with NEC, Article 250, suitable for recess mounting.
 - 1) Provide boxes of appropriate shape and size for intended purpose.
 - b. Devices:
 - 1) Duplex Receptacles: 15 A or 20 A 115 V, UL Listed with screw side connections and corrugated bearing pads.
 - a) GFCI Outlets: 115 V, 60 Hz, 15/20 A rating, UL Listed.
 - 2) Switches: 15 A, 115 V, single pole, single throw switch, UL Listed, with side screw connections and corrugated bearing pads.
 - a) Garbage Disposal: Heavy duty, 120/277 VAC, 60 Hz, single pole, single throw, 20 A rate, UL listed and CSA certified.

16 - Electrical

- 3) Cover Plates: Smooth plastic in color to match existing.
- c. Wiring: Insulated wire, Type NM 600 V with ground wire, sized as appropriate for intended purpose and in accordance with NEC.
 - 1) Aluminum Wire: Not allowed unless existing wiring is aluminum.
 - 2) Provide necessary fittings in accordance with NEC.

EXECUTION**Examination**

7. Units, Spaces and Areas to be Renovated: Inspect to become familiar with existing conditions and to take measurements which are necessary for renovation work to be completed in accordance with contract requirements.
 - a. Carefully inspect condition of existing spaces including, but not limited to walls, floors, plumbing, electrical, etc. as essential to successful completion of renovation work.
 - b. Survey each space and verify dimensions for work.

Preparation

8. Building Occupation: Carry out renovation work to cause as little inconvenience to occupants as possible. See Division 1 Section "Summary of Work."
9. Protection: Protect and be responsible for existing buildings, facilities, utilities, and improvements within areas of construction operations.
 - a. Tenant's Property: Be responsible for any damage or loss to residents' property and to other work. Replace any material, which, in opinion of the Owner, has become damaged to extent that it could not be restored to its original condition.
 - b. Take precautions to protect residents and public from injury from construction operations.

Laying Out Work

10. Discrepancies: Verify dimensions and elevations indicated in layout of existing work.
 - a. Prior to commencing work, carefully compare and check Drawings (if any), for discrepancies in locations or elevations of work to be executed.
 - b. Refer discrepancies among Drawings (if any), Specifications and existing conditions to the Owner for adjustment before work affected is performed.
 - 1) Failure to make such notification shall place responsibility on Contractor to carry out work in satisfactory, workmanlike manner.
11. Contractor: Responsible for location and elevation of construction contemplated by Construction Documents.

Location Of Equipment And Piping

12. Drawings (if any) indicating location of equipment, piping, ductwork, etc. are diagrammatic and job conditions shall not always permit their installation in location shown. When this situation occurs, bring condition to the Owner's attention immediately. Relocation will be determined in joint conference.
13. Contractor: Do not relocate any items without first obtaining the Owner's acceptance. Remove and relocate such relocated items at own expense if so directed.

Electrical Work

14. General: Install boxes, wiring, and devices as indicated and required to connect and control electrical devices in accordance with NFPA 70 (NEC).
 - a. Boxes: Solidly anchor to framing or blocking.
15. Removing Electrical Switch or Duplex Outlet (Non-Hazardous Locations):
 - a. Box to Remain:
 - 1) Remove electrical device; cap hot and neutral with set-screw wire connectors.
 - 2) Attach ground wire to remaining box with solid screw attachment.
 - 3) Provide and install natural finish aluminum blank cover plate with screw fasteners integral to match size of box remaining.
 - b. Box to be removed:

- 1) Remove electrical device and box and pull wire out of wall back to first circuit panel, disconnecting from circuit panel.
 - 2) Patch and repair hole in partition to match existing.
16. Garbage Disposal Electrical Hook-up: See Division 15 Section "Plumbing." Comply with NFPA 70 (NEC):
 - a. Wiring: Install from disposal through concealed spaces to house panel, anchoring wire, and providing necessary fittings.
 - b. Switch: Install above counter top backsplash.
 17. Range Hood Electrical Hook-up: See Division 11 Section "Residential Appliances." Comply with NFPA 70 (NEC):
 - a. Electric service: Install insulated wire from range hood through concealed spaces to house panel, anchoring wire, and providing necessary fittings.
 18. Water Heater Electrical Hook-up: See Division 15 Section "Domestic Water Heaters." Comply with NFPA 70 (NEC).
 19. Furnace Electrical Hook-up: See Division 15 Section "Furnaces." Comply with NFPA 70 (NEC).
 20. Smoke Detector Electrical Hook-up: See Division 13 Section "Fire Alarm." Comply with NFPA 70 (NEC).

Integrating Existing Work

21. Protection: Protect existing improvements from damage.
 - a. Where new work is to be connected to existing work, exercise special care not to disturb or damage existing work more than necessary.
 - b. Damaged Work: Replace, repair and restored to its original condition at no cost to Owner.

END OF SECTION 16101a

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SECTION 16101b - PANELBOARDS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for panelboards. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Distribution panelboards.
 - b. Lighting and appliance branch-circuit panelboards.
 - c. Load centers.
 - d. Electronic-grade panelboards.

C. Definitions

1. SVR: Suppressed voltage rating.
2. TVSS: Transient voltage surge suppressor.

D. Performance Requirements

1. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

E. Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings: For each panelboard and related equipment.
 - a. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - b. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - c. Detail bus configuration, current, and voltage ratings.
 - d. Short-circuit current rating of panelboards and overcurrent protective devices.
 - e. Include evidence of NRTL listing for series rating of installed devices.
 - f. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - g. Include wiring diagrams for power, signal, and control wiring.
 - h. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device.
3. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 16 Section "Vibration And Seismic Controls For Electrical Systems".
4. Panelboard Schedules: For installation in panelboards.
5. Operation and maintenance data

F. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with NEMA PB 1.
3. Comply with NFPA 70.

16 - Electrical

- G. Delivery, Storage, And Handling
 - 1. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
 - 2. Handle and prepare panelboards for installation according to NECA 407 **OR** NEMA PB 1.
- H. Project Conditions
 - 1. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - a. Notify Owner no fewer than two days in advance of proposed interruption of electric service.
 - b. Do not proceed with interruption of electric service without Owner's written permission.
 - c. Comply with NFPA 70E.
- I. Warranty
 - 1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within five years from date of Substantial Completion.

1.2 PRODUCTS

- A. General Requirements For Panelboards
 - 1. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 16 Section "Vibration And Seismic Controls For Electrical Systems".
 - 2. Enclosures: Flush **OR** Surface **OR** Flush- and surface, **as directed**, -mounted cabinets.
 - a. Rated for environmental conditions at installed location.
 - 1) Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - 2) Outdoor Locations: NEMA 250, Type 3R.
 - 3) Kitchen or Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
 - 4) Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - 5) Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 5 **OR** Type 12, **as directed**.
 - b. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - c. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
 - d. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
 - e. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
 - f. Finishes:
 - 1) Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - 2) Back Boxes: Galvanized steel **OR** Same finish as panels and trim, **as directed**.
 - 3) Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
 - g. Directory Card: Inside panelboard door, mounted in transparent card holder **OR** metal frame with transparent protective cover, **as directed**.
 - 3. Incoming Mains Location: Top **OR** Bottom **OR** Top and bottom, **as directed**.
 - 4. Phase, Neutral, and Ground Buses:
 - a. Material: Tin-plated aluminum **OR** Hard-drawn copper, 98 percent conductivity, **as directed**.
 - b. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

- c. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
 - d. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
 - e. Split Bus: Vertical buses divided into individual vertical sections.
 - 5. Conductor Connectors: Suitable for use with conductor material and sizes.
 - a. Material: Tin-plated aluminum **OR** Hard-drawn copper, 98 percent conductivity, **as directed**.
 - b. Main and Neutral Lugs: Compression **OR** Mechanical, **as directed**, type.
 - c. Ground Lugs and Bus-Configured Terminators: Compression **OR** Mechanical, **as directed**, type.
 - d. Feed-Through Lugs: Compression **OR** Mechanical, **as directed**, type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 - e. Subfeed (Double) Lugs: Compression **OR** Mechanical, **as directed**, type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 - f. Gutter-Tap Lugs: Compression **OR** Mechanical, **as directed**, type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
 - g. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
 - 6. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.
 - 7. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
 - 8. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.
 - 9. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.
- B. Distribution Panelboards
- 1. Panelboards: NEMA PB 1, power and feeder distribution type.
 - 2. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
 - a. For doors more than 36 inches (914 mm) high, provide two latches, keyed alike.
 - 3. Mains: Circuit breaker **OR** Fused switch **OR** Lugs only, **as directed**.
 - 4. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Plug-in **OR** Bolt-on, **as directed**, circuit breakers.
 - 5. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.
 - 6. Branch Overcurrent Protective Devices: Fused switches.
 - 7. Contactors in Main Bus: NEMA ICS 2, Class A, electrically **OR** mechanically, **as directed**, held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 - a. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
 - b. External Control-Power Source: 120-V branch circuit **OR** 24-V control circuit, **as directed**.
- C. Lighting And Appliance Branch-Circuit Panelboards
- 1. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
 - 2. Mains: Circuit breaker **OR** Lugs only, **as directed**.
 - 3. Branch Overcurrent Protective Devices: Plug-in **OR** Bolt-on, **as directed**, circuit breakers, replaceable without disturbing adjacent units.
 - 4. Contactors in Main Bus: NEMA ICS 2, Class A, electrically **OR** mechanically, **as directed**, held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 - a. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
 - b. External Control-Power Source: 120-V branch circuit **OR** 24-V control circuit, **as directed**.
 - 5. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

16 - Electrical

6. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

D. Load Centers

1. Load Centers: Comply with UL 67.
2. Mains: Circuit breaker **OR** Lugs only, **as directed**.
3. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.
4. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

E. Electronic-Grade Panelboards

1. Panelboards: NEMA PB 1; with factory-installed, integral TVSS; labeled by an NRTL for compliance with UL 67 after installing TVSS.
2. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
3. Main Overcurrent Protective Devices: Bolt-on thermal-magnetic circuit breakers.
4. Branch Overcurrent Protective Devices: Bolt-on thermal-magnetic circuit breakers.
5. Buses:
 - a. Copper phase and neutral buses; 200 percent capacity neutral bus and lugs.
 - b. Copper equipment and isolated ground buses.
6. Surge Protection Device: IEEE C62.41-compliant, integrally mounted, plug-in **OR** wired-in **OR** bolt-on, **as directed**, solid-state, parallel-connected, modular (with field-replaceable modules) **OR** non-modular, **as directed**, type, with sine-wave tracking suppression and filtering modules, short-circuit current rating complying with UL 1449, second edition, and matching or exceeding the panelboard short-circuit rating, redundant suppression circuits, with individually fused metal-oxide varistors.
 - a. Accessories:
 - 1) Fuses rated at 200-kA interrupting capacity.
 - 2) Fabrication using bolted compression lugs for internal wiring.
 - 3) Integral disconnect switch.
 - 4) Redundant suppression circuits.
 - 5) Redundant replaceable modules.
 - 6) Arrangement with wire connections to phase buses, neutral bus, and ground bus.
 - 7) LED indicator lights for power and protection status.
 - 8) Audible alarm, with silencing switch, to indicate when protection has failed.
 - 9) Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of system operation. Contacts shall reverse position on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
 - 10) Four **OR** Six, **as directed**, -digit, transient-event counter set to totalize transient surges.
 - b. Peak Single-Impulse Surge Current Rating: 160 kA per mode/320 kA per phase **OR** 120 kA per mode/240 kA per phase **OR** 80 kA per mode/160 kA per phase, **as directed**.
 - c. Minimum single-impulse current ratings, using 8-by-20-mic.sec. waveform described in IEEE C62.41.2.
 - 1) Line to Neutral: 70,000 A.
 - 2) Line to Ground: 70,000 A.
 - 3) Neutral to Ground: 50,000 A.
 - d. Withstand Capabilities: 12,000 IEEE C62.41, Category C3 (10 kA), 8-by-20-mic.sec. surges with less than 5 percent change in clamping voltage.
 - e. Protection modes and UL 1449 SVR for grounded wye circuits with 480Y/277 **OR** 208Y/120 **OR** 600Y/347, **as directed**, -V, three-phase, four-wire circuits shall be as follows:
 - 1) Line to Neutral: 800 V for 480Y/277 **OR** 400 V for 208Y/120 **OR** 1200 V for 600Y/347, **as directed**.
 - 2) Line to Ground: 800 V for 480Y/277 **OR** 400 V for 208Y/120 **OR** 1200 V for 600Y/347, **as directed**.
 - 3) Neutral to Ground: 800 V for 480Y/277 **OR** 400 V for 208Y/120 **OR** 1200 V for 600Y/347, **as directed**.

- f. Protection modes and UL 1449 SVR for 240/120-V, single-phase, three-wire circuits shall be as follows:
 - 1) Line to Neutral: 400 V.
 - 2) Line to Ground: 400 V.
 - 3) Neutral to Ground: 400 V.
 - g. Protection modes and UL 1449 SVR for 240/120-V, three-phase, four-wire circuits with high leg shall be as follows:
 - 1) Line to Neutral: 400 V, 800 V from high leg.
 - 2) Line to Ground: 400 V.
 - 3) Neutral to Ground: 400 V.
 - h. Protection modes and UL 1449 SVR for 240-, 480-, or 600-V, three-phase, three-wire, delta circuits shall be as follows:
 - 1) Line to Line: 2000 V for 480 V **OR** 1000 V for 240 V **OR** 2500 V for 600 V, **as directed**.
 - 2) Line to Ground: 1500 V for 480 V **OR** 800 V for 240 V **OR** 2500 V for 600 V, **as directed**.
- F. Disconnecting And Overcurrent Protective Devices
- 1. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating **OR** interrupting capacity, **as directed**, to meet available fault currents.
 - a. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - b. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
 - c. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:
 - 1) Instantaneous trip.
 - 2) Long- and short-time pickup levels.
 - 3) Long- and short-time time adjustments.
 - 4) Ground-fault pickup level, time delay, and I^2t response.
 - d. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
 - e. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
 - f. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
 - g. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
 - h. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
 - 1) Standard frame sizes, trip ratings, and number of poles.
 - 2) Lugs: Compression **OR** Mechanical, **as directed**, style, suitable for number, size, trip ratings, and conductor materials.
 - 3) Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
 - 4) Ground-Fault Protection: Integrally mounted **OR** Remote-mounted, **as directed**, relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - 5) Communication Capability: Circuit-breaker-mounted **OR** Universal-mounted **OR** Integral **OR** Din-rail-mounted, **as directed**, communication module with functions and features compatible with power monitoring and control system specified in Division 16 Section "Electrical Power Monitoring And Control".
 - 6) Shunt Trip: 120 **OR** 24, **as directed**, -V trip coil energized from separate circuit, set to trip at 55 **OR** 75, **as directed**, percent of rated voltage.
 - 7) Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional **OR** with field-adjustable 0.1- to 0.6-second, **as directed**, time delay.

- 8) Auxiliary Contacts: One SPDT switch **OR** Two SPDT switches, **as directed**, with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
 - 9) Alarm Switch: Single-pole, normally open contact that actuates only when circuit breaker trips.
 - 10) Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
 - 11) Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function with other upstream or downstream devices.
 - 12) Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
 - 13) Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on **OR** off, **as directed**, position.
 - 14) Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.
2. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
 - a. Fuses, and Spare-Fuse Cabinet: Comply with requirements specified in Division 16 Section "Fuses".
 - b. Fused Switch Features and Accessories: Standard ampere ratings and number of poles.
 - c. Auxiliary Contacts: One **OR** Two, **as directed**, normally open and normally closed contact(s) that operate with switch handle operation.

G. Panelboard Suppressors

1. Surge Protection Device: IEEE C62.41-compliant, integrally mounted, solid-state, parallel-connected, non-modular type, with sine-wave tracking suppression and filtering modules, UL 1449, second edition, short-circuit current rating matching or exceeding the panelboard short-circuit rating, and with the following features and accessories:
 - a. Accessories:
 - 1) LED indicator lights for power and protection status.
 - 2) Audible alarm, with silencing switch, to indicate when protection has failed.
 - 3) One set of dry contacts rated at 5 A and 250-V ac, for remote monitoring of protection status.
2. Surge Protection Device: IEEE C62.41-compliant, integrally mounted, plug-in **OR** wired-in **OR** bolt-on, **as directed**, solid-state, parallel-connected, modular (with field-replaceable modules) **OR** non-modular, **as directed**, type, with sine-wave tracking suppression and filtering modules, UL 1449, second edition, short-circuit current rating matching or exceeding the panelboard short-circuit rating, and with the following features and accessories:
 - a. Accessories:
 - 1) Fuses rated at 200-kA interrupting capacity.
 - 2) Fabrication using bolted compression lugs for internal wiring.
 - 3) Integral disconnect switch.
 - 4) Redundant suppression circuits.
 - 5) Redundant replaceable modules.
 - 6) Arrangement with wire connections to phase buses, neutral bus, and ground bus.
 - 7) LED indicator lights for power and protection status.
 - 8) Audible alarm, with silencing switch, to indicate when protection has failed.
 - 9) Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of system operation. Contacts shall reverse position on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
 - 10) Four **OR** Six, **as directed**, -digit, transient-event counter set to totalize transient surges.
 - b. Peak Single-Impulse Surge Current Rating: 160 kA per mode/320 kA per phase **OR** 120 kA per mode/240 kA per phase **OR** 80 kA per mode/160 kA per phase, **as directed**.
 - c. Minimum single-impulse current ratings, using 8-by-20-mic.sec. waveform described in IEEE C62.41.2.
 - 1) Line to Neutral: 70,000 A.
 - 2) Line to Ground: 70,000 A.

- 3) Neutral to Ground: 50,000 A.
- d. Withstand Capabilities: 12,000 IEEE C62.41, Category C3 (10 kA), 8-by-20-mic.sec. surges with less than 5 percent change in clamping voltage.
- e. Protection modes and UL 1449 SVR for grounded wye circuits with 480Y/277 **OR** 208Y/120 **OR** 600Y/347, **as directed**, -V, three-phase, four-wire circuits shall be as follows:
 - 1) Line to Neutral: 800 V for 480Y/277 **OR** 400 V for 208Y/120 **OR** 1200 V for 600Y/347, **as directed**.
 - 2) Line to Ground: 800 V for 480Y/277 **OR** 400 V for 208Y/120 **OR** 1200 V for 600Y/347, **as directed**.
 - 3) Neutral to Ground: 800 V for 480Y/277 **OR** 400 V for 208Y/120 **OR** 1200 V for 600Y/347, **as directed**.
- f. Protection modes and UL 1449 SVR for 240/120-V, single-phase, three-wire circuits shall be as follows:
 - 1) Line to Neutral: 400 V.
 - 2) Line to Ground: 400 V.
 - 3) Neutral to Ground: 400 V.
- g. Protection modes and UL 1449 SVR for 240/120-V, three-phase, four-wire circuits with high leg shall be as follows:
 - 1) Line to Neutral: 400 V, 800 V from high leg.
 - 2) Line to Ground: 400 V.
 - 3) Neutral to Ground: 400 V.
- h. Protection modes and UL 1449 SVR for 240-, 480-, or 600-V, three-phase, three-wire, delta circuits shall be as follows:
 - 1) Line to Line: 2000 V for 480 V **OR** 1000 V for 240 V **OR** 2500 V for 600 V, **as directed**.
 - 2) Line to Ground: 1500 V for 480 V **OR** 800 V for 240 V **OR** 2500 V for 600 V, **as directed**.

H. Accessory Components And Features

1. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
2. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

1.3 EXECUTION

A. Installation

1. Install panelboards and accessories according to NECA 407 **OR** NEMA PB 1.1, **as directed**.
2. Equipment Mounting: Install panelboards on concrete bases, 4-inch (100-mm) nominal thickness. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-place Concrete".
 - a. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.
 - b. For panelboards, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - c. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - d. Install anchor bolts to elevations required for proper attachment to panelboards.
 - e. Attach panelboard to the vertical finished or structural surface behind the panelboard.
3. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
4. Comply with mounting and anchoring requirements specified in Division 16 Section "Hangers And Supports For Electrical Systems".
5. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.
6. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

16 - Electrical

7. Install overcurrent protective devices and controllers not already factory installed.
 - a. Set field-adjustable, circuit-breaker trip ranges.
 8. Install filler plates in unused spaces.
 9. Stub four 1-inch (27-GRC) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (27-GRC) empty conduits into raised floor space or below slab not on grade.
 10. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing, **as directed**.
 11. Comply with NECA 1.
- B. Identification
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 16 Section "Electrical Identification".
 2. Create a directory to indicate installed circuit loads after balancing panelboard loads, **as directed**; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
 3. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 16 Section "Electrical Identification".
 4. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 16 Section "Electrical Identification".
- C. Field Quality Control
1. Perform tests and inspections.
 2. Acceptance Testing Preparation:
 - a. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - b. Test continuity of each circuit.
 3. Tests and Inspections:
 - a. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - b. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - c. Perform the following infrared scan tests and inspections and prepare reports:
 - 1) Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
 - 2) Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - 3) Instruments and Equipment:
 - a) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 4. Panelboards will be considered defective if they do not pass tests and inspections.
 5. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- D. Adjusting
1. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.
 2. Set field-adjustable circuit-breaker trip ranges as indicated **OR** as specified in Division 16 Section "Overcurrent Protective Device Coordination", **as directed**.
 3. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
 - a. Measure as directed during period of normal system loading.

- b. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
 - c. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - d. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.
- E. Protection
- 1. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 16101b

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SECTION 16102 - MEDIUM-VOLTAGE CABLES

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of medium-voltage cables. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes cables and related splices, terminations, and accessories for medium-voltage electrical distribution systems.

C. Definitions

1. NETA ATS: Acceptance Testing Specification.

D. Submittals

1. Product Data: For each type of cable indicated. Include splices and terminations for cables and cable accessories.
2. Field quality-control test reports.

E. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Comply with IEEE C2 and NFPA 70.

1.2 PRODUCTS

A. Cables

1. Cable Type: MV90 **OR** MV105, **as directed**.
2. Comply with UL 1072, AEIC CS 8, ICEA S-93-639, and ICEA S-97-682, **OR** ICEA S-94-649, **as directed**.
3. Conductor: Copper **OR** Aluminum, **as directed**.
4. Conductor Stranding: Compact round, concentric lay, Class B) **OR** Concentric lay, Class B, **as directed**.
5. Strand Filling: Conductor interstices are filled with impermeable compound.
6. Conductor Insulation: Crosslinked polyethylene **OR** Ethylene-propylene rubber, **as directed**.
 - a. Voltage Rating: 5 **OR** 8 **OR** 15 **OR** 25 **OR** 35, **as directed**, kV.
 - b. Insulation Thickness: 100 **OR** 133, **as directed**, percent insulation level.
7. Shielding: Copper tape **OR** Solid copper wires, **as directed**, helically applied over semiconducting insulation shield.
8. Shielding and Jacket: Corrugated copper drain wires embedded in extruded, chlorinated, polyethylene jacket.
9. Three-Conductor Cable Assembly: Three insulated, shielded conductors cabled together with ground conductors, **as directed**.
 - a. Circuit Identification: Color-coded tape (black, red, blue) under the metallic shielding.
10. Cable Armor: Interlocked aluminum **OR** Interlocked galvanized steel **OR** Corrugated aluminum tube, **as directed**, applied over cable.
11. Cable Jacket: Sunlight-resistant PVC **OR** Chlorosulfonated polyethylene, CPE, **as directed**.

B. Splice Kits

16 - Electrical

1. Connectors and Splice Kits: Comply with IEEE 404; type as recommended by cable or splicing kit manufacturer for the application.
 2. Splicing Products: As recommended, in writing, by splicing kit manufacturer for specific sizes, ratings, and configurations of cable conductors. Include all components required for complete splice, with detailed instructions.
 - a. Combination tape and cold-shrink-rubber sleeve kit with re-jacketing by cast-epoxy-resin encasement or other waterproof, abrasion-resistant material.
 - b. Heat-shrink splicing kit of uniform, cross-section, polymeric construction with outer heat-shrink jacket.
 - c. Premolded, cold-shrink-rubber, in-line splicing kit.
 - d. Premolded EPDM splicing body kit with cable joint sealed by interference fit of mating parts and cable.
- C. Solid Terminations
1. Multiconductor Cable Sheath Seals: Type recommended by seal manufacturer for type of cable and installation conditions, including orientation.
 - a. Compound-filled, cast-metal body, metal-clad cable terminator for metal-clad cable with **OR** without, **as directed**, external plastic jacket.
 - b. Cold-shrink sheath seal kit with preformed sleeve openings sized for cable and insulated conductors.
 - c. Heat-shrink sheath seal kit with phase- and ground-conductor re-jacketing tubes, cable-end sealing boot, and sealing plugs for unused ground-wire openings in boot.
 - d. Cast-epoxy-resin sheath seal kit with wraparound mold and packaged, two-part, epoxy-resin casting material.
 2. Shielded-Cable Terminations: Comply with the following classes of IEEE 48. Insulation class is equivalent to that of cable. Include shield ground strap for shielded cable terminations.
 - a. Class 1 Terminations: Modular type, furnished as a kit, with stress-relief tube; multiple, molded-silicone rubber, insulator modules; shield ground strap; and compression-type connector.
 - b. Class 1 Terminations: Heat-shrink type with heat-shrink inner stress control and outer nontracking tubes; multiple, molded, nontracking skirt modules; and compression-type connector.
 - c. Class 1 Terminations: Modular type, furnished as a kit, with stress-relief shield terminator; multiple-wet-process, porcelain, insulator modules; shield ground strap; and compression-type connector.
 - d. Class 1 Terminations, Indoors: Kit with stress-relief tube, nontracking insulator tube, shield ground strap, compression-type connector, and end seal.
 - e. Class 2 Terminations, Indoors: Kit with stress-relief tube, nontracking insulator tube, shield ground strap, and compression-type connector. Include silicone-rubber tape, cold-shrink-rubber sleeve, or heat-shrink plastic-sleeve moisture seal for end of insulation whether or not supplied with kits.
 - f. Class 3 Terminations: Kit with stress cone and compression-type connector.
 3. Nonshielded-Cable Terminations: Kit with compression-type connector. Include silicone-rubber tape, cold-shrink-rubber sleeve, or heat-shrink plastic-sleeve moisture seal for end of insulation whether or not supplied with kits.
- D. Separable Insulated Connectors
1. Description: Modular system, complying with IEEE 386, with disconnecting, single-pole, cable terminators and with matching, stationary, plug-in, dead-front terminals designed for cable voltage and for sealing against moisture.
 2. Terminations at Distribution Points: Modular type, consisting of terminators installed on cables and modular, dead-front, terminal junctions for interconnecting cables.
 3. Load-Break Cable Terminators: Elbow-type units with 200-A load make/break and continuous-current rating; coordinated with insulation diameter, conductor size, and material of cable being terminated. Include test point on terminator body that is capacitance coupled.
 4. Dead-Break Cable Terminators: Elbow-type unit with 600-A continuous-current rating; designed for de-energized disconnecting and connecting; coordinated with insulation diameter, conductor

- size, and material of cable being terminated. Include test point on terminator body that is capacitance coupled.
5. Dead-Front Terminal Junctions: Modular bracket-mounted groups of dead-front stationary terminals that mate and match with above cable terminators. Two-, three-, or four-terminal units as indicated, with fully rated, insulated, watertight conductor connection between terminals and complete with grounding lug, manufacturer's standard accessory stands, stainless-steel mounting brackets, and attaching hardware.
 - a. Protective Cap: Insulating, electrostatic-shielding, water-sealing cap with drain wire.
 - b. Portable Feed-Through Accessory: Two-terminal, dead-front junction arranged for removable mounting on accessory stand of stationary terminal junction.
 - c. Grounding Kit: Jumpered elbows, portable feed-through accessory units, protective caps, test rods suitable for concurrently grounding three phases of feeders, and carrying case.
 - d. Standoff Insulator: Portable, single dead-front terminal for removable mounting on accessory stand of stationary terminal junction. Insulators suitable for fully insulated isolation of energized cable-elbow terminator.
 6. Test-Point Fault Indicators: Applicable current-trip ratings and arranged for installation in test points of load-break separable connectors, and complete with self-resetting indicators capable of being installed with shotgun hot stick and tested with test tool.
 7. Tool Set: Shotgun hot stick with energized terminal indicator, fault-indicator test tool, and carrying case.
- E. Arc-Proofing Materials
1. Tape for First Course on Metal Objects: 10-mil- (250-micrometer-) thick, corrosion-protective, moisture-resistant, PVC pipe-wrapping tape.
 2. Arc-Proofing Tape: Fireproof tape, flexible, conformable, intumescent to 0.3 inch (8 mm) thick, compatible with cable jacket.
 3. Glass-Cloth Tape: Pressure-sensitive adhesive type, 1/2 inch (13 mm) wide.
- F. Fault Indicators
1. Indicators: Automatically **OR** Manually, **as directed**, reset fault indicator with inrush restraint feature, arranged to clamp to cable sheath and provide a display after a fault has occurred in cable. Instrument shall not be affected by heat, moisture, and corrosive conditions and shall be recommended by manufacturer for installation conditions.
 2. Resetting Tool: Designed for use with fault indicators, with moisture-resistant storage and carrying case.
- G. Source Quality Control
1. Test and inspect cables according to ICEA S-97-682 **OR** ICEA S-94-649, **as directed**, before shipping.
 2. Test strand-filled cables for water-penetration resistance according to ICEA T-31-610, using a test pressure of 5 psig (35 kPa).

1.3 EXECUTION

A. Installation

1. Install cables according to IEEE 576.
2. Pull Conductors: Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
 - a. Where necessary, use manufacturer-approved pulling compound or lubricant that will not deteriorate conductor or insulation.
 - b. Use pulling means, including fish tape, cable, rope, and basket-weave cable grips that will not damage cables and raceways. Do not use rope hitches for pulling attachment to cable.
3. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
4. Support cables according to Division 16 Section "Common Work Results For Electrical".

16 - Electrical

5. Install direct-buried cables on leveled and tamped bed of 3-inch- (75-mm-) thick, clean sand. Separate cables crossing other cables or piping by a minimum of 4 inches (100 mm) of tamped earth. Install permanent markers at ends of cable runs, changes in direction, and buried splices.
 6. Install "buried-cable" warning tape 12 inches (305 mm) above cables.
 7. In manholes, handholes, pull boxes, junction boxes, and cable vaults, train cables around walls by the longest route from entry to exit and support cables at intervals adequate to prevent sag.
 8. Install cable splices at pull points and elsewhere as indicated; use standard kits.
 9. Install terminations at ends of conductors and seal multiconductor cable ends with standard kits.
 10. Install separable insulated-connector components as follows:
 - a. Protective Cap: At each terminal junction, with one on each terminal to which no feeder is indicated to be connected.
 - b. Portable Feed-Through Accessory: Three.
 - c. Standoff Insulator: Three.
 11. Arc Proofing: Unless otherwise indicated, arc proof medium-voltage cable at locations not protected by conduit, cable tray, direct burial, or termination materials. In addition to arc-proofing tape manufacturer's written instructions, apply arc proofing as follows:
 - a. Clean cable sheath.
 - b. Wrap metallic cable components with 10-mil (250-micrometer) pipe-wrapping tape.
 - c. Smooth surface contours with electrical insulation putty.
 - d. Apply arc-proofing tape in one half-lapped layer with coated side toward cable.
 - e. Band arc-proofing tape with 1-inch- (25-mm-) wide bands of half-lapped, adhesive, glass-cloth tape 2 inches (50 mm) o.c.
 12. Seal around cables passing through fire-rated elements according to Division 07 Section "Through-penetration Firestop Systems".
 13. Install fault indicators on each phase where indicated.
 14. Ground shields of shielded cable at terminations, splices, and separable insulated connectors. Ground metal bodies of terminators, splices, cable and separable insulated-connector fittings, and hardware.
 15. Identify cables according to Division 16 Section "Electrical Identification".
- B. Field Quality Control
1. Perform the following field tests and inspections and prepare test reports:
 - a. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters.
 - b. After installing medium-voltage cables and before electrical circuitry has been energized, test for compliance with requirements.
 2. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 16102

Task	Specification	Specification Description
16102	01204	No Specification Required
16102	16101a	Electrical Renovation
16102	16120	Wire And Cable

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SECTION 16120 - WIRE AND CABLE

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of conductors and cables. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes the following:
 - a. Building wires and cables rated 600 V and less.
 - b. Connectors, splices, and terminations rated 600 V and less.
 - c. Sleeves and sleeve seals for cables.

C. Definitions

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

D. Submittals

1. Product Data: For each type of product indicated.
2. Field quality-control test reports.

E. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Comply with NFPA 70.

1.2 PRODUCTS

A. Conductors And Cables

1. Aluminum and Copper, **as directed**, Conductors: Comply with NEMA WC 70.
2. Conductor Insulation: Comply with NEMA WC 70 for Types THW **OR** THHN-THWN **OR** XHHW **OR** UF **OR** USE **OR** SO, **as directed**.
3. Multiconductor Cable: Comply with NEMA WC 70 for armored cable, Type AC **OR** metal-clad cable, Type MC **OR** mineral-insulated, metal-sheathed cable, Type MI **OR** nonmetallic-sheathed cable, Type NM **OR** Type SO **OR** Type USE, **as directed**, with ground wire.

B. Connectors And Splices

1. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

C. Sleeves For Cables

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
3. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.
4. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Through-penetration Firestop Systems".

16 - Electrical

- D. Sleeve Seals
1. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 - a. Sealing Elements: EPDM **OR** NBR, **as directed**, interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - b. Pressure Plates: Plastic **OR** Carbon steel **OR** Stainless steel, **as directed**. Include two for each sealing element.
 - c. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating **OR** Stainless steel, **as directed**, of length required to secure pressure plates to sealing elements. Include one for each sealing element.

1.3 EXECUTION

- A. Conductor Material Applications
1. Feeders: Copper **OR** Aluminum for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger, **as directed**. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
 2. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Conductor Insulation And Multiconductor Cable Applications And Wiring Methods
1. Service Entrance: Type THHN-THWN, single conductors in raceway **OR** Type XHHW, single conductors in raceway **OR** Mineral-insulated, metal-sheathed cable, Type MI **OR** Type SE or USE multiconductor cable, **as directed**.
 2. Exposed Feeders: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI **OR** Nonmetallic-sheathed cable, Type NM, **as directed**.
 3. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI **OR** Nonmetallic-sheathed cable, Type NM, **as directed**.
 4. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway **OR** Underground feeder cable, Type UF, **as directed**.
 5. Feeders Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI, **as directed**.
 6. Feeders in Cable Tray: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI **OR** Nonmetallic-sheathed cable, Type NM, **as directed**.
 7. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI **OR** Nonmetallic-sheathed cable, Type NM, **as directed**.
 8. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI **OR** Nonmetallic-sheathed cable, Type NM, **as directed**.
 9. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway **OR** Underground branch-circuit cable, Type UF, **as directed**.
 10. Branch Circuits Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI, **as directed**.
 11. Branch Circuits in Cable Tray: Type THHN-THWN, single conductors in raceway **OR** Armored cable, Type AC **OR** Metal-clad cable, Type MC **OR** Mineral-insulated, metal-sheathed cable, Type MI, **as directed**.

12. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
13. Class 1 Control Circuits: Type THHN-THWN, in raceway.
14. Class 2 Control Circuits: Type THHN-THWN, in raceway **OR** Power-limited cable, concealed in building finishes **OR** Power-limited tray cable, in cable tray, **as directed**.

C. Installation Of Conductors And Cables

1. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
2. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
3. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
4. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
5. Support cables according to Division 16 Section "Hangers And Supports For Electrical Systems".
6. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification".
7. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
8. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - a. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
9. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) **OR** 12 inches (300 mm), **as directed**, of slack.

D. Sleeve Installation For Electrical Penetrations

1. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Through-penetration Firestop Systems".
2. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
3. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
4. Rectangular Sleeve Minimum Metal Thickness:
 - a. For sleeve rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).
5. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
6. Cut sleeves to length for mounting flush with both wall surfaces.
7. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
8. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and cable unless sleeve seal is to be installed or unless seismic criteria require different clearance, **as directed**.
9. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies, **as directed**.
10. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants".
11. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Through-penetration Firestop Systems".
12. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

16 - Electrical

13. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
14. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

E. Sleeve-Seal Installation

1. Install to seal underground exterior-wall penetrations.
2. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

F. Firestopping

1. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Through-penetration Firestop Systems".

G. Field Quality Control

1. Perform tests and inspections and prepare test reports.
2. Tests and Inspections:
 - a. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services, **as directed**, for compliance with requirements.
 - b. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - c. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
 - 1) Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - 2) Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 3) Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
3. Test Reports: Prepare a written report to record the following:
 - a. Test procedures used.
 - b. Test results that comply with requirements.
 - c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
4. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 16120

SECTION 16120a - UNDERCARPET CABLES

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of undercarpet cables. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes the following:
 - a. Undercarpet cable and service fittings for branch circuits.
 - b. Undercarpet cable and service fittings for communication and data transmission.

C. Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings: Include plans, elevations, sections, details of components, and attachments to other work.
 - a. Indicate cable types, accessories, and transition boxes.
 - b. Indicate proposed layering of cables, cable dimensions, and installation requirements.
3. Field quality-control test reports.
4. Operation and maintenance data.

D. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Comply with NEMA UC 2, "Undercarpet Power Distribution Systems" and with NFPA 70.

1.2 PRODUCTS

A. Power Distribution Cable

1. Cable: Factory laminated and complying with NEMA UC 2; three-piece assembly including bottom shield, conductor assembly, and top shield.
 - a. Bottom Shield: Abrasion resistant, nonmetallic **OR** Metallic, **as directed**.
 - b. Conductor Assembly: Two **OR** Three **OR** Four, **as directed**,-wire branch circuit with insulated ground, **as directed**.
 - c. Top Shield: Copper or copper alloy.
2. Current Rating: 20 **OR** 30 **OR** 20 and 30, **as directed**, A.

B. Communication And Data Cable

1. Category 5e Communication and Data Cable: Extruded-vinyl jacket over 4 unshielded, twisted pairs, No. 24 AWG, copper; complying with TIA/EIA 568-B; and tested to 300-lb (136-kg) rollover test.

C. Pedestals

1. Description: Manufacturer's standard low **OR** regular, **as directed**, -profile type, single **OR** two **OR** three, **as directed**, gang with single **OR** duplex, **as directed**, receptacles and Category 5e modular connectors, **as directed**.
 - a. Pedestal Colors: As selected from manufacturer's full range.

D. Power Cable Transition Unit

16 - Electrical

1. Description: Interface transition unit, with junction box, for connecting three-, four-, or five-conductor, flat-conductor cable to building wiring system.

E. Communication And Data Cable Transition Unit

1. Description: Category 5 transition termination circuit board in wall-mounted box to convert round incoming cable to outgoing flat-undercarpet cable.

1.3 EXECUTION

A. Installation

1. Do not begin installation until heavy construction is completed and wheeled traffic is no longer a threat.
2. Do not stack cables in circulation routes.
3. Limit total installed height to 0.09 inch (2.29 mm).
4. Install cables in proper order with power-transmission cable first, followed by telephone cable and then data cable. Cross cables at 90-degree angles.
5. Install undercarpet cables and accessories using special tools as recommended by undercarpet cable manufacturer.

B. Connections

1. Ground equipment according to Division 16 Section "Grounding And Bonding".
2. Connect undercarpet cable and components to branch circuits and to ground as indicated and instructed by manufacturer.

C. Field Quality Control

1. Perform tests and inspections and prepare test reports.
2. Tests and Inspections:
 - a. Branch-Circuit Cables: After cables have been installed and energized, perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - b. Communication and Data Cables: After cables have been installed and connected between telecommunications outlet and system cross-connect panel, test each cable according to TIA/EIA TSB67. Certify compliance with test parameters.
3. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 16120a

SECTION 16120b - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of control-voltage electrical power cables. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. UTP cabling.
 - b. 50/125 **OR** 62.5/125, **as directed**,-micrometer, multimode optical fiber cabling.
 - c. RS-232 cabling.
 - d. RS-485 cabling.
 - e. Low-voltage control cabling.
 - f. Control-circuit conductors.
 - g. Identification products.

C. Definitions

1. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.
2. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel section.
3. EMI: Electromagnetic interference.
4. IDC: Insulation displacement connector.
5. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).
6. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
7. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).
8. RCDD: Registered Communications Distribution Designer.
9. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal side rails, and a bottom without ventilation openings.
10. Trough or Ventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal rails and a bottom having openings sufficient for the passage of air and using 75 percent or less of the plan area of the surface to support cables.
11. UTP: Unshielded twisted pair.

D. Submittals

1. Product Data: For each type of product indicated.
2. Field quality-control reports.
3. Maintenance data.

E. Quality Assurance

1. Testing Agency Qualifications: Member company of an NRTL.
 - a. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
2. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 **OR** 450, **as directed**, or less.

16 - Electrical

3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Delivery, Storage, And Handling

1. Test cables upon receipt at Project site.
 - a. Test optical fiber cable to determine the continuity of the strand end to end. Use optical fiber flashlight **OR** optical loss test set, **as directed**.
 - b. Test optical fiber cable on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector; include the loss value of each. Retain test data and include the record in maintenance data.
 - c. Test each pair of UTP cable for open and short circuits.

1.2 PRODUCTS

A. Pathways

1. Support of Open Cabling: NRTL labeled for support of Category 5e **OR** Category 6, **as directed**, cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 - a. Support brackets with cable tie slots for fastening cable ties to brackets.
 - b. Lacing bars, spools, J-hooks, and D-rings.
 - c. Straps and other devices.
2. Cable Trays:
 - a. Cable Tray Materials: Metal, suitable for indoors and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick **OR** hot-dip galvanizing, complying with ASTM A 123/A 123M, Grade 0.55, not less than 0.002165 inch (0.055 mm) thick, **as directed**.
 - 1) Basket Cable Trays: 6 inches (150 mm) wide and 2 inches (50 mm) deep. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).
 - 2) Trough or Ventilated Cable Trays: Nominally 6 inches (150 mm) wide.
 - 3) Ladder Cable Trays: Nominally 18 inches (455 mm) wide, and a rung spacing of 12 inches (305 mm).
 - 4) Channel Cable Trays: One-piece construction, nominally 4 inches (100 mm) wide. Slot spacing shall not exceed 4-1/2 inches (115 mm) o.c.
 - 5) Solid-Bottom or Nonventilated Cable Trays: One-piece construction, nominally 12 inches (305 mm) wide. Provide with **OR** without, **as directed**, solid covers.
3. Conduit and Boxes: Comply with requirements in Division 16 Section "Raceways And Boxes". Flexible metal conduit shall not be used, **as directed**.
 - a. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

B. Backboards

1. Description: Plywood, fire-retardant treated, **as directed**, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels in Division 06 Section "Rough Carpentry".

C. UTP Cable

1. Description: 100-ohm, four-pair UTP, formed into 25-pair binder groups covered with a blue thermoplastic jacket, **as directed**.
 - a. Comply with ICEA S-90-661 for mechanical properties.
 - b. Comply with TIA/EIA-568-B.1 for performance specifications.
 - c. Comply with TIA/EIA-568-B.2, Category 5e **OR** Category 6, **as directed**.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - 1) Communications, General Purpose: Type CM or Type CMG; or Type MPP, Type CMP, Type MPR, Type CMR, Type MP, or Type MPG, **as directed**.

- 2) Communications, Plenum Rated: Type CMP or Type MPP, **as directed**, complying with NFPA 262.
- 3) Communications, Riser Rated: Type CMR; or Type MPP, Type CMP, or Type MPR, **as directed**; complying with UL 1666.
- 4) Communications, Limited Purpose: Type CMX; or Type MPP, Type CMP, Type MPR, Type CMR, Type MP, Type MPG, Type CM, or Type CMG, **as directed**.
- 5) Multipurpose: Type MP or Type MPG; or Type MPP or Type MPR, **as directed**.
- 6) Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
- 7) Multipurpose, Riser Rated: Type MPR or Type MPP, **as directed**, complying with UL 1666.

D. UTP Cable Hardware

1. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.
2. Connecting Blocks: 110 style for Category 5e **OR** 110 style for Category 6 **OR** 66 style for Category 5e, **as directed**. Provide blocks for the number of cables terminated on the block, plus 25 percent spare; integral with connector bodies, including plugs and jacks where indicated.

E. Optical Fiber Cable

1. Description: Multimode, 50/125 **OR** 62.5/125, **as directed**,-micrometer, 24-fiber, nonconductive, **as directed**, tight buffer, optical fiber cable.
 - a. Comply with ICEA S-83-596 for mechanical properties.
 - b. Comply with TIA/EIA-568-B.3 for performance specifications.
 - c. Comply with TIA/EIA-492AAAA-B **OR** TIA/EIA-492AAAA-A, **as directed**, for detailed specifications.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
 - 1) General Purpose, Nonconductive: Type OFN or OFNG, or Type OFNR or Type OFNP, **as directed**.
 - 2) Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
 - 3) Riser Rated, Nonconductive: Type OFNR or Type OFNP, **as directed**, complying with UL 1666.
 - 4) General Purpose, Conductive: Type OFC or Type OFCG; or Type OFNG, Type OFN, Type OFCR, Type OFNR, Type OFCP, or Type OFNP, **as directed**.
 - 5) Plenum Rated, Conductive: Type OFCP or Type OFNP, **as directed**, complying with NFPA 262.
 - 6) Riser Rated, Conductive: Type OFCR; or Type OFNR, Type OFCP, or Type OFNP, **as directed**; complying with UL 1666.
 - e. Conductive cable shall be steel **OR** aluminum, **as directed**,-armored type.
 - f. Maximum Attenuation: 3.5 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
 - g. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.
2. Jacket:
 - a. Jacket Color: Aqua for 50/125 **OR** Orange for 62.5/125, **as directed**,-micrometer cable.
 - b. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
 - c. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

F. Optical Fiber Cable Hardware

1. Cable Connecting Hardware: Comply with the Fiber Optic Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
 - a. Quick-connect, simplex and duplex, Type SC **OR** Type ST **OR** Type LC **OR** Type MT-RJ, **as directed**, connectors. Insertion loss not more than 0.75 dB.
 - b. Type SFF connectors may be used in termination racks, panels, and equipment packages.

G. RS-232 Cable

1. Standard Cable: NFPA 70, Type CM.
 - a. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.

- b. Polypropylene insulation.
 - c. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
 - d. PVC jacket.
 - e. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
 - f. Flame Resistance: Comply with UL 1581.
2. Plenum-Rated Cable: NFPA 70, Type CMP.
- a. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - b. Plastic insulation.
 - c. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
 - d. Plastic jacket.
 - e. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
 - f. Flame Resistance: Comply with NFPA 262.
- H. RS-485 Cable
1. Standard Cable: NFPA 70, Type CM or Type CMG, **as directed**.
- a. Paired, two pairs, twisted, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - b. PVC insulation.
 - c. Unshielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with UL 1581.
2. Plenum-Rated Cable: NFPA 70, Type CMP.
- a. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - b. Fluorinated ethylene propylene insulation.
 - c. Unshielded.
 - d. Fluorinated ethylene propylene jacket.
 - e. Flame Resistance: NFPA 262, Flame Test.
- I. Low-Voltage Control Cable
1. Paired Cable: NFPA 70, Type CMG.
- a. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
 - b. PVC insulation.
 - c. Unshielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with UL 1581.
2. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
- a. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
 - b. PVC insulation.
 - c. Unshielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with NFPA 262.
3. Paired Cable: NFPA 70, Type CMG.
- a. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
 - b. PVC insulation.
 - c. Unshielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with UL 1581.
4. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
- a. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
 - b. Fluorinated ethylene propylene insulation.
 - c. Unshielded.
 - d. Plastic jacket.
 - e. Flame Resistance: NFPA 262, Flame Test.
- J. Control-Circuit Conductors

1. Class 1 Control Circuits: Stranded copper, Type THHN-THWN **OR** Type XHHN, **as directed**, in raceway, complying with UL 83 **OR** UL 44, **as directed**.
2. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, in raceway **OR** Type XHHN, in raceway **OR** power-limited cable, concealed in building finishes **OR** power-limited tray cable, in cable tray, **as directed**, complying with UL 83 **OR** UL 44, **as directed**.
3. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or Type TF, complying with UL 83.

K. Identification Products

1. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
2. Comply with requirements in Division 16 Section "Electrical Identification".

L. Source Quality Control

1. Testing Agency: Engage a qualified testing agency to evaluate cables.
2. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.
3. Factory test UTP cables according to TIA/EIA-568-B.2.
4. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
5. Cable will be considered defective if it does not pass tests and inspections.
6. Prepare test and inspection reports.

1.3 EXECUTION

A. Installation Of Pathways

1. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.
2. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
3. Comply with requirements in Division 16 Section "Raceways And Boxes" for installation of conduits and wireways.
4. Install manufactured conduit sweeps and long-radius elbows if possible.
5. Pathway Installation in Equipment Rooms:
 - a. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed or in the corner of room if multiple sheets of plywood are installed around perimeter walls of room.
 - b. Install cable trays to route cables if conduits cannot be located in these positions.
 - c. Secure conduits to backboard if entering room from overhead.
 - d. Extend conduits 3 inches (75 mm) above finished floor.
 - e. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
6. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

B. Installation Of Conductors And Cables

1. Comply with NECA 1.
2. General Requirements for Cabling:
 - a. Comply with TIA/EIA-568-B.1.
 - b. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - c. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - d. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - e. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.

16 - Electrical

- f. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 - g. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 - h. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
3. UTP Cable Installation:
- a. Comply with TIA/EIA-568-B.2.
 - b. Install 110-style IDC termination hardware unless otherwise indicated.
 - c. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
4. Installation of Control-Circuit Conductors:
- a. Install wiring in raceways. Comply with requirements specified in Division 16 Section "Raceways And Boxes".
5. Optical Fiber Cable Installation:
- a. Comply with TIA/EIA-568-B.3.
 - b. Cable shall be terminated on connecting hardware that is rack or cabinet mounted.
6. Open-Cable Installation:
- a. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 - b. Suspend copper cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1525 mm) apart.
 - c. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
7. Installation of Cable Routed Exposed under Raised Floors:
- a. Install plenum-rated cable only.
 - b. Install cabling after the flooring system has been installed in raised floor areas.
 - c. Coil cable 72 inches (1830 mm) long shall be neatly coiled not less than 12 inches (305 mm) in diameter below each feed point.
8. Separation from EMI Sources:
- a. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 - b. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (305 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).
 - c. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (305 mm).
 - d. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (75 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
 - e. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
 - f. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

C. Removal Of Conductors And Cables

1. Remove abandoned conductors and cables.
- D. Control-Circuit Conductors
1. Minimum Conductor Sizes:
 - a. Class 1 remote-control and signal circuits, No 14 AWG.
 - b. Class 2 low-energy, remote-control, and signal circuits, No. 16 AWG.
 - c. Class 3 low-energy, remote-control, alarm, and signal circuits, No 12 AWG.
- E. Firestopping
1. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
 2. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
 3. Comply with BICSI TDMM, "Firestopping Systems" Article.
- F. Grounding
1. For data communication wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
 2. For low-voltage wiring and cabling, comply with requirements in Division 16 Section "Grounding And Bonding".
- G. Identification
- H. Identify system components, wiring, and cabling according to TIA/EIA-606-A. Comply with requirements for identification specified in Division 16 Section "Electrical Identification".
- I. Field Quality Control
1. Perform tests and inspections.
 2. Tests and Inspections:
 - a. Visually inspect UTP and optical fiber cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
 - b. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - c. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not after cross connection.
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - d. Optical Fiber Cable Tests:
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - 2) Link End-to-End Attenuation Tests:
 - a) Multimode Link Measurements: Test at 850 or 1300 nm in one direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
 - b) Attenuation test results for links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
 3. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
 4. End-to-end cabling will be considered defective if it does not pass tests and inspections.
 5. Prepare test and inspection reports.

END OF SECTION 16120b

Task	Specification	Specification Description
16120	16102	Medium-Voltage Cables

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SECTION 16130 - RACEWAYS AND BOXES

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of raceways and boxes. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

C. Definitions

1. EMT: Electrical metallic tubing.
2. ENT: Electrical nonmetallic tubing.
3. EPDM: Ethylene-propylene-diene terpolymer rubber.
4. FMC: Flexible metal conduit.
5. IMC: Intermediate metal conduit.
6. LFMC: Liquidtight flexible metal conduit.
7. LFNC: Liquidtight flexible nonmetallic conduit.
8. NBR: Acrylonitrile-butadiene rubber.
9. RNC: Rigid nonmetallic conduit.

D. Submittals

1. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
2. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
 - a. Custom enclosures and cabinets.
 - b. For handholes and boxes for underground wiring, including the following:
 - 1) Duct entry provisions, including locations and duct sizes.
 - 2) Frame and cover design.
 - 3) Grounding details.
 - 4) Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
 - 5) Joint details.
3. Samples: For each type of exposed finish required for wireways, nonmetallic wireways and surface raceways, prepared on Samples of size indicated below.
4. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - a. Structural members in the paths of conduit groups with common supports.
 - b. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.
5. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 16 Section(s) "Hangers And Supports For Electrical Systems" AND "Vibration And Seismic Controls For Electrical Systems". Include the following:
 - a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 1) The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will retain its enclosure characteristics, including its interior accessibility, after the seismic event."
 - b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

16 - Electrical

- c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
6. Qualification Data: For professional engineer and testing agency.
7. Source quality-control test reports.

E. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Comply with NFPA 70.

1.2 PRODUCTS

A. Metal Conduit And Tubing

1. Rigid Steel Conduit: ANSI C80.1.
2. Aluminum Rigid Conduit: ANSI C80.5.
3. IMC: ANSI C80.6.
4. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit **OR** IMC, **as directed**.
 - a. Comply with NEMA RN 1.
 - b. Coating Thickness: 0.040 inch (1 mm), minimum.
5. EMT: ANSI C80.3.
6. FMC: Zinc-coated steel **OR** Aluminum **OR** Zinc-coated steel or aluminum, **as directed**.
7. LFMC: Flexible steel conduit with PVC jacket.
8. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - a. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
 - b. Fittings for EMT: Steel **OR** Die-cast, **as directed**, set-screw **OR** compression, **as directed**, type.
 - c. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
9. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

B. Nonmetallic Conduit And Tubing

1. ENT: NEMA TC 13.
2. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
3. LFNC: UL 1660.
4. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
5. Fittings for LFNC: UL 514B.

C. Optical Fiber/Communications Cable Raceway And Fittings

1. Description: Comply with UL 2024; flexible type, approved for plenum **OR** riser **OR** general-use, **as directed**, installation.

D. Metal Wireways

1. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 **OR** 12 **OR** 3R, **as directed**, unless otherwise indicated.
2. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
3. Wireway Covers: Hinged type **OR** Screw-cover type **OR** Flanged-and-gasketed type **OR** As indicated, **as directed**.
4. Finish: Manufacturer's standard enamel finish.

- E. Nonmetallic Wireways
1. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.
OR
Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.
 2. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- F. Surface Raceways
1. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected **OR** Prime coating, ready for field painting, **as directed**.
 2. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected from manufacturer's standard **OR** custom, **as directed**, colors.
- G. Boxes, Enclosures, And Cabinets
1. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
 2. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy **OR** aluminum, **as directed**, Type FD, with gasketed cover.
 3. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
 4. Metal Floor Boxes: Cast metal **OR** Sheet metal, **as directed**, fully adjustable **OR** semi-adjustable, **as directed**, rectangular.
 5. Nonmetallic Floor Boxes: Nonadjustable, round.
 6. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
 7. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum **OR** galvanized, cast iron, **as directed**, with gasketed cover.
 8. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
 - a. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - b. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint, **as directed**.
 9. Cabinets:
 - a. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - b. Hinged door in front cover with flush latch and concealed hinge.
 - c. Key latch to match panelboards.
 - d. Metal barriers to separate wiring of different systems and voltage.
 - e. Accessory feet where required for freestanding equipment.
- H. Handholes And Boxes For Exterior Underground Wiring
1. Description: Comply with SCTE 77.
 - a. Color of Frame and Cover: Gray **OR** Green **as directed**.
 - b. Configuration: Units shall be designed for flush burial and have open **OR** closed **OR** integral closed, **as directed**, bottom, unless otherwise indicated.
 - c. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
 - d. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - e. Cover Legend: Molded lettering, "ELECTRIC" **OR** "TELEPHONE" **OR** as indicated for each service, **as directed**.
 - f. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
 - g. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

16 - Electrical

2. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.
3. Fiberglass Handholes and Boxes with Polymer-Concrete Frame and Cover: Sheet-molded, fiberglass-reinforced, polyester-resin enclosure joined to polymer-concrete top ring or frame.
4. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with covers of polymer concrete **OR** reinforced concrete **OR** cast iron **OR** hot-dip galvanized-steel diamond plate **OR** fiberglass, **as directed**.

I. Sleeves For Raceways

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
3. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.
4. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Through-penetration Firestop Systems".

J. Sleeve Seals

1. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 - a. Sealing Elements: EPDM **OR** NBR, **as directed**, interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - b. Pressure Plates: Plastic **OR** Carbon steel **OR** Stainless steel, **as directed**. Include two for each sealing element.
 - c. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating **OR** Stainless steel, **as directed**, of length required to secure pressure plates to sealing elements. Include one for each sealing element.

K. Source Quality Control For Underground Enclosures

1. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
 - a. Tests of materials shall be performed by a independent testing agency.
 - b. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
 - c. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

1.3 EXECUTION

A. Raceway Application

1. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - a. Exposed Conduit: Rigid steel conduit **OR** IMC **OR** RNC, Type EPC-40-PVC **OR** RNC, Type EPC-80-PVC, **as directed**.
 - b. Concealed Conduit, Aboveground: Rigid steel conduit **OR** IMC **OR** EMT **OR** RNC, Type EPC-40-PVC, **as directed**.
 - c. Underground Conduit: RNC, Type EPC-40 **OR** 80, **as directed**, -PVC, direct buried.
 - d. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC **OR** LFNC, **as directed**.
 - e. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R **OR** 4, **as directed**.
 - f. Application of Handholes and Boxes for Underground Wiring:
 - 1) Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete

- OR** Fiberglass enclosures with polymer-concrete frame and cover **OR** Fiberglass-reinforced polyester resin, **as directed**, SCTE 77, Tier 15 structural load rating.
- 2) Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer-concrete units **OR** Heavy-duty fiberglass units with polymer-concrete frame and cover, **as directed**, SCTE 77, Tier 8 structural load rating.
 - 3) Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf (13 345-N) vertical loading.
2. Comply with the following indoor applications, unless otherwise indicated:
 - a. Exposed, Not Subject to Physical Damage: EMT **OR** ENT **OR** RNC, **as directed**.
 - b. Exposed, Not Subject to Severe Physical Damage: EMT **OR** RNC identified for such use, **as directed**.
 - c. Exposed and Subject to Severe Physical Damage: Rigid steel conduit **OR** IMC, **as directed**. Includes raceways in the following locations:
 - 1) Loading dock.
 - 2) Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - 3) Mechanical rooms.
 - d. Concealed in Ceilings and Interior Walls and Partitions: EMT **OR** ENT **OR** RNC, Type EPC-40-PVC, **as directed**.
 - e. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - f. Damp or Wet Locations: Rigid steel conduit **OR** IMC, **as directed**.
 - g. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway **OR** EMT, **as directed**.
 - h. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: Riser-type, optical fiber/communications cable raceway **OR** EMT, **as directed**.
 - i. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: General-use, optical fiber/communications cable raceway **OR** Riser-type, optical fiber/communications cable raceway **OR** Plenum-type, optical fiber/communications cable raceway **OR** EMT, **as directed**.
 - j. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel **OR** nonmetallic, **as directed**, in damp or wet locations.
 3. Minimum Raceway Size: 1/2-inch (16-mm) **OR** 3/4-inch (21-mm), **as directed**, trade size.
 4. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - a. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
 - b. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
 5. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
 6. Do not install aluminum conduits in contact with concrete.
- B. Installation
1. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
 2. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
 3. Complete raceway installation before starting conductor installation.
 4. Support raceways as specified in Division 16 Section(s) "Hangers And Supports For Electrical Systems" AND "Vibration And Seismic Controls For Electrical Systems".
 5. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
 6. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
 7. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
 8. Raceways Embedded in Slabs:

- a. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - b. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - c. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
9. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
 10. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
 11. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
 12. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
 - a. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).
 - b. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).
 - c. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
 13. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - b. Where otherwise required by NFPA 70.
 14. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m).
 - a. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
 - 1) Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
 - 2) Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 - 3) Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
 - 4) Attics: 135 deg F (75 deg C) temperature change.
 - b. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change.
 - c. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
 15. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures, **as directed**, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - a. Use LFMC in damp or wet locations subject to severe physical damage.
 - b. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
 16. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
 17. Set metal floor boxes level and flush with finished floor surface.
 18. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

C. Installation Of Underground Conduit

1. Direct-Buried Conduit:

- a. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 02 Section "Earthwork" for pipe less than 6 inches (150 mm) in nominal diameter.
- b. Install backfill as specified in Division 02 Section "Earthwork"
- c. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 02 Section "Earthwork".
- d. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.

OR

Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

- 1) Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.

OR

For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

- e. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of conduit.

D. Installation Of Underground Handholes And Boxes

1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
2. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
3. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
4. Install handholes and boxes with bottom below the frost line, **<Insert depth of frost line below grade at Project site>** below grade.
5. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.
6. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

E. Sleeve Installation For Electrical Penetrations

1. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Through-penetration Firestop Systems".
2. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
3. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
4. Rectangular Sleeve Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

16 - Electrical

5. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
 6. Cut sleeves to length for mounting flush with both surfaces of walls.
 7. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
 8. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.
 9. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies, **as directed**.
 10. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
 11. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Through-penetration Firestop Systems".
 12. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
 13. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 14. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway and sleeve for installing mechanical sleeve seals.
- F. Sleeve-Seal Installation
1. Install to seal underground, exterior wall penetrations.
 2. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- G. Firestopping
1. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Through-penetration Firestop Systems".
- H. Protection
1. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - a. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - b. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 16130

SECTION 16130a - UNDERFLOOR RACEWAYS FOR ELECTRICAL SYSTEMS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of underfloor raceways for electrical systems. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes the following:
 - a. Flat-top, single-channel, underfloor raceways.
 - b. Flat-top, multichannel, underfloor raceways.
 - c. Flush, flat-top underfloor raceways.
 - d. Cellular metal underfloor raceways.
 - e. Trench-type underfloor raceways.
 - f. Electrical connection components for precast concrete, hollow-core, floor decks.
 - g. Electrical connection components for electrified cellular steel floor decks.
 - h. Service fittings.

C. Definitions

1. Flush Outlet: Underfloor raceway outlet installed so the top of the fixed portions of the receptacles, jacks, and connector assemblies is located approximately at the surface of the floor or floor covering, and with the bodies of connected plugs exposed above the surface of the floor.
2. Flush Underfloor Raceway: Rectangular cross-section, flat-top raceway installed with the top of the raceway flush with the surface of the concrete in which it is embedded.
3. Header Raceway: Rectangular cross-section, single-channel or multichannel, underfloor raceway arranged as feeder raceway to bring wires and cables to service raceways from panelboards and communication terminal components.
4. Recessed Outlet: Underfloor raceway outlet installed with the top of the fixed portion of the connector assemblies located below the surface of the floor or floor covering and arranged to receive plug connectors with the bodies of the plugs concealed below the floor level.
5. Service Raceway: Underfloor distribution raceway providing direct connection to service fittings using preset or afterset inserts.
6. Trench Header: Trench-type raceway arranged as feeder raceway to bring wires and cables to service raceways from panelboards and communication terminal equipment.
7. Underfloor Raceway: A conduit, duct, or cell assembly, or trench located within the floor material or with its top at the floor surface.

D. Submittals

1. Product Data: For underfloor raceway components, fittings, and accessories.
2. Shop Drawings: For underfloor raceways. Include floor plans, assembly drawings, sections, and details.
 - a. Identify components and accessories such as expansion-joint assemblies, straight raceway lengths, preset and afterset inserts, and service fittings.
 - b. Provide dimensions locating raceway header and distribution elements. Include spacing between preset inserts and between preset inserts and ends of duct runs, walls, columns, junction boxes, and header duct connections.
 - c. Show connections between raceway elements and relationships between components and adjacent structural and architectural elements including slab reinforcement, floor finish work, permanent partitions, architectural module lines, and pretensioning or post-tensioning components.
 - d. Indicate height of preset inserts, junction boxes, and raceways coordinated with depth of concrete slab and floor fill.

- e. Indicate thickening of slabs where required for adequate encasement of raceway components.
 - f. Document coordination of exposed components with floor-covering materials to ensure that fittings and trim are suitable for indicated floor-covering material.
 - g. Revise locations from those indicated in the Contract Documents, as required to suit field conditions and to ensure a functioning layout. Identify proposed deviations from the Contract Documents.
 - h. Show details of connections and terminations of underfloor raceways at panelboards and communication terminal equipment in equipment rooms, wire closets, and similar spaces.
 - i. Identify those cells of cellular floor deck that are to be connected and fitted for the following underfloor distribution:
 - 1) Power.
 - 2) Voice.
 - 3) Data.
 - 4) Signal.
 - 5) Communications.
3. Samples: For typical underfloor raceway products, in specified finish, including the following:
- a. Service fittings and flush and recessed outlet and junction-box covers.
 - b. A section of each service raceway configuration with specified preset insert and service fitting installed.
 - c. A junction box of each size and type for use with underfloor raceway.
 - d. A section of each header raceway configuration, complete with provisions for connection with service raceway.
 - e. A section of trench-type raceway, complete with cover and required trim.
 - f. A junction box of each size and type, complete with cover and trim.
4. Operation and Maintenance Data: For underfloor raceways, to include in emergency, operation, and maintenance manuals. Include the following:
- a. Manufacturer's written instructions for locating preset inserts and for installing afterset inserts.
- E. Quality Assurance
- 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Comply with NFPA 70.

1.2 PRODUCTS

A. Flat-Top, Single-Channel, Underfloor Raceways

- 1. Description:
 - a. Material: Steel.
 - b. Cross-Section Shape: Rectangular.
 - c. Number of Levels: One **OR** Two, **as directed**.
 - d. Minimum Bending Radius for Communication Cables: Combination of raceways, fittings, inserts, junction boxes, service fittings, and mounting and connection arrangements for wiring devices and jacks shall provide a 2-inch- (50-mm-) minimum bending radius for communication cables.
- 2. Service Raceways: Fitted with preset inserts.
 - a. Nominal Raceway Dimensions:
 - 1) Depth: 1-1/2 inches (38 mm).
 - 2) Power Service Raceway Width: 3-1/2 inches (90 mm).
 - 3) Communication Service Raceway Width: 3-1/2 inches (90 mm) **OR** 6-1/2 inches (165 mm), **as directed**.
 - b. Number of Single-Channel Raceways per Run: One **OR** Two **OR** Three **OR** Four **OR** Five, **as directed**, unless otherwise indicated.
 - c. Preset Inserts: Rectangular **OR** Round, **as directed**.
 - 1) Spacing: 24 inches (600 mm) **OR** 12 inches (300 mm), **as directed**, o.c.

- 2) Size: Rectangular dimensions as required to accommodate mounting and connection of flush-mounted, duplex receptacle or dual communication-jack or connector service fitting.
 - 3) Size: 2 inches (50 mm) in diameter.
 - 4) Equip each insert with a disposable cover and select insert height so cover is 1/8 inch (3 mm) below surface of concrete.
 - 5) Arrange insert for optional attachment of flush-, surface-, or wiring- extension service fitting to replace disposable cover.
3. Header Raceways: Single channel, without preset inserts (blank raceway).
- a. Nominal Raceway Dimensions:
 - 1) Depth: 1-1/2 inches (38 mm).
 - 2) Power Header Raceway Width: 3-1/2 inches (90 mm).
 - 3) Communication Header Raceway Width: 3-1/2 inches (90 mm) **OR** 6-1/2 inches (165 mm), **as directed**.
 - b. Arrangement: In same plane as **OR** Below, **as directed**, service raceways.
 - c. Connections: Arranged to connect with service raceways at single-level **OR** two-level, **as directed**, junction boxes.
- B. Flat-Top, Multichannel, Underfloor Raceways
1. Description:
 - a. Material: Steel.
 - b. Cross-Section Shape: Rectangular.
 - c. Number of Longitudinal Channels: Two **OR** Three **OR** Four, **as directed**, separated by steel wall(s).
 - d. Number of Levels: One **OR** Two, **as directed**.
 - e. Minimum Bending Radius for Communication Cables: Combination of raceways, fittings, inserts, junction boxes, service fittings, and mounting and connection arrangements for wiring devices and jacks shall provide a 2-inch- (50-mm-) minimum bending radius for communication cables.
 2. Service Raceways: Fitted with preset inserts.
 - a. Nominal Raceway Dimensions:
 - 1) Depth: 1-3/8 inches (35 mm).
 - 2) Power Service Channel Width: 3-1/2 inches (90 mm) **OR** 4-3/8-inches (111 mm), **as directed**.
 - 3) Communication Service Channel Width: 3-1/2 inches (90 mm) **OR** 4 inches (102 mm) **OR** 6-1/2 inches (165 mm), **as directed**.
 - b. Preset Inserts:
 - 1) Spacing: 24 inches (600 mm) **OR** 12 inches (300 mm), **as directed**, o.c.
 - 2) Size: Dimensions as required to accommodate mounting and connection of flush- and surface-mounted, single- and multiple-system service fittings or to connect to wiring extensions for feeding wall outlets for power **OR** communications **OR** power and communications, **as directed**.
 - 3) Equip each insert with a disposable cover arranged for installation with top 1/8 inch (3 mm) below surface of concrete.
 - 4) Arrange inserts for optional attachment of flush-, surface-, or wiring-extension service fitting to replace disposable cover. Arrange brackets, mountings, barriers, and floor access covers to support, isolate, and provide access to flush or surface outlet-mounting connector, jack, and receptacle devices.
 3. Header Raceways: Multichannel, without preset inserts (blank raceway).
 - a. Nominal Raceway Dimensions:
 - 1) Header Raceway Depth: Same as service raceways **OR** 2-1/2 inches (64 mm) **OR** 2-3/4 inches (70 mm) **OR** 3 inches (76 mm) **OR** 3-1/2 inches (90 mm), **as directed**.
 - 2) Power Header Channel Width: 3-1/2 inches (90 mm) **OR** 4-3/8-inches (111 mm), **as directed**.
 - 3) Communication Header Channel Width: 3-1/2 inches (90 mm) **OR** 4 inches (102 mm) **OR** 6-1/2 inches (165 mm), **as directed**.
 - b. Arrangement: In same plane as **OR** Below, **as directed**, service raceways.

16 - Electrical

- c. Connections: Arranged to connect with service raceways at single-level **OR** two-level, **as directed**, junction boxes.
- C. Flush, Flat-Top Underfloor Raceways
1. Description:
 - a. Material: Steel.
 - b. Cross-Section Shape: Rectangular, single channel and multichannel, separated by steel wall(s).
 - c. Listed and labeled for installation with top flush with concrete floor.
 - d. Number of Levels: One.
 2. Service Raceways: Fitted with preset inserts.
 - a. Number of Longitudinal Channels per Multichannel Raceway: Two **OR** Three, **as directed**.
 - b. Number of Single-Channel Raceways per Run: One **OR** Two **OR** Three, **as directed**, unless otherwise indicated.
 - c. Nominal Channel Dimensions: 3 inches (76 mm) wide by 1-1/4 inches (32 mm) deep.
 - d. Preset Inserts: Threaded opening with removable steel plug that is flush with top of raceway when screwed in place.
 - 1) Spacing: 24 inches (600 mm) **OR** 12 inches (300 mm), **as directed**, o.c., full length of each service raceway.
 - 2) Arrangement: Stagger insert locations on parallel raceways or channels to accommodate placement of adjacent service fittings.
 - 3) Size: 1-5/8-inch (41-mm) diameter.
 3. Header Raceways: Raceways same as service raceways except without preset inserts (blank raceway).
 - a. Nominal Channel Dimensions: Same as service raceways.
 - b. Arrangement: In same plane as service raceways.
 - c. Connections: Arranged to connect with service raceways at junction boxes.
- D. Cellular Metal Underfloor Raceways
1. Service Raceways: Fitted with preset inserts.
 - a. Material: Steel.
 - b. Number of Longitudinal Cells: Three, separated by steel walls.
 - c. Nominal Dimensions of Cells:
 - 1) Overall Depth: 1-1/4 inches (32 mm) unless otherwise indicated.
 - 2) Cross-Sectional Area of Cells: Power cells: 5-1/2 sq. in. (35.5 sq. cm); communication system cells: 16 sq. in. (103 sq. cm).
 - d. Minimum Bending Radius for Communication Cables: Combination of raceways, fittings, inserts, junction boxes, service fittings, and mounting and connection arrangements for wiring devices and jacks shall provide a 2-inch- (50-mm-) minimum bending radius for communication cables.
 - e. Preset Inserts: Rectangular-shaped metal housing assemblies arranged to provide electrical outlet access to each cell of each raceway designated for service raceway use. Inserts shall be provided throughout the entire length of each such raceway.
 - 1) Spacing: 30 inches (762 mm) **OR** 24 inches (600 mm) **OR** 12 inches (300 mm), **as directed**, o.c.
 - 2) Include housing and connecting provisions for a flush or recessed, single-, double-, or triple-system service fitting.
 - 3) Include mounting and connecting provisions for a surface, single- or multiple-system service fitting.
 - 4) Include connecting provisions for a wiring-extension service fitting to feed wall outlets.
 - 5) Equip each insert with a disposable cover plate arranged for installation with top 1/8 inch (3 mm) below surface of concrete. Arrange insert to receive a flush-, recessed-, or wiring-extension service fitting to replace disposable top.
 2. Header Assembly: A junction box and raceway arrangement arranged to feed wires and cables to service raceways.

- a. Three-compartment junction box connecting blank, multicell cellular header raceway (no inserts) with cellular service raceways.
 - 1) Arrange junction box in the center of a 60-inch (152-cm) length of header raceway.
 - 2) Cellular header raceway shall have same dimensions as service raceways.
 - 3) Provide capability for service raceways to be run in both directions from intersection with header raceway.
 - b. Three-compartment junction box preassembled with blank, flat-top, multichannel header raceway (no inserts) and fitted to connect with cellular service raceway at right angles to header raceway.
 - 1) Arrange junction box in the center of a 60-inch (152-cm) length of header raceway.
 - 2) Provide capability for service raceways to be run in both directions from intersection with header raceway.
- E. Trench-Type Underfloor Raceways
1. Trench: Steel, shop or factory welded and fabricated to indicated sizes. Include the following features:
 - a. Slab Depth Adjustment: Minimum of minus 1/8 inch (3 mm) to plus 5/8 inch (16 mm) before and during concrete placement.
 - b. Cover Supports: Height adjustable, with leveling screws to rigidly support cover assembly.
 - c. Screed Strip: Extruded aluminum along both edges at proper elevation without requiring shim material.
 - d. Trim Strip: Select to accommodate floor finish material.
 - e. Partitions: Arranged to separate channels and isolate wiring of different systems.
 - f. Grommeted openings in active floor cells or service raceways.
 - g. Manufacturer's standard corrosion-resistant finish, applied after fabrication.
 2. Cover Plates: Removable, steel plates, 1/4 inch (6 mm) thick, each weighing 60 lb (27 kg) or less with full gasket attached to side units. Fabricate intermediate supports to limit unsupported spans to 15 inches (380 mm) or less. Fabricate covers with appropriate depth recess to receive indicated floor finish.
- F. Electrical Connection Components For Cellular Steel Floor Deck
1. Preset Inserts: Rectangular metal-housing assemblies.
 - a. Spacing: 30 inches (762 mm) **OR** 24 inches (600 mm) **OR** 12 inches (300 mm), **as directed**, o.c.
 - b. Size: As required to provide electrical outlet access to each cell of each group of three cells that is designated for electrical service raceway use.
 - c. Equip each insert with a disposable cover arranged for installation with top 1/8 inch (3 mm) below surface of concrete. Arrange insert to receive a flush-, recessed-, or wiring-extension service fitting to replace disposable cover.
 - d. Include housing and connecting provisions for a flush or recessed, single-, double-, or triple-system service fitting.
 - e. Include mounting and connecting provisions for a surface, single-, double-, or triple-system service fitting.
 - f. Include connecting provisions for a wiring-extension service fitting to feed wall outlets.
- G. Electrical Connection Components For Cellular Concrete Floor Deck
1. Afterset Inserts: Round metal-nipple assembly with internal and external threading, arranged to screw into plug driven into 1-7/8-inch (48-mm) hole drilled through floor fill, where present, and deck-cell wall into floor raceway cell.
 - a. Inserts shall be compatible with floor-mounting service fittings.
 - b. Inserts shall provide wiring path from cell to power **OR** communication **OR** power and communication, **as directed**, wall and ceiling outlets.
 - c. Inserts shall provide wiring path from cell to header raceway.
- H. Supports, Fittings, And Hardware
1. Supports, fittings, and hardware shall be compatible with raceway and outlet system and shall be listed for use with raceway systems and components specified.

16 - Electrical

2. Supports: Adjustable for height and arranged to maintain alignment and spacing of raceways during concrete placement. Include hold-down straps.
3. Raceway Fittings: Couplings, expansion-joint sleeves, cross-under offsets, vertical and horizontal elbows, grounding screws, adapters, end caps, and other fittings suitable for use with basic components to form a complete installation.

I. Junction Boxes

1. Description: Manufacturer's standard enclosure for indicated type, quantity, arrangement, and configuration of raceways at each raceway junction, intersection, and access location. Include the following accessories and features:
 - a. Mounting brackets.
 - b. Escutcheons and holders to accommodate surrounding floor covering.
 - c. Means for leveling and height adjustment more than 3/8 inch (10 mm) before and after concrete is placed.
 - d. Raceway Openings: For underfloor raceways and conduits arranged to accommodate raceway layout.
 - e. Covers shall have appropriate depth recess to receive specific floor finish material.
 - f. Partitions to separate wiring of different systems.

J. Service Fittings

1. Exposed Parts Finish: Brass **OR** Brushed Aluminum, **as directed**.
2. Flush, Single-System Service Fitting for Round Inserts: Include mounting and cover to support and provide access to single connector, jack, or receptacle device; mounted flush with floor within body of insert.
 - a. Connector, Jack, and Receptacle Devices: Single modular type; complying with Division 16 Section(s) "Wiring Devices" AND "Communications Horizontal Cabling".
 - b. Power Receptacle Outlet: Suitable for 20-A device.
3. Flush, Single- or Multiple-System Service Fitting for Rectangular Inserts: Include mounting, hinged cover, and trim to support and provide access to connector, jack, or receptacle devices mounted flush with floor within insert.
 - a. Connector, Jack, and Receptacle Devices: Modular type; complying with Division 16 Section(s) "Wiring Devices" AND "Communications Horizontal Cabling".
 - b. Power Receptacle Rating: 20 A, 120 V unless otherwise indicated.
4. Recess-Mounted Service Fitting: Modular fittings compatible with preset inserts and shall include covers; provisions for receptacles, jacks, and connectors; and associated device plates for indicated systems. Include hinged flush handhole covers with recessed depth to match thickness of floor finish material. Provide for internally mounted receptacle- and communication-jack and connector assemblies complying with requirements in Division 16 Section(s) "Wiring Devices" AND "Communications Horizontal Cabling".
 - a. Duplex receptacle.
 - b. Duplex telephone-data jacks.
 - c. Double duplex receptacles.
 - d. Duplex receptacle and duplex telephone-data jacks.
 - e. Double duplex telephone-data jacks, Category 5 **OR** Category 5e **OR** Category 6, **as directed**.
 - f. Fiber-optic cable connector.
5. Surface-Mounted Service Fitting: Modular pedestal type, with locking attachment matched to insert floor opening.
 - a. Power-outlet, double-faced, surface-mounted unit for duplex receptacle on both sides.
 - b. Power-outlet, single-faced, surface-mounted unit for duplex receptacle on one side.
 - c. Communication-outlet, double-faced, surface-mounted unit.
 - 1) Include bushed openings on both sides; 1-inch (25-mm) minimum diameter; insulated with nonconducting material.
 - 2) Include provisions for modular dual fiber-optic connector assembly on both sides.
 - 3) Include provisions for modular dual jack-connector assembly, rated for Category 5 **OR** Category 5e **OR** Category 6, **as directed**, on both sides.

- d. Communication-outlet, single-faced, surface-mounted unit with bushed opening on one side; 1-inch (25-mm) minimum diameter; insulated with nonconducting material.
- e. Combination surface-mounted unit for duplex receptacle on one side and with communication cable connection provision on opposite side.
 - 1) Communication Side: Include bushed opening; 1-inch (25-mm) minimum diameter; insulated with nonconducting material.
 - 2) Communication Side: Include provisions for modular dual fiber-optic connector assembly.
 - 3) Communication Side: Include provisions for modular dual jack-connector assembly, rated for Category 5 **OR** Category 5e **OR** Category 6, **as directed**.
- 6. Flush-Mounted Service Fittings: Modular fittings compatible with preset inserts and shall include covers, provisions for receptacles jacks and connector assemblies and wiring extensions to wall-mounted outlets, and associated device plates for indicated systems. Include flush handhole covers, recessed to suit floor finish material. Internally mounted, modular, receptacle, jack and connector assemblies shall comply with requirements in Division 16 Section(s) "Wiring Devices" AND "Communications Horizontal Cabling".
 - a. Duplex convenience receptacle.
 - b. Duplex telephone-data outlets.
 - c. Double duplex convenience receptacles.
 - d. Duplex convenience receptacle and duplex telephone-data outlets.
 - e. Double duplex telephone-data outlets.
 - f. Duplex communication jack, rated for Category 5 **OR** Category 5e **OR** Category 6, **as directed**.
 - g. Duplex fiber-optic communication connector.
 - h. Wiring-Extension Service Fittings: Arrangement of brackets and mountings to support, and provide access to wiring or cabling of a cell, and to connect the cable or raceway that extends the system to an individual wall outlet. Provide for connection of FMC **OR** ENT **OR** Type MC cable, **as directed**, for power extensions, and FMC **OR** ENT **OR** optical fiber/communication cable raceway, **as directed**, for communication system extensions.

1.3 EXECUTION

A. Installation

1. Install raceways aligned and leveled and, unless otherwise indicated, parallel or perpendicular to building walls.
2. Provide a concrete base for support of cellular metal raceway.
3. Arrange supports to attain proper elevation, alignment, and spacing of raceways. Install supports securely at ends and at intervals not to exceed 60 inches (1500 mm), to prevent movement during concrete pour.
4. Level raceway components with finished slab and make adjustments for floor finishes.
5. Adjust supports to maintain a 1/16- to 3/8-inch (1.6- to 10-mm) finished concrete cover over preset inserts.
6. Remove burrs, sharp edges, dents, and mechanical defects.
7. Cap or plug boxes, insert- and service-fitting openings, and open ends of raceways.
8. Seal raceways, cells, junction boxes, and inserts to prevent water, concrete, or foreign matter from entering raceways before and during pouring slab or placing fill. Tape joints, or seal with compound, as recommended in writing by underfloor raceway manufacturer.
9. Junction Boxes: Install tops level and flush with finished floor. Install blank closure plates or plugs to close unused junction-box openings. Grout boxes in place to prevent movement during construction. Place top covers in inverted position during construction to prevent damage to surface of cover. Reinstall covers in proper position prior to final acceptance of Work.
10. Afterset Inserts: Cut, hole saw, and drill slab and raceways to allow for installation.
11. Ground underfloor raceway components.
12. Install a marker at the center of the last insert of each cell and channel of each straight run of metal underfloor service raceway to locate the insert and identify the system.
 - a. Install markers at last inserts on both sides of permanent walls and at first inserts adjacent to each junction box.

16 - Electrical

- b. Install markers flush at screed line before pouring slab or placing fill. Extend marker with grommated screw when floor covering is placed. Do not extend through carpet.
 - c. Use slotted-head screw to identify electrical power; use Phillips-head screw to identify conventional communications.
 - d. Use another distinctive screw head to identify third system such as special-purpose wiring.
13. Level raceway components with finished slab and make adjustments in raceway component elevation to accommodate indicated floor finishes.

B. Field Quality Control

1. Perform tests and inspections.
 - a. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Tests and Inspections:
 - a. Perform visual inspection of interior of each junction box **OR** section of trench raceway, **as directed**, to verify absence of dirt, dust, construction debris, and moisture. Replace damaged and malfunctioning components.
 - b. Perform point-to-point tests of ground continuity and resistance of ground path between the most remote accessible fitting on each branch of each underfloor raceway system and the main electrical distribution grounding system.
 - 1) Determine cause and perform correction of any point-to-point resistance value that exceeds 0.05 ohms.
 - 2) Comply with NETA Acceptance Testing Specifications about safety, suitability of test equipment, test instrument calibration, and test report and records.

C. Cleaning

1. Clean and swab out underfloor raceways, inserts, and junction boxes after finish has been applied to floor slab, and remove foreign material, dirt, and moisture. Leave interiors clean and dry.

END OF SECTION 16130a

Task	Specification	Specification Description
16130	16101a	Electrical Renovation
16130	16120a	Undercarpet Cables

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SECTION 16131 - COMMON WORK RESULTS FOR ELECTRICAL

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for common work results for electrical. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Electrical equipment coordination and installation.
 - b. Sleeves for raceways and cables.
 - c. Sleeve seals.
 - d. Grout.
 - e. Common electrical installation requirements.

C. Definitions

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

D. Submittals

1. Product Data: For sleeve seals.

1.2 PRODUCTS

A. Sleeves For Raceways And Cables

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
3. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - a. Minimum Metal Thickness:
 - 1) For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - 2) For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

B. Sleeve Seals

1. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - a. Sealing Elements: EPDM **OR** NBR, **as directed**, interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - b. Pressure Plates: Plastic **OR** Carbon steel **OR** Stainless steel, **as directed**. Include two for each sealing element.
 - c. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating **OR** Stainless steel, **as directed**, of length required to secure pressure plates to sealing elements. Include one for each sealing element.

C. Grout

16 - Electrical

1. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

1.3 EXECUTION

A. Common Requirements For Electrical Installation

1. Comply with NECA 1.
2. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
3. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
4. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
5. Right of Way: Give to piping systems installed at a required slope.

B. Sleeve Installation For Electrical Penetrations

1. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
2. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
3. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
4. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
5. Cut sleeves to length for mounting flush with both surfaces of walls.
6. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
7. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.
8. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - a. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
9. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants".
10. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
11. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
12. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel **OR** cast-iron, **as directed**, pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
13. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

C. Sleeve-Seal Installation

1. Install to seal exterior wall penetrations.
2. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- D. Firestopping
 - 1. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Through-penetration Firestop Systems".

END OF SECTION 16131

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SECTION 16131a - COMMON WORK RESULTS FOR COMMUNICATIONS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for common work results for communications. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Communications equipment coordination and installation.
 - b. Sleeves for pathways and cables.
 - c. Sleeve seals.
 - d. Grout.
 - e. Common communications installation requirements.

C. Definitions

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

D. Submittals

1. Product Data: For sleeve seals.

1.2 PRODUCTS

A. Sleeves For Pathways And Cables

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
3. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - a. Minimum Metal Thickness:
 - 1) For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - 2) For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

B. Sleeve Seals

1. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
 - a. Sealing Elements: EPDM **OR** NBR, **as directed**, interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.
 - b. Pressure Plates: Plastic **OR** Carbon steel **OR** Stainless steel, **as directed**. Include two for each sealing element.
 - c. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating **OR** Stainless steel, **as directed**, of length required to secure pressure plates to sealing elements. Include one for each sealing element.

C. Grout

16 - Electrical

1. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

1.3 EXECUTION

A. Common Requirements For Communications Installation

1. Comply with NECA 1.
2. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
3. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
4. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
5. Right of Way: Give to piping systems installed at a required slope.

B. Sleeve Installation For Communications Penetrations

1. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
2. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
3. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
4. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
5. Cut sleeves to length for mounting flush with both surfaces of walls.
6. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
7. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable, unless indicated otherwise.
8. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - a. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
9. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants".
10. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
11. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.
12. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel **OR** cast-iron, **as directed**, pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
13. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

C. Sleeve-Seal Installation

1. Install to seal exterior wall penetrations.
2. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- D. Firestopping
1. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Through-penetration Firestop Systems".

END OF SECTION 16131a

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SECTION 16131b - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for common work results for electronic safety and security. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Electronic safety and security equipment coordination and installation.
 - b. Sleeves for raceways and cables.
 - c. Sleeve seals.
 - d. Grout.
 - e. Common electronic safety and security installation requirements.

C. Definitions

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

D. Submittals

1. Product Data: For sleeve seals.

1.2 PRODUCTS

A. Sleeves For Raceways And Cables

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
3. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - a. Minimum Metal Thickness:
 - 1) For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - 2) For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

B. Sleeve Seals

1. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - a. Sealing Elements: EPDM **OR** NBR, **as directed**, interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - b. Pressure Plates: Plastic **OR** Carbon steel **OR** Stainless steel, **as directed**. Include two for each sealing element.
 - c. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating **OR** Stainless steel, **as directed**, of length required to secure pressure plates to sealing elements. Include one for each sealing element.

C. Grout

16 - Electrical

1. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

1.3 EXECUTION

A. Common Requirements For Electronic Safety And Security Installation

1. Comply with NECA 1.
2. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
3. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
4. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electronic safety and security equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
5. Right of Way: Give to piping systems installed at a required slope.

B. Sleeve Installation For Electronic Safety And Security Penetrations

1. Electronic safety and security penetrations occur when raceways, pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
2. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
3. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
4. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
5. Cut sleeves to length for mounting flush with both surfaces of walls.
6. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
7. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.
8. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - a. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
9. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants".
10. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
11. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
12. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel **OR** cast-iron, **as directed**, pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
13. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

C. Sleeve-Seal Installation

1. Install to seal exterior wall penetrations.

2. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- D. Firestopping
1. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electronic safety and security installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Through-penetration Firestop Systems".

END OF SECTION 16131b

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SECTION 16131c - COMMUNICATIONS EQUIPMENT ROOM FITTINGS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for communications equipment room fittings. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Telecommunications mounting elements.
 - b. Backboards.
 - c. Telecommunications equipment racks and cabinets.
 - d. Telecommunications service entrance pathways.
 - e. Grounding.

C. Definitions

1. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.
2. BICSI: Building Industry Consulting Service International.
3. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel not exceeding 6 inches (152 mm) in width.
4. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).
5. LAN: Local area network.
6. RCDD: Registered Communications Distribution Designer.
7. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of a bottom without ventilation openings within integral or separate longitudinal side rails.
8. Trough or Ventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal rails and a bottom having openings sufficient for the passage of air and using 75 percent or less of the plan area of the surface to support cables.

D. Performance Requirements

1. Seismic Performance: Floor-mounted cabinets and cable pathways shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

E. Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings: For communications equipment room fittings. Include plans, elevations, sections, details, and attachments to other work.
 - a. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - b. Equipment Racks and Cabinets: Include workspace requirements and access for cable connections.
 - c. Grounding: Indicate location of grounding bus bar and its mounting detail showing standoff insulators and wall mounting brackets.
3. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.
4. Seismic Qualification Certificates: For floor-mounted cabinets, accessories, and components, from manufacturer.

16 - Electrical

- a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
- b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions. Base certification on the maximum number of components capable of being mounted in each rack type. Identify components on which certification is based.
- c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Quality Assurance

1. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - a. Layout Responsibility: Preparation of Shop Drawings shall be under the direct supervision of RCDD **OR** RCDD/NTS **OR** Commercial Installer, Level 2, **as directed**.
 - b. Installation Supervision: Installation shall be under the direct supervision of Registered Technician **OR** Level 2 Installer, **as directed**, who shall be present at all times when Work of this Section is performed at Project site.
 - c. Field Inspector: Currently registered by BICSI as RCDD **OR** Commercial Installer, Level 2, **as directed**, to perform the on-site inspection.
2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
4. Grounding: Comply with ANSI-J-STD-607-A.

G. Project Conditions

1. Environmental Limitations: Do not deliver or install equipment frames and cable trays until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and work above ceilings is complete.

H. Coordination

1. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier.
 - a. Meet jointly with telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
 - b. Record agreements reached in meetings and distribute them to other participants.
 - c. Adjust arrangements and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
 - d. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
2. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

1.2 PRODUCTS**A. Pathways**

1. General Requirements: Comply with TIA/EIA-569-A.
2. Cable Support: NRTL labeled. Cable support brackets shall be designed to prevent degradation of cable performance and pinch points that could damage cable. Cable tie slots fasten cable ties to brackets.
 - a. Comply with NFPA 70 and UL 2043 for fire-resistant and low-smoke-producing characteristics.
 - b. Support brackets with cable tie slots for fastening cable ties to brackets.
 - c. Lacing bars, spools, J-hooks, and D-rings.

- d. Straps and other devices.
 3. Cable Trays:
 - a. Cable Tray Materials: Metal, suitable for indoors and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick **OR** hot-dip galvanizing, complying with ASTM A 123/A 123M, Grade 0.55, not less than 0.002165 inch (0.055 mm) thick, **as directed**.
 - 1) Basket Cable Trays: 6 inches (150 mm) wide and 2 inches (50 mm) deep. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).
 - 2) Trough Cable Trays: Nominally 6 inches (150 mm) wide.
 - 3) Ladder Cable Trays: Nominally 18 inches (455 mm) wide, and a rung spacing of 12 inches (305 mm).
 - 4) Channel Cable Trays: One-piece construction, nominally 4 inches (100 mm) wide. Slot spacing shall not exceed 4-1/2 inches (115 mm) o.c.
 - 5) Solid-Bottom Cable Trays: One-piece construction, nominally 12 inches (305 mm) wide. Provide with **OR** without, **as directed**, solid covers.
 4. Conduit and Boxes: Comply with requirements in Division 16 Section "Raceways And Boxes". Flexible metal conduit shall not be used.
 - a. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.
- B. Backboards
1. Backboards: Plywood, fire-retardant treated, **as directed**, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry".
- C. Equipment Frames
1. General Frame Requirements:
 - a. Distribution Frames: Freestanding and wall-mounting, modular-steel units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.
 - b. Module Dimension: Width compatible with EIA 310 standard, 19-inch (480-mm) panel mounting.
 - c. Finish: Manufacturer's standard, baked-polyester powder coat.
 2. Floor-Mounted Racks: Modular-type, steel **OR** aluminum, **as directed**, construction.
 - a. Vertical and horizontal cable management channels, top and bottom cable troughs, grounding lug, and a power strip, **as directed**.
 - b. Baked-polyester powder coat finish.
 3. Modular Freestanding Cabinets:
 - a. Removable and lockable side panels.
 - b. Hinged and lockable front and rear doors.
 - c. Adjustable feet for leveling.
 - d. Screened ventilation openings in the roof and rear door.
 - e. Cable access provisions in the roof and base.
 - f. Grounding bus bar.
 - g. Rack **OR** Roof, **as directed**, -mounted, 550-cfm (260-L/s) fan with filter.
 - h. Power strip.
 - i. Baked-polyester powder coat finish.
 - j. All cabinets keyed alike.
 4. Modular Wall Cabinets:
 - a. Wall mounting.
 - b. Steel **OR** Aluminum, **as directed**, construction.
 - c. Treated to resist corrosion.
 - d. Lockable front and rear doors.
 - e. Louvered side panels.
 - f. Cable access provisions top and bottom.
 - g. Grounding lug.
 - h. Rack **OR** Roof, **as directed**, -mounted, 250-cfm (118-L/s) fan.

16 - Electrical

- i. Power strip.
- j. All cabinets keyed alike.
- 5. Cable Management for Equipment Frames:
 - a. Metal, with integral wire retaining fingers.
 - b. Baked-polyester powder coat finish.
 - c. Vertical cable management panels shall have front and rear channels, with covers.
 - d. Provide horizontal crossover cable manager at the top of each relay rack, with a minimum height of two rack units each.

D. Power Strips

- 1. Power Strips: Comply with UL 1363.
 - a. Rack mounting.
 - b. Six, 15-A, 120-V ac, NEMA WD 6, Configuration 5-15R **OR** 20-A, 120-V ac, NEMA WD 6, Configuration 5-20R, **as directed**, receptacles.
 - c. LED indicator lights for power and protection status.
 - d. LED indicator lights for reverse polarity and open outlet ground.
 - e. Circuit Breaker and Thermal Fusing:
 - 1) When protection is lost, circuit opens and cannot be reset.

OR

 Unit continues to supply power if protection is lost.
 - f. Close-coupled, direct plug-in **OR** Cord connected with 15-foot (4.5-m), **as directed**, line cord.
 - g. Rocker-type on-off switch, illuminated when in on position.
 - h. Peak Single-Impulse Surge Current Rating: 33 **OR** 26 **OR** 13, **as directed**, kA per phase.
 - i. Protection modes shall be line to neutral, line to ground, and neutral to ground. UL 1449 clamping voltage for all 3 modes shall be not more than 330 V.

E. Grounding

- 1. Comply with requirements in Division 16 Section "Grounding And Bonding" for grounding conductors and connectors.
- 2. Telecommunications Main Bus Bar:
 - a. Connectors: Mechanical type, cast silicon bronze, solderless compression **OR** exothermic, **as directed**, -type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
 - b. Ground Bus Bar: Copper, minimum 1/4 inch thick by 4 inches wide (6 mm thick by 100 mm wide) with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart.
 - c. Stand-Off Insulators: Comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.
- 3. Comply with ANSI-J-STD-607-A.

F. Labeling

- 1. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

1.3 EXECUTION**A. Entrance Facilities**

- 1. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and a housing when so directed by service provider.
- 2. Install underground **OR** buried **OR** aerial, **as directed**, pathways complying with recommendations in TIA/EIA-569-A, "Entrance Facilities" Article.
 - a. Install underground **OR** buried, **as directed**, entrance pathway complying with Division 16 Section "Raceways And Boxes".

B. Installation

- 1. Comply with NECA 1.

2. Comply with BICSI TDMM for layout and installation of communications equipment rooms.
 3. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.
 4. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
- C. Firestopping
1. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
 2. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
 3. Comply with BICSI TDMM, "Firestopping Systems" Article.
- D. Grounding
1. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
 2. Comply with ANSI-J-STD-607-A.
 3. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
 4. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
 - a. Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.
- E. Identification
1. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements in Division 16 Section "Electrical Identification".
 2. Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
 3. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 2 **OR** Class 3 **OR** Class 4, **as directed**, level of administration including optional identification requirements of this standard, **as directed**.
 4. Labels shall be preprinted or computer-printed type.

END OF SECTION 16131c

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SECTION 16131d - COMMUNICATIONS BACKBONE CABLING

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for communications backbone cabling. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Pathways.
 - b. UTP cable.
 - c. 50/125 and 62.5/125-micrometer, optical fiber cabling.
 - d. Coaxial cable.
 - e. Cable connecting hardware, patch panels, and cross-connects.
 - f. Cabling identification products.

C. Definitions

1. BICSI: Building Industry Consulting Service International.
2. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
3. EMI: Electromagnetic interference.
4. IDC: Insulation displacement connector.
5. LAN: Local area network.
6. RCDD: Registered Communications Distribution Designer.
7. UTP: Unshielded twisted pair.

D. Backbone Cabling Description

1. Backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
2. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

E. Performance Requirements

1. General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

F. Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings:
 - a. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
 - b. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
 - c. Cabling administration drawings and printouts.
 - d. Wiring diagrams to show typical wiring schematics including the following:
 - 1) Cross-connects.
 - 2) Patch panels.
 - 3) Patch cords.

16 - Electrical

- e. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
- f. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements.
- 3. Qualification Data: For Installer, **as directed**, qualified layout technician, installation supervisor, and field inspector.
- 4. Source quality-control reports.
- 5. Field quality-control reports.
- 6. Maintenance Data.
- 7. Software and Firmware Operational Documentation:
 - a. Software operating and upgrade manuals.
 - b. Program Software Backup: On magnetic media or compact disk, complete with data files.
 - c. Device address list.
 - d. Printout of software application and graphic screens.

G. Quality Assurance

- 1. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - a. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
 - b. Installation Supervision: Installation shall be under the direct supervision of Registered Technician **OR** Level 2 Installer, **as directed**, who shall be present at all times when Work of this Section is performed at Project site.
- 2. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 **OR** 450, **as directed**, or less.
- 3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 4. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
- 5. Grounding: Comply with ANSI-J-STD-607-A.

H. Delivery, Storage, And Handling

- 1. Test cables upon receipt at Project site.
 - a. Test optical fiber cable to determine the continuity of the strand end to end. Use optical fiber flashlight or optical loss test set.
 - b. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.
 - c. Test each pair of UTP cable for open and short circuits.

I. Software Service Agreement

- 1. Technical Support: Beginning with Substantial Completion, provide software support for two years.
- 2. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 - a. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.2 PRODUCTS**A. Pathways**

- 1. General Requirements: Comply with TIA/EIA-569-A.

2. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 - a. Support brackets with cable tie slots for fastening cable ties to brackets.
 - b. Lacing bars, spools, J-hooks, and D-rings.
 - c. Straps and other devices.
 3. Cable Trays:
 - a. Cable Tray Material: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inches (0.012 mm) thick **OR** hot-dip galvanizing, complying with ASTM A 123/A 123M, Grade 0.55, not less than 0.002165 inches (0.055 mm) thick, **as directed**.
 - 1) Basket Cable Trays: 6 inches (150 mm) wide and 2 inches (50 mm) deep. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).
 - 2) Trough Cable Trays: Nominally 6 inches (150 mm) wide.
 - 3) Ladder Cable Trays: Nominally 18 inches (455 mm) wide, and a rung spacing of 12 inches (305 mm).
 - 4) Channel Cable Trays: One-piece construction, nominally 4 inches (100 mm) wide. Slot spacing shall not exceed 4-1/2 inches (115 mm) o.c.
 - 5) Solid-Bottom Cable Trays: One-piece construction, nominally 12 inches (305 mm) wide. Provide with **OR** without, **as directed**, solid covers.
 4. Conduit and Boxes: Comply with requirements in Division 16 Section "Raceways And Boxes". Flexible metal conduit shall not be used.
 - a. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.
- B. Backboards
1. Backboards: Plywood, fire-retardant treated, **as directed**, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements in Division 06 Section "Rough Carpentry" for plywood backing panels.
- C. UTP Cable
1. Description: 100-ohm, 100-pair UTP, formed into 25-pair binder groups covered with a gray thermoplastic jacket and overall metallic shield.
 - a. Comply with ICEA S-90-661 for mechanical properties.
 - b. Comply with TIA/EIA-568-B.1 for performance specifications.
 - c. Comply with TIA/EIA-568-B.2, Category 5e **OR** Category 6, **OR** Category 6e **as directed**.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - 1) Communications, General Purpose: Type CM or CMG; or MPP, CMP, MPR, CMR, MP, or MPG, **as directed**.
 - 2) Communications, Plenum Rated: Type CMP or MPP, **as directed**, complying with NFPA 262.
 - 3) Communications, Riser Rated: Type CMR; or MPP, CMP, or MPR, **as directed**, complying with UL 1666.
 - 4) Communications, Limited Purpose: Type CMX; or MPP, CMP, MPR, CMR, MP, MPG, CM, or CMG, **as directed**.
 - 5) Multipurpose: Type MP or MPG; or MPP or MPR, **as directed**.
 - 6) Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
 - 7) Multipurpose, Riser Rated: Type MPR or MPP, **as directed**, complying with UL 1666.
- D. UTP Cable Hardware
1. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
 2. Connecting Blocks: 110-style IDC for Category 5e **OR** 110-style IDC for Category 6 **OR** 66-style IDC for Category 5e, **OR** 110-style IDC for Category 6e **as directed**. Provide blocks for the

number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

3. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
 - a. Number of Terminals per Field: One for each conductor in assigned cables.
4. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
 - a. Number of Jacks per Field: One for each four-pair UTP cable indicated **OR** conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria, **as directed**.
5. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
6. Patch Cords: Factory-made, 4-pair cables in 36-inch (900-mm) **OR** 48-inch (1200-mm), **as directed**, lengths; terminated with 8-position modular plug at each end.
 - a. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
 - b. Patch cords shall have color-coded boots for circuit identification.

E. Optical Fiber Cable

1. Description: Multimode, 50/125 **OR** 62.5/125, **as directed**,-micrometer, 24-fiber, nonconductive, **as directed**, tight buffer, optical fiber cable.
 - a. Comply with ICEA S-83-596 for mechanical properties.
 - b. Comply with TIA/EIA-568-B.3 for performance specifications.
 - c. Comply with TIA/EIA-492AAAA-B **OR** TIA/EIA-492AAAA-A, **as directed**, for detailed specifications.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
 - 1) General Purpose, Nonconductive: Type OFN or OFNG, or OFNR, OFNP, **as directed**.
 - 2) Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
 - 3) Riser Rated, Nonconductive: Type OFNR or OFNP, **as directed**, complying with UL 1666.
 - 4) General Purpose, Conductive: Type OFC or OFCG; or OFNG, OFN, OFCR, OFNR, OFCP, or OFNP, **as directed**.
 - 5) Plenum Rated, Conductive: Type OFCP or OFNP, **as directed**, complying with NFPA 262.
 - 6) Riser Rated, Conductive: Type OFCR; or OFNR, OFCP, or OFNP, **as directed**, complying with UL 1666.
 - e. Conductive cable shall be steel **OR** aluminum, **as directed**, armored type.
 - f. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
 - g. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.
2. Jacket:
 - a. Jacket Color: Aqua for 50/125-micrometer cable **OR** Orange for 62.5/125-micrometer cable, **as directed**.
 - b. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
 - c. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

F. Optical Fiber Cable Hardware

1. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
 - a. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.
2. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths.
3. Cable Connecting Hardware:
 - a. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.

- b. Quick-connect, simplex and duplex, Type SC **OR** Type ST **OR** Type LC **OR** Type MT-RJ, **as directed**, connectors. Insertion loss not more than 0.75 dB.
 - c. Type SFF connectors may be used in termination racks, panels, and equipment packages.
- G. Coaxial Cable
- 1. General Coaxial Cable Requirements: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.
 - 2. RG-11/U: NFPA 70, Type CATV.
 - a. No. 14 AWG, solid, copper-covered steel conductor.
 - b. Gas-injected, foam-PE insulation.
 - c. Double shielded with 100 percent aluminum polyester tape and 60 percent aluminum braid.
 - d. Jacketed with sunlight-resistant, black PVC or PE.
 - e. Suitable for outdoor installations in ambient temperatures ranging from minus 40 to plus 85 deg C.
 - 3. RG59/U: NFPA 70, Type CATVR.
 - a. No. 20 AWG, solid, silver-plated, copper-covered steel conductor.
 - b. Gas-injected, foam-PE insulation.
 - c. Triple shielded with 100 percent aluminum polyester tape and 95 percent aluminum braid; covered by aluminum foil with grounding strip.
 - d. Color-coded PVC jacket.
 - 4. RG-6/U: NFPA 70, Type CATV or CM.
 - a. No. 16 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
 - b. Double shielded with 100 percent aluminum-foil shield and 60 percent aluminum braid.
 - c. Jacketed with black PVC or PE.
 - d. Suitable for indoor installations.
 - 5. RG59/U: NFPA 70, Type CATV.
 - a. No. 20 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
 - b. Double shielded with 100 percent aluminum polyester tape and 40 percent aluminum braid.
 - c. PVC jacket.
 - 6. RG59/U (Plenum Rated): NFPA 70, Type CMP.
 - a. No. 20 AWG, solid, copper-covered steel conductor; foam fluorinated ethylene propylene insulation.
 - b. Double shielded with 100 percent aluminum-foil shield and 65 percent aluminum braid.
 - c. Copolymer jacket.
 - 7. NFPA and UL compliance, listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655 and with NFPA 70, "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles. Types are as follows:
 - a. CATV Cable: Type CATV, or CATVP or CATVR, **as directed**.
 - b. CATV Plenum Rated: Type CATVP, complying with NFPA 262.
 - c. CATV Riser Rated: Type CATVR; or CATVP, CATVR, or CATV, **as directed**, complying with UL 1666.
 - d. CATV Limited Rating: Type CATVX.
- H. Coaxial Cable Hardware
- 1. Coaxial-Cable Connectors: Type BNC, 75 ohms.
- I. Grounding
- 1. Comply with requirements in Division 16 Section "Grounding And Bonding" for grounding conductors and connectors.
 - 2. Comply with ANSI-J-STD-607-A.
- J. Identification Products
- 1. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- K. Source Quality Control
- 1. Testing Agency: Engage a qualified testing agency to evaluate cables.

16 - Electrical

2. Factory test cables on reels according to TIA/EIA-568-B.1.
3. Factory test UTP cables according to TIA/EIA-568-B.2.
4. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
5. Cable will be considered defective if it does not pass tests and inspections.
6. Prepare test and inspection reports.

1.3 EXECUTION**A. Entrance Facilities**

1. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

B. Wiring Methods

1. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
 - a. Install plenum cable in environmental air spaces, including plenum ceilings.
 - b. Comply with requirements for raceways and boxes specified in Division 16 Section "Raceways And Boxes".
2. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
3. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

C. Installation Of Pathways

1. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A.
2. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 16 Section "Communications Equipment Room Fittings". Drawings indicate general arrangement of pathways and fittings.
3. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
4. Comply with requirements in Division 16 Section "Raceways And Boxes" for installation of conduits and wireways.
5. Install manufactured conduit sweeps and long-radius elbows whenever possible.
6. Pathway Installation in Communications Equipment Rooms:
 - a. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
 - b. Install cable trays to route cables if conduits cannot be located in these positions.
 - c. Secure conduits to backboard when entering room from overhead.
 - d. Extend conduits 3 inches (76 mm) above finished floor.
 - e. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
7. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

D. Installation Of Cables

1. Comply with NECA 1.
2. General Requirements for Cabling:
 - a. Comply with TIA/EIA-568-B.1.
 - b. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - c. Install 110-style IDC termination hardware unless otherwise indicated.
 - d. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.

- e. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - f. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 - g. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
 - h. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 - i. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 - j. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
 - k. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
3. UTP Cable Installation:
 - a. Comply with TIA/EIA-568-B.2.
 - b. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
 4. Optical Fiber Cable Installation:
 - a. Comply with TIA/EIA-568-B.3.
 - b. Cable may be terminated on connecting hardware that is rack or cabinet mounted.
 5. Open-Cable Installation:
 - a. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 - b. Suspend UTP cable not in a wireway or pathway, a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
 - c. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
 6. Installation of Cable Routed Exposed under Raised Floors:
 - a. Install plenum-rated cable only.
 - b. Install cabling after the flooring system has been installed in raised floor areas.
 - c. Coil cable 6 feet (1800 mm) long not less than 12 inches (300 mm) in diameter below each feed point.
 7. Outdoor Coaxial Cable Installation:
 - a. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
 - b. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches (915 mm).
 8. Group connecting hardware for cables into separate logical fields.
 9. Separation from EMI Sources:
 - a. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 - b. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).
 - c. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

16 - Electrical

- d. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
 - e. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
 - f. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).
- E. Firestopping
- 1. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
 - 2. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
 - 3. Comply with BICSI TDMM, "Firestopping Systems" Article.
- F. Grounding
- 1. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
 - 2. Comply with ANSI-J-STD-607-A.
 - 3. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
 - 4. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
- G. Identification
- 1. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 16 Section "Electrical Identification".
 - a. Administration Class: **1 OR 2 OR 3 OR 4, as directed.**
 - b. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.
 - 2. Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
 - 3. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class **2 OR Class 3 OR Class 4, as directed**, level of administration including optional identification requirements of this standard.
 - 4. Comply with requirements in Division 16 Section "Communications Horizontal Cabling" for cable and asset management software.
 - 5. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
 - 6. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.
 - 7. Cable and Wire Identification:
 - a. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - b. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 - c. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).

- d. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - 1) Individually number wiring conductors connected to terminal strips and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device with name and number of particular device as shown.
 - 2) Label each unit and field within distribution racks and frames.
 - e. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
8. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following:
- a. Cables use flexible vinyl or polyester that flexes as cables are bent.
- H. Field Quality Control
1. Tests and Inspections:
 - a. Visually inspect UTP and optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
 - b. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - c. Test UTP copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - d. Optical Fiber Cable Tests:
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - 2) Link End-to-End Attenuation Tests:
 - a) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
 - b) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
 2. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
 3. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
 4. End-to-end cabling will be considered defective if it does not pass tests and inspections.
 5. Prepare test and inspection reports.

END OF SECTION 16131d

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SECTION 16131e - COMMUNICATIONS HORIZONTAL CABLING

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for communications horizontal cabling. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. Pathways.
 - b. UTP cabling.
 - c. 50/125 and 62.5/125-micrometer, optical fiber cabling.
 - d. Coaxial cable.
 - e. Multiuser telecommunications outlet assemblies.
 - f. Cable connecting hardware, patch panels, and cross-connects.
 - g. Telecommunications outlet/connectors.
 - h. Cabling system identification products.
 - i. Cable management system.

C. Definitions

1. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.
2. BICSI: Building Industry Consulting Service International.
3. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel.
4. Consolidation Point: A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.
5. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
6. EMI: Electromagnetic interference.
7. IDC: Insulation displacement connector.
8. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).
9. LAN: Local area network.
10. MUTOA: Multiuser telecommunications outlet assembly, a grouping in one location of several telecommunications outlet/connectors.
11. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.
12. RCDD: Registered Communications Distribution Designer.
13. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of longitudinal side rails and a bottom without ventilation openings.
14. Trough or Ventilated Cable Tray: A fabricated structure consisting of longitudinal side rails and a bottom having openings for the passage of air.
15. UTP: Unshielded twisted pair.

D. Horizontal Cabling Description

1. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called "permanent link," a term that is used in the testing protocols.
 - a. TIA/EIA-568-B.1 requires that a minimum of two telecommunications outlet/connectors be installed for each work area.
 - b. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.

16 - Electrical

- c. Bridged taps and splices shall not be installed in the horizontal cabling.
- d. Splitters shall not be installed as part of the optical fiber cabling.
- 2. A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the telecommunications outlet/connectors to the station equipment.
- 3. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment. The maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) in the horizontal cross-connect.

E. Performance Requirements

- 1. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

F. Submittals

- 1. Product Data: For each type of product indicated.
- 2. Shop Drawings:
 - a. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
 - b. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
 - c. Cabling administration drawings and printouts.
 - d. Wiring diagrams to show typical wiring schematics, including the following:
 - 1) Cross-connects.
 - 2) Patch panels.
 - 3) Patch cords.
 - e. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
 - f. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements.
- 3. Samples: For workstation outlets, jacks, jack assemblies, in specified finish, one for each size and outlet configuration and faceplates for color selection and evaluation of technical features.
- 4. Qualification Data: For Installer, **as directed**, qualified layout technician, installation supervisor, and field inspector.
- 5. Source quality-control reports.
- 6. Field quality-control reports.
- 7. Maintenance Data.
- 8. Software and Firmware Operational Documentation:
 - a. Software operating and upgrade manuals.
 - b. Program Software Backup: On magnetic media or compact disk, complete with data files.
 - c. Device address list.
 - d. Printout of software application and graphic screens.

G. Quality Assurance

- 1. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - a. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
 - b. Installation Supervision: Installation shall be under the direct supervision of Registered Technician **OR** Level 2 Installer, **as directed**, who shall be present at all times when Work of this Section is performed at Project site.
- 2. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 **OR** 450, **as directions**, or less.
- 3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 4. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

5. Grounding: Comply with ANSI-J-STD-607-A.
- H. Delivery, Storage, And Handling
1. Test cables upon receipt at Project site.
 - a. Test optical fiber cables to determine the continuity of the strand end to end. Use optical fiber flashlight or optical loss test set.
 - b. Test optical fiber cables while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector; including the loss value of each. Retain test data and include the record in maintenance data.
 - c. Test each pair of UTP cable for open and short circuits.
- I. Software Service Agreement
1. Technical Support: Beginning with Substantial Completion, provide software support for two years.
 2. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 - a. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.2 PRODUCTS

A. Pathways

1. General Requirements: Comply with TIA/EIA-569-A.
2. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 - a. Support brackets with cable tie slots for fastening cable ties to brackets.
 - b. Lacing bars, spools, J-hooks, and D-rings.
 - c. Straps and other devices.
3. Cable Trays:
 - a. Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick **OR** hot-dip galvanizing, complying with ASTM A 123/A 123M, Grade 0.55, not less than 0.002165 inch (0.055 mm) thick, **as directed**.
 - 1) Basket Cable Trays: 6 inches (150 mm) wide and 2 inches (50 mm) deep. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).
 - 2) Trough Cable Trays: Nominally 6 inches (150 mm) wide.
 - 3) Ladder Cable Trays: Nominally 18 inches (455 mm) wide, and a rung spacing of 12 inches (305 mm).
 - 4) Channel Cable Trays: One-piece construction, nominally 4 inches (100 mm) wide. Slot spacing shall not exceed 4-1/2 inches (115 mm) o.c.
 - 5) Solid-Bottom Cable Trays: One-piece construction, nominally 12 inches (305 mm) wide. Provide with **OR** without, **as directed**, solid covers.
4. Conduit and Boxes: Comply with requirements in Division 16 Section "Raceways And Boxes". Flexible metal conduit shall not be used.
 - a. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

B. Backboards

1. Backboards: Plywood, fire-retardant treated, **as directed**, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements in Division 06 Section "Rough Carpentry" for plywood backing panels.

C. UTP Cable

16 - Electrical

1. Description: 100-ohm, 4-pair UTP, formed into 25-pair, binder groups covered with a blue thermoplastic jacket.
 - a. Comply with ICEA S-90-661 for mechanical properties.
 - b. Comply with TIA/EIA-568-B.1 for performance specifications.
 - c. Comply with TIA/EIA-568-B.2, Category 5e **OR** Category 6, **OR** Category 6e **as directed**.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - 1) Communications, General Purpose: Type CM or CMG; or MPP, CMP, MPR, CMR, MP, or MPG, **as directed**.
 - 2) Communications, Plenum Rated: Type CMP or MPP, **as directed**, complying with NFPA 262.
 - 3) Communications, Riser Rated: Type CMR; or MPP, CMP, or MPR, **as directed**, complying with UL 1666.
 - 4) Communications, Limited Purpose: Type CMX; or MPP, CMP, MPR, CMR, MP, MPG, CM, or CMG, **as directed**.
 - 5) Multipurpose: Type MP or MPG; or MPP or MPR, **as directed**.
 - 6) Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
 - 7) Multipurpose, Riser Rated: Type MPR or MPP, **as directed**, complying with UL 1666.

D. UTP Cable Hardware

1. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
2. Connecting Blocks: 110-style IDC for Category 5e **OR** 110-style IDC for Category 6 **OR** 66-style IDC for Category 5e, **OR** 110-style IDC for Category 6e **as directed**. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.
3. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
 - a. Number of Terminals per Field: One for each conductor in assigned cables.
4. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
 - a. Number of Jacks per Field: One for each four-pair UTP cable indicated **OR** conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria, **as directed**.
5. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
6. Patch Cords: Factory-made, four-pair cables in 36-inch (900 mm) **OR** 48-inch (1200-mm), **as directed**, lengths; terminated with eight-position modular plug at each end.
 - a. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
 - b. Patch cords shall have color-coded boots for circuit identification.

E. Optical Fiber Cable

1. Description: Multimode, 50/125 **OR** 62.5/125, **as directed**,-micrometer, 24-fiber, nonconductive, **as directed**, tight buffer, optical fiber cable.
 - a. Comply with ICEA S-83-596 for mechanical properties.
 - b. Comply with TIA/EIA-568-B.3 for performance specifications.
 - c. Comply with TIA/EIA-492AAAA-B **OR** TIA/EIA-492AAAA-A, **as directed**, for detailed specifications.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
 - 1) General Purpose, Nonconductive: Type OFN or OFNG, or OFNR, OFNP, **as directed**.
 - 2) Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.

- 3) Riser Rated, Nonconductive: Type OFNR or OFNP, **as directed**, complying with UL 1666.
 - 4) General Purpose, Conductive: Type OFC or OFCG; or OFNG, OFN, OFCR, OFNR, OFCP, or OFNP, **as directed**.
 - 5) Plenum Rated, Conductive: Type OFCP or OFNP, **as directed**, complying with NFPA 262.
 - 6) Riser Rated, Conductive: Type OFCR; or OFNR, OFCP, or OFNP, **as directed**, complying with UL 1666.
 - e. Conductive cable shall be steel **OR** aluminum, **as directed**, armored type.
 - f. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
 - g. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.
2. Jacket:
- a. Jacket Color: Aqua for 50/125-micrometer cable **OR** Orange for 62.5/125-micrometer cable, **as directed**.
 - b. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
 - c. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).
- F. Optical Fiber Cable Hardware
1. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
 - a. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.
 2. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths.
 3. Cable Connecting Hardware:
 - a. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
 - b. Quick-connect, simplex and duplex, Type SC **OR** Type ST **OR** Type LC **OR** Type MT-RJ, **as directed**, connectors. Insertion loss not more than 0.75 dB.
 - c. Type SFF connectors may be used in termination racks, panels, and equipment packages.
- G. Coaxial Cable
1. Cable Characteristics: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.
 2. RG-11/U: NFPA 70, Type CATV.
 - a. No. 14 AWG, solid, copper-covered steel conductor.
 - b. Gas-injected, foam-PE insulation.
 - c. Double shielded with 100 percent aluminum polyester tape and 60 percent aluminum braid.
 - d. Jacketed with sunlight-resistant, black PVC or PE.
 - e. Suitable for outdoor installations in ambient temperatures ranging from minus 40 to plus 85 deg C.
 3. RG59/U: NFPA 70, Type CATVR.
 - a. No. 20 AWG, solid, silver-plated, copper-covered steel conductor.
 - b. Gas-injected, foam-PE insulation.
 - c. Triple shielded with 100 percent aluminum polyester tape and 95 percent aluminum braid; covered by aluminum foil with grounding strip.
 - d. Color-coded PVC jacket.
 4. RG-6/U: NFPA 70, Type CATV or CM.
 - a. No. 16 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
 - b. Double shielded with 100 percent aluminum-foil shield and 60 percent aluminum braid.
 - c. Jacketed with black PVC or PE.
 - d. Suitable for indoor installations.
 5. RG59/U: NFPA 70, Type CATV.
 - a. No. 20 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
 - b. Double shielded with 100 percent aluminum polyester tape and 40 percent aluminum braid.
 - c. PVC jacket.
 6. RG59/U (Plenum Rated): NFPA 70, Type CMP.

16 - Electrical

- a. No. 20 AWG, solid, copper-covered steel conductor; foam fluorinated ethylene propylene insulation.
 - b. Double shielded with 100 percent aluminum-foil shield and 65 percent aluminum braid.
 - c. Copolymer jacket.
7. NFPA and UL compliance, listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655 and with NFPA 70 "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles. Types are as follows:
- a. CATV Cable: Type CATV or CATVP or CATVR, **as directed**.
 - b. CATV Plenum Rated: Type CATVP, complying with NFPA 262.
 - c. CATV Riser Rated: Type CATVR; or CATVP, CATVR, or CATV, **as directed**, complying with UL 1666.
 - d. CATV Limited Rating: Type CATVX.
- H. Coaxial Cable Hardware
- 1. Coaxial-Cable Connectors: Type BNC, 75 ohms.
- I. Consolidation Points
- 1. Description: Consolidation points shall comply with requirements for cable connecting hardware.
 - a. Number of Terminals per Field: One for each conductor in assigned cables.
 - b. Number of Connectors per Field:
 - 1) One for each four-pair UTP cable indicated.
 - 2) One for each four-pair conductor group of indicated cables, plus 25 percent spare positions.
 - c. Mounting: Recessed in ceiling **OR** Wall **OR** Desk **OR** Furniture, **as directed**.
 - d. NRTL listed as complying with UL 50 and UL 1863.
 - e. When installed in plenums used for environmental air, NRTL listed as complying with UL 2043.
- J. Multiuser Telecommunications Outlet Assembly (MUTOA)
- 1. Description: MUTOAs shall meet the requirements for cable connecting hardware.
 - a. Number of Terminals per Field: One for each conductor in assigned cables.
 - b. Number of Connectors per Field:
 - 1) One for each four-pair UTP cable indicated.
 - 2) One for each four-pair conductor group of indicated cables, plus 25 percent spare positions.
 - c. Mounting: Recessed in ceiling **OR** Wall **OR** Desk **OR** Furniture, **as directed**.
 - d. NRTL listed as complying with UL 50 and UL 1863.
 - e. Label shall include maximum length of work area cords, based on TIA/EIA-568-B.1.
 - f. When installed in plenums used for environmental air, NRTL listed as complying with UL 2043.
- K. Telecommunications Outlet/Connectors
- 1. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1.
 - 2. Workstation Outlets: Two **OR** Four, **as directed**,-port-connector assemblies mounted in single or multigang faceplate.
 - a. Plastic Faceplate: High-impact plastic. Coordinate color with Division 16 Section "Wiring Devices".
 - b. Metal Faceplate: Stainless steel **OR** Brass, **as directed**, complying with requirements in Division 16 Section "Wiring Devices".
 - c. For use with snap-in jacks accommodating any combination of UTP, optical fiber, and coaxial work area cords.
 - 1) Flush mounting jacks, positioning the cord at a 45-degree angle.
 - d. Legend:
 - 1) Factory labeled by silk-screening or engraving for stainless steel **OR** brass, **as directed**, faceplates.
OR

Machine printed, in the field, using adhesive-tape label.

OR

Snap-in, clear-label covers and machine-printed paper inserts.

- L. Grounding
 - 1. Comply with requirements in Division 16 Section "Grounding And Bonding" for grounding conductors and connectors.
 - 2. Comply with ANSI-J-STD-607-A.
- M. Identification Products
 - 1. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
 - 2. Comply with requirements in Division 16 Section "Electrical Identification".
- N. Cable Management System
 - 1. Description: Computer-based cable management system, with integrated database and graphic, **as directed**, capabilities.
 - 2. Document physical characteristics by recording the network, TIA/EIA details, and connections between equipment and cable.
 - 3. Information shall be presented in database view, schematic plans, or technical drawings.
 - a. Microsoft Visio Professional or AutoCAD drawing software shall be used as drawing and schematic plans software.
 - 4. System shall interface with the following testing and recording devices:
 - a. Direct upload tests from circuit testing instrument into the personal computer.
 - b. Direct download circuit labeling into labeling printer.
- O. Source Quality Control
 - 1. Testing Agency: Engage a qualified testing agency to evaluate cables.
 - 2. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.
 - 3. Factory test UTP cables according to TIA/EIA-568-B.2.
 - 4. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
 - 5. Factory-sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.
 - 6. Cable will be considered defective if it does not pass tests and inspections.
 - 7. Prepare test and inspection reports.

1.3 EXECUTION

- A. Entrance Facilities
 - 1. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.
- B. Wiring Methods
 - 1. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
 - a. Install plenum cable in environmental air spaces, including plenum ceilings.
 - b. Comply with requirements for raceways and boxes specified in Division 16 Section "Raceways And Boxes".
 - 2. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
 - 3. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

16 - Electrical

- C. Installation Of Pathways
1. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.
 2. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 16 Section "Communications Equipment Room Fittings". Drawings indicate general arrangement of pathways and fittings.
 3. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
 4. Comply with requirements in Division 16 Section "Raceways And Boxes" for installation of conduits and wireways.
 5. Install manufactured conduit sweeps and long-radius elbows whenever possible.
 6. Pathway Installation in Communications Equipment Rooms:
 - a. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
 - b. Install cable trays to route cables if conduits cannot be located in these positions.
 - c. Secure conduits to backboard when entering room from overhead.
 - d. Extend conduits 3 inches (76 mm) above finished floor.
 - e. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
 7. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.
- D. Installation Of Cables
1. Comply with NECA 1.
 2. General Requirements for Cabling:
 - a. Comply with TIA/EIA-568-B.1.
 - b. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - c. Install 110-style IDC termination hardware unless otherwise indicated.
 - d. MUTOA shall not be used as a cross-connect point.
 - e. Consolidation points may be used only for making a direct connection to telecommunications outlet/connectors:
 - 1) Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
 - 2) Locate consolidation points for UTP at least 49 feet (15 m) from communications equipment room.
 - f. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 - g. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - h. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 - i. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
 - j. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 - k. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 - l. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
 - m. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
 3. UTP Cable Installation:
 - a. Comply with TIA/EIA-568-B.2.

- b. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
4. Optical Fiber Cable Installation:
 - a. Comply with TIA/EIA-568-B.3.
 - b. Cable may be terminated on connecting hardware that is rack or cabinet mounted.
5. Open-Cable Installation:
 - a. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 - b. Suspend UTP cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
 - c. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
6. Installation of Cable Routed Exposed under Raised Floors:
 - a. Install plenum-rated cable only.
 - b. Install cabling after the flooring system has been installed in raised floor areas.
 - c. Coil cable 6 feet (1800 mm) long not less than 12 inches (300 mm) in diameter below each feed point.
7. Outdoor Coaxial Cable Installation:
 - a. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
 - b. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches (915 mm).
8. Group connecting hardware for cables into separate logical fields.
9. Separation from EMI Sources:
 - a. Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 - b. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).
 - c. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
 - d. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
 - e. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
 - f. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).
- E. Firestopping
 1. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
 2. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
 3. Comply with BICSI TDMM, "Firestopping Systems" Article.
- F. Grounding
 1. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

16 - Electrical

2. Comply with ANSI-J-STD-607-A.
3. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
4. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

G. Identification

1. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 16 Section "Electrical Identification".
 - a. Administration Class: **1 OR 2 OR 3 OR 4, as directed.**
 - b. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.
2. Using cable management system software specified in Part 2, develop Cabling Administration Drawings for system identification, testing, and management. Use unique, alphanumeric designation for each cable and label cable, jacks, connectors, and terminals to which it connects with same designation. At completion, cable and asset management software shall reflect as-built conditions.
3. Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
4. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 2 **OR** Class 3 **OR** Class 4, **as directed**, level of administration, including optional identification requirements of this standard.
5. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
6. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.
7. Cable and Wire Identification:
 - a. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - b. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 - c. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
 - d. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - 1) Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
 - 2) Label each unit and field within distribution racks and frames.
 - e. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
 - f. Uniquely identify and label work area cables extending from the MUTOA to the work area. These cables may not exceed the length stated on the MUTOA label.
8. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.
 - a. Cables use flexible vinyl or polyester that flex as cables are bent.

H. Field Quality Control

1. Tests and Inspections:

- a. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
- b. Visually confirm Category 5e **OR** Category 6, **OR** Category 6e **as directed**, marking of outlets, cover plates, outlet/connectors, and patch panels.
- c. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
- d. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- e. Optical Fiber Cable Tests:
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - 2) Link End-to-End Attenuation Tests:
 - a) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
 - b) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
- f. UTP Performance Tests:
 - 1) Test for each outlet and MUTOA. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:
 - a) Wire map.
 - b) Length (physical vs. electrical, and length requirements).
 - c) Insertion loss.
 - d) Near-end crosstalk (NEXT) loss.
 - e) Power sum near-end crosstalk (PSNEXT) loss.
 - f) Equal-level far-end crosstalk (ELFEXT).
 - g) Power sum equal-level far-end crosstalk (PSELFEXT).
 - h) Return loss.
 - i) Propagation delay.
 - j) Delay skew.
- g. Optical Fiber Cable Performance Tests: Perform optical fiber end-to-end link tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.3.
- h. Coaxial Cable Tests: Conduct tests according to Division 16 Section "Master Antenna Television System".
- i. Final Verification Tests: Perform verification tests for UTP and optical fiber systems after the complete communications cabling and workstation outlet/connectors are installed.
 - 1) Voice Tests: These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and digital subscription line telephone call.
 - 2) Data Tests: These tests assume the Information Technology Staff has a network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

16 - Electrical

2. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
3. End-to-end cabling will be considered defective if it does not pass tests and inspections.
4. Prepare test and inspection reports.

END OF SECTION 16131e

SECTION 16131f - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of materials for conductors and cables for electronic safety and security. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. Section Includes:
 - a. UTP cabling.
 - b. 50/125 and 62.5/125-micrometer, multimode optical fiber cabling.
 - c. Coaxial cabling.
 - d. RS-232 cabling.
 - e. RS-485 cabling.
 - f. Low-voltage control cabling.
 - g. Control-circuit conductors.
 - h. Fire alarm wire and cable.
 - i. Identification products.

C. Definitions

1. BICSI: Building Industry Consulting Service International.
2. EMI: Electromagnetic interference.
3. IDC: Insulation displacement connector.
4. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
5. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).
6. RCDD: Registered Communications Distribution Designer.

D. Performance Requirements

1. Seismic Performance: Pathways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

E. Submittals

1. Product Data: For each type of product indicated.
 - a. For coaxial cable, include the following installation data for each type used:
 - 1) Nominal OD.
 - 2) Minimum bending radius.
 - 3) Maximum pulling tension.
2. Shop Drawings: Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:
 - a. Vertical and horizontal offsets and transitions.
 - b. Clearances for access above and to side of cable trays.
 - c. Vertical elevation of cable trays above the floor or bottom of ceiling structure.
3. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.
4. Seismic Qualification Certificates: For pathways, accessories, and components, from manufacturer.
 - a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

16 - Electrical

- b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
5. Source quality-control reports.
 6. Field quality-control reports.
 7. Operation and Maintenance Data: For wire and cable to include in operation and maintenance manuals. Include the following:
 - a. Allowable pulling tension of cable.
 - b. Cable connectors and terminations recommended by the manufacturer.

F. Quality Assurance

1. Testing Agency Qualifications: An NRTL.
 - a. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
2. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 **OR** 450, **as directed**, or less.
3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Delivery, Storage, And Handling

1. Test cables upon receipt at Project site.
 - a. Test optical fiber cable to determine the continuity of the strand end to end. Use optical-fiber flashlight or optical loss test set.
 - b. Test optical fiber cable on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector; include the loss value of each. Retain test data and include the record in maintenance data.
 - c. Test each pair of UTP cable for open and short circuits.

H. Project Conditions

1. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.
 - a. Indications that wire and cables are wet or moisture damaged include, but are not limited to, discoloration and sagging of factory packing materials.
2. Environmental Limitations: Do not deliver or install UTP, optical fiber, and coaxial cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.2 PRODUCTS**A. Pathways**

1. Support of Open Cabling: NRTL labeled for support of Category 5e **OR** Category 6, **OR** Category 6e **as directed**, cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
 - a. Support brackets with cable tie slots for fastening cable ties to brackets.
 - b. Lacing bars, spools, J-hooks, and D-rings.
 - c. Straps and other devices.
2. Cable Trays:
 - a. Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick **OR** hot-dip galvanizing, complying with

- ASTM A 123/A 123M Grade 0.55, not less than 0.002165 inch (0.055 mm) thick, **as directed**.
- 1) Basket Cable Trays: 6 inches (150 mm) wide and 2 inches (50 mm) deep, **as directed**. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).
 - 2) Trough Cable Trays: Nominally 6 inches (150 mm), **as directed**, wide.
 - 3) Ladder Cable Trays: Nominally 18 inches (455 mm), **as directed**, wide, and a rung spacing of 12 inches (305 mm), **as directed**.
 - 4) Channel Cable Trays: One-piece construction, nominally 4 inches (100 mm), **as directed**, wide. Slot spacing shall not exceed 4-1/2 inches (115 mm) o.c.
 - 5) Solid-Bottom Cable Trays: One-piece construction, nominally 12 inches (305 mm), **as directed**, wide. Provide with **OR** without, **as directed**, solid covers.
3. Conduit and Boxes: Comply with requirements in Division 16 Section "Raceways and Boxes." Flexible metal conduit shall not be used, **as directed**.
 4. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.
- B. Backboards
1. Backboards: Plywood, fire-retardant treated, **as directed**, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels in Division 06 Section "Rough Carpentry".
- C. UTP Cable
1. Description: 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket.
 - a. Comply with ICEA S-90-661 for mechanical properties.
 - b. Comply with TIA/EIA-568-B.1 for performance specifications.
 - c. Comply with TIA/EIA-568-B.2, Category 5e **OR** Category 6, **OR** Category 6e **as directed**.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - 1) Communications, General Purpose: Type CM or CMG; **OR** MPP, CMP, MPR, CMR, MP, or MPG, **as directed**.
 - 2) Communications, Plenum Rated: Type CMP **OR** MPP, **as directed**, complying with NFPA 262.
 - 3) Communications, Riser Rated: Type CMR; **OR** MPP, CMP, or MPR, **as directed**, complying with UL 1666.
 - 4) Communications, Limited Purpose: Type CMX; **OR** MPP, CMP, MPR, CMR, MP, MPG, CM, or CMG, **as directed**.
 - 5) Multipurpose: Type MP or MPG; **OR** MPP or MPR, **as directed**.
 - 6) Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
 - 7) Multipurpose, Riser Rated: Type MPR **OR** MPP, **as directed**, complying with UL 1666.
- D. UTP Cable Hardware
1. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.
 2. Connecting Blocks: 110-style for Category 5e **OR** 110-style for Category 6 **OR** 66-style for Category 5e, **OR** 110-style for Category 6e **as directed**. Provide blocks for the number of cables terminated on the block, plus 25, **as directed**, percent spare. Integral with connector bodies, including plugs and jacks where indicated.
- E. Optical Fiber Cable
1. Description: Multimode, 50/125 **OR** 62.5/125, **as directed**,-micrometer, 24-fiber, **as directed**, nonconductive, **as directed**, tight buffer, optical fiber cable.
 - a. Comply with ICEA S-83-596 for indoor cable **OR** ICEA S-87-640 for outside plant, **as directed**, for mechanical properties.
 - b. Comply with TIA/EIA-568-B.3 for performance specifications.
 - c. Comply with TIA-492AAAB **OR** TIA-492AAAA-A, **as directed**, for detailed specifications.
 - d. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

- 1) General Purpose, Nonconductive: Type OFN or OFNG, **OR** OFNR, OFNP, **as directed**.
 - 2) Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
 - 3) Riser Rated, Nonconductive: Type OFNR or OFNP, complying with UL 1666.
 - 4) General Purpose, Conductive: Type OFC or OFCG; **OR** OFNG, OFN, OFCR, OFNR, OFCP, or OFNP, **as directed**.
 - 5) Plenum Rated, Conductive: Type OFCP or OFNP, complying with NFPA 262.
 - 6) Riser Rated, Conductive: Type OFCR; or OFNR, OFCP, or OFNP, **asa directed**, complying with UL 1666.
- e. Conductive cable shall be steel **OR** aluminum, **as directed**, armored type.
 - f. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
 - g. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.
2. Jacket:
 - a. Jacket Color: Aqua for 50/125-micrometer cable **OR** Orange for 62.5/125-micrometer cable, **as directed**.
 - b. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-C.
 - c. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).
- F. Optical Fiber Cable Hardware
1. Cable Connecting Hardware: Meet the Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA-604-2-B, TIA-604-3-B, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
 - a. Quick-connect, simplex and duplex, Type SC **OR** Type ST **OR** Type LC **OR** Type MT-RJ, **as directed**, connectors. Insertion loss not more than 0.75 dB.
 - b. Type SFF connectors may be used in termination racks, panels, and equipment packages.
- G. Coaxial Cable
1. General Coaxial Cable Requirements: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.
 2. RG-11/U: NFPA 70, Type CATV.
 - a. No. 14 AWG, solid, copper-covered steel conductor.
 - b. Gas-injected, foam-PE insulation.
 - c. Double shielded with 100 percent aluminum polyester tape and 60 percent aluminum braid.
 - d. Jacketed with sunlight-resistant, black PVC or PE.
 - e. Suitable for outdoor installations in ambient temperatures ranging from minus 40 to plus 85 deg C.
 3. RG59/U: NFPA 70, Type CATVR.
 - a. No. 20 AWG, solid, silver-plated, copper-covered steel conductor.
 - b. Gas-injected, foam-PE insulation.
 - c. Triple shielded with 100 percent aluminum polyester tape and 95 percent aluminum braid; covered by aluminum foil with grounding strip.
 - d. Color-coded PVC jacket.
 4. RG-6/U: NFPA 70, Type CATV or CM.
 - a. No. 16 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
 - b. Double shielded with 100 percent aluminum-foil shield and 60 percent aluminum braid.
 - c. Jacketed with black PVC or PE.
 - d. Suitable for indoor installations.
 5. RG59/U: NFPA 70, Type CATV.
 - a. No. 20 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
 - b. Double shielded with 100 percent aluminum polyester tape and 40 percent aluminum braid.
 - c. PVC jacket.
 6. RG59/U (Plenum Rated): NFPA 70, Type CMP.
 - a. No. 20 AWG, solid, copper-covered steel conductor; foam fluorinated ethylene propylene insulation.

- b. Double shielded with 100 percent aluminum-foil shield and 65 percent aluminum braid.
- c. Copolymer jacket.
- 7. NFPA and UL Compliance: Coaxial cables shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655, and with NFPA 70 "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles. Types are as follows:
 - a. CATV Cable: Type CATV, **OR** CATVP or CATVR, **as directed**.
 - b. CATV Plenum Rated: Type CATVP, complying with NFPA 262.
 - c. CATV Riser Rated: Type CATVR; **OR** CATVP, CATVR, or CATV, **as directed**, complying with UL 1666.
 - d. CATV Limited Rating: Type CATVX.
- H. Coaxial Cable Hardware
 - 1. Coaxial-Cable Connectors: Type BNC, 75 ohms.
- I. RS-232 Cable
 - 1. Standard Cable: NFPA 70, Type CM.
 - a. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
 - b. Polypropylene insulation.
 - c. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
 - d. PVC jacket.
 - e. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
 - f. Flame Resistance: Comply with UL 1581.
 - 2. Plenum-Rated Cable: NFPA 70, Type CMP.
 - a. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
 - b. Plastic insulation.
 - c. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
 - d. Plastic jacket.
 - e. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
 - f. Flame Resistance: Comply with NFPA 262.
- J. RS-485 Cable
 - 1. Standard Cable: NFPA 70, Type CM **OR** CMG, **as directed**.
 - a. Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors.
 - b. PVC insulation.
 - c. Unshielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with UL 1581.
 - 2. Plenum-Rated Cable: NFPA 70, Type CMP.
 - a. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
 - b. Fluorinated ethylene propylene insulation.
 - c. Unshielded.
 - d. Fluorinated ethylene propylene jacket.
 - e. Flame Resistance: NFPA 262, Flame Test.
- K. Low-Voltage Control Cable
 - 1. Paired Cable: NFPA 70, Type CMG.
 - a. 1 pair, twisted, No. 16 AWG, stranded (19x29) and No. 18 AWG, stranded (19x30) tinned copper conductors.
 - b. PVC insulation.
 - c. Unshielded.
 - d. PVC jacket.
 - e. Flame Resistance: Comply with UL 1581.
 - 2. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
 - a. 1 pair, twisted, No. 16 AWG, stranded (19x29) and No. 18 AWG, stranded (19x30) tinned copper conductors.

16 - Electrical

- b. PVC insulation.
- c. Unshielded.
- d. PVC jacket.
- e. Flame Resistance: Comply with NFPA 262.

L. Control-Circuit Conductors

1. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway **OR** Type XHHN, complying with UL 44, in raceway, **as directed**.
2. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway **OR** power-limited cable, complying with UL 83, concealed in building finishes **OR** power-limited tray cable, complying with UL 83, in cable tray **OR** Type XHHN, complying with UL 44, in raceway, **as directed**.
3. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or TF, complying with UL 83.

M. Fire Alarm Wire And Cable

1. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
2. Signaling Line Circuits: Twisted, shielded pair, not less than **OR** No. 18 AWG **OR** size as recommended by system manufacturer, **as directed**.
 - a. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a 2-hour rating.
3. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
 - a. Low-Voltage Circuits: No. 16 AWG, minimum.
 - b. Line-Voltage Circuits: No. 12 AWG, minimum.
 - c. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket, **as directed**, with red identifier stripe, NRTL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

N. Identification Products

1. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
2. Comply with requirements in Division 16 Section "Electrical Identification".

O. Source Quality Control

1. Testing Agency: Engage a qualified testing agency to evaluate cables.
2. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.
3. Factory test UTP cables according to TIA/EIA-568-B.2.
4. Factory test multimode optical fiber cables according to TIA-526-14-A and TIA/EIA-568-B.3.
5. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.
6. Cable will be considered defective if it does not pass tests and inspections.
7. Prepare test and inspection reports.

1.3 EXECUTION

A. Installation Of Pathways

1. Cable Trays: Comply with NEMA VE 2 and TIA-569-B.
2. Comply with TIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.

3. Comply with requirements in Division 16 Section "Raceways And Boxes" for installation of conduits and wireways.
 4. Install manufactured conduit sweeps and long-radius elbows whenever possible.
 5. Pathway Installation in Equipment Rooms:
 - a. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
 - b. Install cable trays to route cables if conduits cannot be located in these positions.
 - c. Secure conduits to backboard when entering room from overhead.
 - d. Extend conduits 3 inches (75 mm) above finished floor.
 - e. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
 6. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.
- B. Installation Of Hangers And Supports
1. Comply with requirements in Division 16 Section "Hangers And Supports For Electrical Systems" for installation of supports for pathways, conductors and cables.
- C. Wiring Method
1. Install wiring in metal raceways and wireways. Conceal raceway except in unfinished spaces and as indicated. Minimum conduit size shall be 3/4 inch (21 mm). Control and data transmission wiring shall not share conduit with other building wiring systems.
 2. Install wiring in raceways except in accessible indoor ceiling spaces and in interior hollow gypsum board partitions where cable may be used. Conceal raceways and wiring except in unfinished spaces and as indicated. Minimum conduit size shall be 3/4 inch (21 mm). Control and data transmission wiring shall not share conduit with other building wiring systems.
 3. Install cable, concealed in accessible ceilings, walls, and floors when possible.
 4. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Use lacing bars and distribution spools. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- D. Installation Of Conductors And Cables
1. Comply with NECA 1.
 2. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.
 3. General Requirements for Cabling:
 - a. Comply with TIA/EIA-568-B.1.
 - b. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - c. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - d. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - e. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
 - f. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 - g. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 - h. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

4. UTP Cable Installation: Install using techniques, practices, and methods that are consistent with Category 5e **OR** Category 6, **OR** Category 6e **as directed**, rating of components and that ensure Category 5e **OR** Category 6, **OR** Category 6e **as directed**, performance of completed and linked signal paths, end to end.
 - a. Comply with TIA/EIA-568-B.2.
 - b. Install 110-style IDC termination hardware unless otherwise indicated.
 - c. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
 5. Optical Fiber Cable Installation:
 - a. Comply with TIA/EIA-568-B.3.
 - b. Cable shall be terminated on connecting hardware that is rack or cabinet mounted.
 6. Outdoor Coaxial Cable Installation:
 - a. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
 - b. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches (915 mm).
 7. Open-Cable Installation:
 - a. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 - b. Suspend copper cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1525 mm) apart.
 - c. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
 8. Installation of Cable Routed Exposed under Raised Floors:
 - a. Install plenum-rated cable only.
 - b. Install cabling after the flooring system has been installed in raised floor areas.
 - c. Coil cable 72 inches (1830 mm) long shall be neatly coiled not less than 12 inches (300 mm) in diameter below each feed point.
 9. Separation from EMI Sources:
 - a. Comply with BICSI TDMM and TIA-569-B recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 - b. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).
 - c. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
 - d. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - 1) Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - 2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (75 mm).
 - 3) Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
 - e. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
 - f. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).
- E. Fire Alarm Wiring Installation
1. Comply with NECA 1 and NFPA 72.

2. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceways And Boxes".
 - a. Install plenum cable in environmental air spaces, including plenum ceilings.
 - b. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.
 3. Wiring Method:
 - a. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
 - b. Fire-Rated Cables: Use of 2-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is **OR** is not, **as directed**, permitted.
 - c. Signaling Line Circuits: Power-limited fire alarm cables may **OR** shall not, **as directed**, be installed in the same cable or raceway as signaling line circuits.
 4. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
 5. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
 6. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
 7. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.
 8. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.
- F. Power And Control-Circuit Conductors
1. 120-V Power Wiring: Install according to Division 16 Section "Conductors And Cables" unless otherwise indicated.
 2. Minimum Conductor Sizes:
 - a. Class 1 remote-control and signal circuits, No. 14 AWG.
 - b. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
 - c. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.
- G. Connections
1. Comply with requirements in Division 13 Section "Perimeter Security" for connecting, terminating, and identifying wires and cables.
 2. Comply with requirements in Division 13 Section "Intrusion Detection" for connecting, terminating, and identifying wires and cables.
 3. Comply with requirements in Division 13 Section "Security Access" for connecting, terminating, and identifying wires and cables.
 4. Comply with requirements in Division 13 Section "Video Surveillance" for connecting, terminating, and identifying wires and cables.
 5. Comply with requirements in Division 13 Section "Plc Electronic Detention Monitoring And Control Systems" for connecting, terminating, and identifying wires and cables.
 6. Comply with requirements in Division 13 Section(s) "Digital, Addressable Fire-alarm System" OR "Zoned (dc Loop) Fire-alarm System", **as directed**, for connecting, terminating, and identifying wires and cables.
 7. Comply with requirements in Division 15 Section "Refrigerant Detection And Alarm" for connecting, terminating, and identifying wires and cables.

16 - Electrical

- H. Firestopping
 1. Comply with requirements in Division 07 Section "Through-penetration Firestop Systems".
 2. Comply with TIA-569-B, "Firestopping" Annex A.
 3. Comply with BICSI TDMM, "Firestopping Systems" Article.

- I. Grounding
 1. For communications wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
 2. For low-voltage wiring and cabling, comply with requirements in Division 16 Section "Grounding And Bonding".

- J. Identification
 1. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 16 Section "Electrical Identification".

- K. Field Quality Control
 1. Perform tests and inspections.
 2. Tests and Inspections:
 - a. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
 - b. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - c. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connection.
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - d. Optical Fiber Cable Tests:
 - 1) Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - 2) Link End-to-End Attenuation Tests:
 - a) Multimode Link Measurements: Test at 850 or 1300 nm in 1 direction according to TIA-526-14-A, Method B, One Reference Jumper.
 - b) Attenuation test results for links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
 - e. Coaxial Cable Tests: Comply with requirements in Division 16 Section "Master Antenna Television System".
 3. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
 4. End-to-end cabling will be considered defective if it does not pass tests and inspections.
 5. Prepare test and inspection reports.

END OF SECTION 16131f

Task	Specification	Specification Description
16131	16101a	Electrical Renovation
16131	16120	Wire And Cable
16134	01204	No Specification Required
16134	16101a	Electrical Renovation
16134	16130	Raceways And Boxes
16134	16130a	Underfloor Raceways For Electrical Systems
16134	16140	Wiring Devices
16135	16101a	Electrical Renovation
16135	16130	Raceways And Boxes

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SECTION 16139 - CABLE TRAYS

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of cable trays. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes steel, aluminum, stainless-steel, and fiberglass cable trays and accessories.

C. Submittals

1. Product Data: Include data indicating dimensions and finishes for each type of cable tray indicated.
2. Shop Drawings: For each type of cable tray.
 - a. Show fabrication and installation details of cable tray, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths, and fittings.
 - b. Seismic-Restraint Details, **as directed**: Signed and sealed by a qualified professional engineer, licensed in the state where Project is located, who is responsible for their preparation.
 - 1) Design Calculations: Calculate requirements for selecting seismic restraints.
 - 2) Detail fabrication, including anchorages and attachments to structure and to supported cable trays.
3. Field quality-control reports.
4. Operation and Maintenance Data.

D. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Comply with NFPA 70.

E. Delivery, Storage, And Handling

1. Steel cable tray, hot dip galvanized after fabrication, **OR** Aluminum cable tray **OR** Stainless-steel cable tray **OR** Fiberglass cable tray, **as directed** may be stored outside without cover, but shall be loosely stacked, elevated off the ground, and ventilated to prevent staining during storage.
2. Store indoors to prevent water or other foreign materials from staining or adhering to cable tray. Unpack and dry wet materials before storage.
3. Steel, mill galvanized **OR** electrogalvanized **OR** factory-primed, **as directed**, cable tray shall be stored in a well-ventilated, dry location. Unpack and dry wet materials before storage.
4. PVC-coated **OR** Field-painted, **as directed**, cable tray shall be stored indoors. Protect cable tray from scratching and marring of finish. Unpack and dry wet materials before storage.

1.2 PRODUCTS

A. Materials And Finishes

1. Cable Trays, Fittings, and Accessories: Steel, complying with NEMA VE 1.
 - a. Factory-standard primer, ready for field painting; with cadmium-plated hardware according to ASTM B 766.

- b. Mill galvanized before fabrication, complying with ASTM A 653/A 653M, G90 (Z275) coating; with hardware galvanized according to ASTM B 633 **OR** cadmium plated according to ASTM B 766, **as directed**.
 - c. Electrogalvanized before fabrication, complying with ASTM B 633; with hardware galvanized according to ASTM B 633.
 - d. Hot-dip galvanized after fabrication, complying with ASTM A 123/A 123M, Class B2; with chromium-zinc, ASTM F 1136, **OR** Type 316 stainless-steel, **as directed**, hardware.
 - e. PVC coating applied in a fluidized bed or by electrostatic spray; with chromium-zinc, ASTM F 1136 **OR** Type 316 stainless-steel, **as directed**, hardware.
 - f. Epoxy-resin paint over paint manufacturer's recommended primer and corrosion-inhibiting treatment; with cadmium-plated hardware according to ASTM B 766 **OR** Type 316 stainless-steel hardware, **as directed**.
2. Cable Trays, Fittings, and Accessories: Aluminum, complying with NEMA VE 1, Aluminum Association's Alloy 6063-T6 for rails, rungs, and cable trays, and Alloy 5052-H32 or Alloy 6061-T6 for fabricated parts; with chromium-zinc, ASTM F 1136, **OR** Type 316 stainless-steel, **as directed**, splice-plate fasteners, bolts, and screws
 3. Cable Trays, Fittings, and Accessories: Stainless steel, Type 304 **OR** 316, **as directed**, complying with NEMA VE 1.
 4. Cable Trays, Fittings, and Accessories: Fiberglass, complying with NEMA FG 1 and UL 568. Splice-plate fasteners, bolts, and screws shall be fiberglass-encapsulated stainless steel. Design fasteners so that no metal is visible when fully assembled and tightened. Fastener encapsulation shall not be damaged when torqued to manufacturer's recommended value.
 5. Sizes and Configurations: Refer to the Cable Tray Schedule on Drawings for specific requirements for types, materials, sizes, and configurations.
 - a. Center-hanger supports may be used only when specifically indicated.
- B. Cable Tray Accessories
1. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.
 2. Covers: Solid **OR** Louvered **OR** Ventilated-hat **OR** 2-in-3 pitch cover, **as directed**, type of same materials and finishes as cable tray.
 3. Barrier Strips: Same materials and finishes as cable tray.
 4. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.
- C. Warning Signs
1. Lettering: 1-1/2-inch- (40-mm-) high, black letters on yellow background with legend "WARNING! NOT TO BE USED AS WALKWAY, LADDER, OR SUPPORT FOR LADDERS OR PERSONNEL."
 2. Materials and fastening are specified in Division 16 Section "Electrical Identification".

1.3 EXECUTION

A. Cable Tray Installation

1. Comply with recommendations in NEMA VE 2. Install as a complete system, including all necessary fasteners, hold-down clips, splice-plate support systems, barrier strips, hinged horizontal and vertical splice plates, elbows, reducers, tees, and crosses.
2. Remove burrs and sharp edges from cable trays.
3. Fasten cable tray supports to building structure and install seismic restraints, **as directed**.
 - a. Design each fastener and support to carry load indicated by seismic requirements and to comply with seismic-restraint details according to Division 16 Section "Vibration And Seismic Controls For Electrical Systems".
 - b. Place supports so that spans do not exceed maximum spans on schedules.
 - c. Construct supports from channel members, threaded rods, and other appurtenances furnished by cable tray manufacturer. Arrange supports in trapeze or wall-bracket form as required by application.

- d. Support bus assembly to prevent twisting from eccentric loading.
 - e. Manufacture center-hung support, designed for 60 percent versus 40 percent eccentric loading condition, with a safety factor of 3.
 - f. Locate and install supports according to NEMA FG 1 **OR** NEMA VE 1, **as directed**.
4. Make connections to equipment with flanged fittings fastened to cable tray and to equipment. Support cable tray independent of fittings. Do not carry weight of cable tray on equipment enclosure.
 5. Install expansion connectors where cable tray crosses building expansion joint and in cable tray runs that exceed dimensions recommended in NEMA FG 1 **OR** NEMA VE 1, **as directed**. Space connectors and set gaps according to applicable standard.
 6. Make changes in direction and elevation using standard fittings.
 7. Make cable tray connections using standard fittings.
 8. Seal penetrations through fire and smoke barriers according to Division 07 Section "Through-penetration Firestop Systems".
 9. Sleeves for Future Cables: Install capped sleeves for future cables through firestop-sealed cable tray penetrations of fire and smoke barriers.
 10. Workspace: Install cable trays with enough space to permit access for installing cables.
 11. Install barriers to separate cables of different systems, such as power, communications, and data processing; or of different insulation levels, such as 600, 5000, and 15 000 V.
 12. After installation of cable trays is completed, install warning signs in visible locations on or near cable trays.
- B. Cable Installation
1. Install cables only when cable tray installation has been completed and inspected.
 2. Fasten cables on horizontal runs with cable clamps or cable ties as recommended by NEMA VE 2. Tighten clamps only enough to secure the cable, without indenting the cable jacket. Install cable ties with a tool that includes an automatic pressure-limiting device.
 3. On vertical runs, fasten cables to tray every 18 inches (457 mm). Install intermediate supports when cable weight exceeds the load-carrying capacity of the tray rungs.
 4. In existing construction, remove inactive or dead cables from cable tray.
 5. Install covers after installation of cable is completed.
- C. Connections
1. Ground cable trays according to manufacturer's written instructions.
 2. Install an insulated equipment grounding conductor with cable tray, in addition to those required by NFPA 70.
- D. Field Quality Control
1. After installing cable trays and after electrical circuitry has been energized, survey for compliance with requirements. Perform the following field quality-control survey:
 - a. Visually inspect cable insulation for damage. Correct sharp corners, protuberances in cable tray, vibration, and thermal expansion and contraction conditions, which may cause or have caused damage.
 - b. Verify that the number, size, and voltage of cables in cable tray do not exceed that permitted by NFPA 70. Verify that communication or data-processing circuits are separated from power circuits by barriers.
 - c. Verify that there is no intrusion of such items as pipe, hangers, or other equipment that could damage cables.
 - d. Remove deposits of dust, industrial process materials, trash of any description, and any blockage of tray ventilation.
 - e. Visually inspect each cable tray joint and each ground connection for mechanical continuity. Check bolted connections between sections for corrosion. Clean and retorque in suspect areas.
 - f. Check for missing or damaged bolts, bolt heads, or nuts. When found, replace with specified hardware.
 - g. Perform visual and mechanical checks for adequacy of cable tray grounding; verify that all takeoff raceways are bonded to cable tray.
 2. Report results in writing.

16 - Electrical

- E. Protection
 - 1. Protect installed cable trays.
 - a. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
 - b. Repair damage to PVC or paint finishes with matching touchup coating recommended by cable tray manufacturer.
 - c. Install temporary protection for cables in open trays to protect exposed cables from falling objects or debris during construction. Temporary protection for cables and cable tray can be constructed of wood or metal materials until the risk of damage is over.

END OF SECTION 16139

SECTION 16140 - WIRING DEVICES

1.1 GENERAL

A. Description Of Work

1. This specification covers the furnishing and installation of wiring devices. Products shall be as follows or as directed by the Owner. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

B. Summary

1. This Section includes the following:
 - a. Receptacles, receptacles with integral GFCI, and associated device plates.
 - b. Twist-locking receptacles.
 - c. Receptacles with integral surge suppression units.
 - d. Wall-box motion sensors.
 - e. Isolated-ground receptacles.
 - f. Hospital-grade receptacles.
 - g. Snap switches and wall-box dimmers.
 - h. Solid-state fan speed controls.
 - i. Wall-switch and exterior occupancy sensors.
 - j. Communications outlets.
 - k. Pendant cord-connector devices.
 - l. Cord and plug sets.
 - m. Floor service outlets, poke-through assemblies, service poles, and multioutlet assemblies.

C. Definitions

1. EMI: Electromagnetic interference.
2. GFCI: Ground-fault circuit interrupter.
3. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
4. RFI: Radio-frequency interference.
5. TVSS: Transient voltage surge suppressor.
6. UTP: Unshielded twisted pair.

D. Submittals

1. Product Data: For each type of product indicated.
2. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
3. Samples: One for each type of device and wall plate specified, in each color specified.
4. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

E. Quality Assurance

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Comply with NFPA 70.

1.2 PRODUCTS

A. Straight Blade Receptacles

1. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

16 - Electrical

2. Hospital-Grade, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498 Supplement SD.
 3. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - a. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.
 4. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - a. Description: Labeled to comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.
- B. GFCI Receptacles
1. General Description: Straight blade, feed **OR** non-feed, **as directed**,-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
 2. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 3. Hospital-Grade, Duplex GFCI Convenience Receptacles, 125 V, 20 A: Comply with UL 498 Supplement SD.
- C. TVSS Receptacles
1. General Description: Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 1449, with integral TVSS in line to ground, line to neutral, and neutral to ground.
 - a. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 volts and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
 - b. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."
 2. Duplex TVSS Convenience Receptacles:
 - a. Description: Straight blade, 125 V, 20 A; NEMA WD 6 configuration 5-20R.
 3. Isolated-Ground, Duplex Convenience Receptacles:
 - a. Description: Straight blade, 125 V, 20 A; NEMA WD 6 configuration 5-20R. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.
 4. Hospital-Grade, Duplex Convenience Receptacles: Comply with UL 498 Supplement SD.
 - a. Description: Straight blade, 125 V, 20 A; NEMA WD 6 configuration 5-20R.
 5. Isolated-Ground, Hospital-Grade, Duplex Convenience Receptacles:
 - a. Description: Straight blade, 125 V, 20 A; NEMA WD 6 configuration 5-20R. Comply with UL 498 Supplement SD. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.
- D. Hazardous (Classified) Location Receptacles
1. Available Wiring Devices for Hazardous (Classified) Locations: Comply with NEMA FB 11 and UL 1010.
- E. Twist-Locking Receptacles
1. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498.
 2. Isolated-Ground, Single Convenience Receptacles, 125 V, 20 A:
 - a. Description: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

- F. Pendant Cord-Connector Devices
1. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade.
 - a. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.
 - b. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.
- G. Cord And Plug Sets
1. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
 - a. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
 - b. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.
- H. Snap Switches
1. Comply with NEMA WD 1 and UL 20.
 2. Switches, 120/277 V, 20 A:
 3. Pilot Light Switches, 20 A:
 - a. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."
 4. Key-Operated Switches, 120/277 V, 20 A:
 - a. Description: Single pole, with factory-supplied key in lieu of switch handle.
 5. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.
 6. Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.
- I. Wall-Box Dimmers
1. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
 2. Control: Continuously adjustable slider **OR** toggle switch **OR** rotary knob, **as directed**; with single-pole or three-way switching. Comply with UL 1472.
 3. Incandescent Lamp Dimmers: 120 V; control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.
 - a. 600 W; dimmers shall require no derating when ganged with other devices. Illuminated when "OFF," **as directed**.
 4. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.
- J. Fan Speed Controls
1. Modular, 120-V, full-wave, solid-state units with integral, quiet on-off switches and audible frequency and EMI/RFI filters. Comply with UL 1917.
 - a. Continuously adjustable slider **OR** toggle switch **OR** rotary knob, **as directed**, 5 A **OR** 1.5 A, **as directed**.
 - b. Three-speed adjustable slider **OR** rotary knob, **as directed**, 1.5 A.
- K. Occupancy Sensors
1. Wall-Switch Sensors:
 - a. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft. (84 sq. m).
 2. Wall-Switch Sensors:
 - a. Description: Adaptive-technology type, 120/277 V, adjustable time delay up to 20 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft. (84 sq. m).

16 - Electrical

3. Long-Range Wall-Switch Sensors:
 - a. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, with a minimum coverage area of 1200 sq. ft. (111 sq. m).
 4. Long-Range Wall-Switch Sensors:
 - a. Description: Dual technology, with both passive-infrared- and ultrasonic-type sensing, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, and a minimum coverage area of 1200 sq. ft. (111 sq. m).
 5. Wide-Range Wall-Switch Sensors:
 - a. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 150-degree field of view, with a minimum coverage area of 1200 sq. ft. (111 sq. m).
 6. Exterior Occupancy Sensors:
 - a. Description: Passive-infrared type, 120/277 V, weatherproof, adjustable time delay up to 15 minutes, 180-degree field of view, and 110-foot (34-m) detection range. Minimum switch rating: 1000-W incandescent, 500-VA fluorescent.
- L. Communications Outlets
1. Telephone Outlet:
 - a. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e. Comply with UL 1863.
 2. Combination TV and Telephone Outlet:
 - a. Description: Single RJ-45 jack for 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e; and one Type F coaxial cable connector.
- M. Wall Plates
1. Single and combination types to match corresponding wiring devices.
 - a. Plate-Securing Screws: Metal with head color to match plate finish.
 - b. Material for Finished Spaces: Steel with white baked enamel, suitable for field painting **OR** Smooth, high-impact thermoplastic **OR** 0.035-inch- (1-mm-) thick, satin-finished stainless steel **OR** 0.04-inch- (1-mm-) thick, brushed brass with factory polymer finish **OR** 0.05-inch- (1.2-mm-) thick anodized aluminum **OR** 0.04-inch- (1-mm-) thick steel with chrome-plated finish, **as directed**.
 - c. Material for Unfinished Spaces: Galvanized steel **OR** Smooth, high-impact thermoplastic, **as directed**.
 - d. Material for Damp Locations: Thermoplastic **OR** Cast aluminum, **as directed**, with spring-loaded lift cover, and listed and labeled for use in "wet locations."
 2. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum **OR** thermoplastic, **as directed**, with lockable cover.
- N. Floor Service Fittings
1. Type: Modular, flush-type **OR** flap-type **OR** above-floor, **as directed**, dual-service units suitable for wiring method used.
 2. Compartments: Barrier separates power from voice and data communication cabling.
 3. Service Plate: Rectangular **OR** Round, **as directed**, die-cast aluminum **OR** solid brass, **as directed**, with satin finish.
 4. Power Receptacle: NEMA WD 6 configuration 5-20R, gray finish, unless otherwise indicated.
 5. Voice and Data Communication Outlet: Blank cover with bushed cable opening **OR** Two modular, keyed, color-coded, RJ-45 Category 5e jacks for UTP cable, **as directed**.
- O. Poke-Through Assemblies
1. Description: Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service outlet assembly.
 - a. Service Outlet Assembly: Pedestal type with services indicated **OR** Flush type with two simplex receptacles and space for two RJ-45 jacks **OR** Flush type with four simplex receptacles and space for four RJ-45 jacks, **as directed**.
 - b. Size: Selected to fit nominal 3-inch (75-mm) **OR** 4-inch (100-mm), **as directed**, cored holes in floor and matched to floor thickness.

- c. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
- d. Closure Plug: Arranged to close unused 3-inch (75-mm) **OR** 4-inch (100-mm), **as directed**, cored openings and reestablish fire rating of floor.
- e. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors and a minimum of two **OR** four, **as directed**, 4-pair, Category 5e voice and data communication cables.

P. Multioutlet Assemblies

- 1. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
- 2. Raceway Material: Metal, with manufacturer's standard finish **OR** PVC, **as directed**.
- 3. Wire: No. 12 AWG.

Q. Service Poles

- 1. Description: Factory-assembled and -wired units to extend power and voice and data communication from distribution wiring concealed in ceiling to devices or outlets in pole near floor.
 - a. Poles: Nominal 2.5-inch- (65-mm-) square cross section, with height adequate to extend from floor to at least 6 inches (150 mm) above ceiling, and with separate channels for power wiring and voice and data communication cabling.
 - b. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to ceiling supports; with pole foot and carpet pad attachment.
 - c. Finishes: Manufacturer's standard painted finish and trim combination **OR** Satin-anodized aluminum, **as directed**.
 - d. Wiring: Sized for minimum of five No. 12 AWG power and ground conductors and a minimum of four, 4-pair, Category 3 or 5 voice and data communication cables.
 - e. Power Receptacles: Two duplex, 20-A, heavy-duty, NEMA WD 6 configuration 5-20R units.
 - f. Voice and Data Communication Outlets: Blank insert with bushed cable opening **OR** Two RJ-45 Category 5e jacks **OR** Four RJ-45 Category 5e jacks, **as directed**.

R. Finishes

- 1. Color: Wiring device catalog numbers in Section Text do not designate device color.
 - a. Wiring Devices Connected to Normal Power System: Almond **OR** Black **OR** Brown **OR** Gray **OR** Ivory **OR** White **OR** As selected, **as directed**, unless otherwise indicated or required by NFPA 70 or device listing.
 - b. Wiring Devices Connected to Emergency Power System: Red.
 - c. TVSS Devices: Blue.
 - d. Isolated-Ground Receptacles: Orange **OR** As specified above, with orange triangle on face, **as directed**.

1.3 EXECUTION

A. Installation

- 1. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- 2. Coordination with Other Trades:
 - a. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
 - b. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - c. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - d. Install wiring devices after all wall preparation, including painting, is complete.
- 3. Conductors:

- a. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 - b. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - c. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - d. Existing Conductors:
 - 1) Cut back and pigtail, or replace all damaged conductors.
 - 2) Straighten conductors that remain and remove corrosion and foreign matter.
 - 3) Pigtailing existing conductors is permitted provided the outlet box is large enough.
4. Device Installation:
- a. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
 - b. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - c. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - d. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
 - e. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
 - f. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
 - g. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - h. Tighten unused terminal screws on the device.
 - i. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
5. Receptacle Orientation:
- a. Install ground pin of vertically mounted receptacles up **OR** down, **as directed**, and on horizontally mounted receptacles to the right **OR** left, **as directed**.
 - b. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.
6. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
7. Dimmers:
- a. Install dimmers within terms of their listing.
 - b. Verify that dimmers used for fan speed control are listed for that application.
 - c. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
8. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
9. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.
- B. Identification
1. Comply with Division 16 Section "Electrical Identification".
 - a. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black **OR** white **OR** red, **as directed**, -filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.
- C. Field Quality Control
1. Perform tests and inspections and prepare test reports.
 - a. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.
 - b. Test Instruments: Use instruments that comply with UL 1436.
 - c. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

2. Tests for Convenience Receptacles:
 - a. Line Voltage: Acceptable range is 105 to 132 V.
 - b. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
 - c. Ground Impedance: Values of up to 2 ohms are acceptable.
 - d. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - e. Using the test plug, verify that the device and its outlet box are securely mounted.
 - f. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
3. Test straight blade convenience outlets in patient-care areas **OR** hospital-grade convenience outlets, **as directed**, for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115 g).

END OF SECTION 16140

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Task	Specification	Specification Description
16140	16101a	Electrical Renovation
16140	16130	Raceways And Boxes

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Task	Specification(s)
01204	01204
01352	01204
02119	01204
15905	15905
15910	15910, 15910a
15915	15915, 15910
15917	15910
16101	16101, 16101a, 16101b
16102	16102, 01204, 16101a, 16120
16120	16120, 16120a, 16120b, 16102
16130	16130, 16130a, 16101a, 16120a
16131	16131, 16131a, 16131b, 16131c, 16131d, 16131e, 16131f, 16101a, 16120
16134	01204, 16101a, 16130, 16130a, 16140
16135	16101a, 16130
16139	16139
16140	16140, 16101a, 16130



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00 Using The Construction Task Catalog®	1
<hr/>	
01000 General Requirements	1
01200 Reimbursable Costs	1
01204 Reimbursable Fees	1
01350 Labor/Wage Rates	1
01352 Wage Rates	1
<hr/>	
02000 Site Construction	1
02110 Demolition	1
02119 Hauling And Disposal Processing Fee	1
<hr/>	
15000 Mechanical	1
15900 Controls And Instrumentation	1
15905 HVAC Instrumentation	1
15910 Energy Monitoring and Control Systems	5
15915 Control Air Compressor And Dryer	21
15917 Pneumatic Tubing	24
<hr/>	
16000 Electrical	1
16100 Basic Materials And Methods	1
16101 General	1
16102 Cable Installation Methods	2
16120 Wire And Cable	2
16130 Raceways	13
16131 Conduit	21
16134 Boxes	80
16135 Enclosures	85
16139 Cable Trays	90
16140 Wiring Devices	165

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CTC Information:

- This Construction Task Catalog® was developed and customized by The Gordian Group, Inc. specifically for **University of California, Santa Barbara**, priced locally using current labor, material and equipment costs, and published in February 2012.
- The Gordian Group, Inc. licenses the use of this CTC and other proprietary information and software for the sole purpose of providing Job Order Contracting services to **University of California, Santa Barbara**. Use of The Gordian Group's CTC and other proprietary information and software for any other purpose or any other entity is expressly prohibited without the express written consent of The Gordian Group, Inc.

The Unit Prices Include:**LABOR COSTS:**

- Labor costs include direct labor through the working foreperson level at straight-time prevailing wage rates including fringe benefits and an allowance for Social Security and Medicare taxes, worker's compensation, unemployment insurance and employee benefits.
- Labor costs are based on workers familiar with and skilled in the performance of the task following OSHA requirements.
- Labor costs include time lost for normal work breaks, layout, measuring and cutting to fit, clean-up of regular construction debris, inspection, permit compliance, job meetings and start-up.

EQUIPMENT COSTS:

- Equipment costs include all equipment required to accomplish the task including rigging and mobilization, except large equipment (e.g. cranes,

pile drivers, bulldozers, excavators, backhoes, bobcats etc.) which exclude mobilization.

- Equipment costs include all operating expenses such as fuel, electricity, lubricants, etc.

MATERIAL COSTS:

- Material costs include the cost of the material being installed and all incidentals and accessories integral to the installation.
- Material costs include manufacturer's and/or fabricator's shop drawings.
- Material costs for roofing, drywall, VCT, carpet, wall covering, ceiling tile, pipe, conduit, concrete, etc. include an allowance for waste. This list is not intended to be all inclusive, but descriptive of the types of construction materials that are typically sold in standard lengths, sizes and weights.

Complete and In-Place Construction:

- Unit prices are for complete and in-place construction and include all labor, equipment and material required to complete the task as described in the CTC.
- Unit Prices include delivery, unloading and storing materials, tools and equipment on site; moving, materials, tools and equipment from storage area or truck up to 2 ½ stories (2 stories with an attic) and within 125' to reach the site.
- Unit prices exclude moving material and equipment greater than 2 ½ stories and handling material and equipment more than 125' (See 01660).
- Unit prices for imported materials (aggregate, sand, soil, etc.) include delivery up to 15 miles from the closest approved source.
- Unit prices include all fasteners such as anchor bolts, lag bolts, screws, adhesive, wedge anchors, expansion bolts, roofing clips (excluding hurricane clips) that are required. Fasteners listed separately in the CTC are for use with Owner furnished

Using The Construction Task Catalog®

material and equipment or relocating or reinstalling existing material and equipment.

- ☑ Unit prices exclude more substantial mounting material such as threaded rod or angle iron unless the task description states otherwise.
- ☑ Unit prices for doors and windows, duct work, plumbing fixtures, seamless floors, countertops, flashing, pitch pockets, skylights, curbs, roofing, etc. include sealant and caulking.
- ☑ Unit prices include testing, calibration, balancing and the like required to ensure proper installation, construction and performance (e.g. compaction test for backfill, balancing of heating ventilation and air conditioning, pneumatic or hydrostatic testing, soaping of joints, others as required). Use of owner supplied materials, equipment or tying into existing equipment/piping may justify testing, balancing, etc.

Demolition:

- ☑ Unit prices for demolition include all labor, equipment and material required for the complete removal of the required items; clean-up of the area; and transferring down 2 ½ stories and within 125' of the site into a truck or dumpster for debris or to a designated area for owner requested items.
- ☑ Unit prices for demolition exclude costs for hauling (See 02119), dump fees (See 02119), dumpsters (See 01510), trash chutes (See 01510), and handling materials more than 2 ½ stories or more than 125' from the site (See 01660), unless the task description states otherwise.
- ☑ If the item being demolished is attached to another item being removed and can be removed as one item, then that item shall not be priced as a separate demolition task, unless the component alone must be demolished to accomplish the task (e.g. demolition of pipe includes pipe fittings unless the fitting must be demolished separately to accomplish the task; demolition of a wood door includes hinges, hardware, closures, kick plates, etc.).

- ☑ The description "replace" includes the demolition of the existing item and the installation of the new item.
- ☑ The descriptions "remove and relocate" or "remove and reinstall" includes the removal, cleaning of item and installation of the existing item in either the same location or another location.
- ☑ The description "reinstall" includes the cleaning and installation of the existing item.
- ☑ Salvageable materials remain the property of the Owner and shall be turned over as directed when specified in the Job Order.

The Adjustment Factors Include:

BUSINESS COSTS:

- ☑ Overhead costs, including, unless specifically excluded in the Contract Documents, but not limited to;
 - home office overhead
 - insurance, bonds, and indemnification
 - project meetings, training, management and supervision
 - mobilization and close-out for the contract and each Job Order and
 - project office staff and equipment.
- ☑ Profit.
- ☑ Subcontractor's overhead and profit.
- ☑ All taxes for which a waiver is not available including material sales tax and equipment rental.
- ☑ Employee or Subcontractor's wage rates that exceed the prevailing wage rates.
- ☑ Fringe benefits, payroll taxes, worker's compensation, insurance costs and any other payment mandated by law in connection with labor that exceeds the labor rate allowances.
- ☑ Cost of financing the work.

Using The Construction Task Catalog®

- Business risks such as the risk of a lower than expected volume of work, smaller than anticipated Job Orders, poor Subcontractor performance, and inflation or material cost fluctuations.

CONSTRUCTION RELATED COSTS:

- Services required to obtain filings and permits.
- Preparation and modification of proposals, sketches, drawings, submittals, as-built drawings, CADD drawings, microfilm, and other project records.
- Incidental engineering and architectural services.
- Office trailer and portable toilets for Contractor's use.
- Construction vehicles such as pick-up trucks, utility trucks, vans, flat bed trucks, tractors, trailers, etc.
- Storage devices or items such as gang boxes and containers for Contractor's tools, equipment and materials.
- Personnel safety equipment (hard hats, ropes, harness, etc.) and basic safety signage, railings, minor barricades, tape, roping, cable, markings, cones, etc.
- Meeting Owner security requirements.
- Excess waste including roofing, drywall, VCT, carpet, wall covering, ceiling tile, pipe, conduit, siding, concrete, etc. This list is not intended to be all inclusive, but descriptive of the types of construction materials that are typically sold in standard lengths, sizes and weights.
- Removing and returning Owner's furniture and furnishings (chairs, tables, pictures, etc. but excluding modular furniture, wall or ceiling attached or fastened devices or furnishings, safes or other furniture requiring disassembly).
- Protection of all surfaces including those not in the scope of work from construction dust, debris or damage during construction up until final acceptance. The methods of protection including plastic, paper, sealing doors or windows, etc. are the Contractor's responsibility.
- Daily clean-up.

February 2012

- Final professional project clean-up.
- Costs resulting from inadequate supply of building materials, fuel, electricity, or skilled labor.
- Costs resulting from productivity loss.
- Working in extreme temperatures (below or above normal) or adverse conditions such as excessive rain, wind, sleet or snow.
- Differences in project size; complexity and location.
- All costs for other than discreet items of work specifically required to complete a particular Job Order.

PRICE VARIATIONS:

- Contractors may find differences in labor, equipment and material costs due to certain economic factors. Variations in labor cost can also result from labor efficiency, labor restrictions, working conditions and local work rules. Variations in material costs can also result from the quantity of material purchased, the existing relationship with suppliers, and because the materials have been discontinued or have become obsolete.
- While diligent effort is made to provide accurate and reliable up-to-date pricing, it is the responsibility of the Contractor to verify the unit prices and to modify their Adjustment Factors accordingly.

GENERAL COSTS:

- This list is not exhaustive and is intended to provide general examples of cost items to be included in the Contractor's Adjustment Factor as defined in the Contract.
- The only compensation to be paid to a Contractor for the unit price tasks will be:

Published Unit Price	X	Installation (or Demolition) Quantity	X	Appropriate Adjustment Factor
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- No additional payments of any kind whatsoever will be made. All costs not included in the unit prices must be part of the Adjustment Factors.

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General Interpretations:

WORKING HEIGHT:

- ☑ Typical working height for work other than masonry is up to 14' above the finished floor or stationary working surface. The Contractor will not be paid for scaffolding, or similar equipment for work below 14'.
- ☑ Typical working height for masonry work is up to 4' above the finished floor or stationary working surface. The Contractor will not be paid for scaffolding and similar equipment for masonry work below 4'.

FIELD ENGINEERING:

- ☑ Surveying tasks shall be used only when the Owner requests the Contractor to perform topographic surveys, property line surveys or to establish horizontal and vertical controls. If the Owner provides horizontal and vertical control points within or adjacent to the site, any other surveying required to complete the work is considered construction staking or layout and the cost thereof is included in the appropriate task.

ASSEMBLIES:

- ☑ Assembly unit prices take precedence over individual component pricing.

TESTING:

- ☑ Contractor will be paid for testing existing material, as required by the technical specifications and as directed by the Owner (record tests) at the unit price for the appropriate task. The cost of process quality control testing routinely performed by the Contractor is included in the unit prices for the individual tasks.

MISCELLANEOUS:

- ☑ For the purpose of quantity discounts, quantities are calculated on a per project basis. The quantity discount applies to the total quantity so determined.
- ☑ Whenever there are alternative tasks that may be selected to complete work the Contractor shall select the most practical and economical tasks available (e.g. rental of equipment by weeks or months rather than days or painting by roller or spray rather than brush).
- ☑ Restricted Working Space is defined as any area with less than 3' vertical or horizontal clearance and includes areas such as crawl spaces, ceiling plenums where the grid is not removed, narrow piping tunnels, and equipment rooms where the space to install the new work is congested as a result of equipment and piping placement that meet these dimensional restrictions. A Restricted Working Space modifier is available for certain mechanical piping and piping accessories tasks and for certain electrical conduit and conduit accessories tasks. Only those tasks with a modifier for Restricted Working Space are eligible for a price adjustment, and then only if the modifier applies to the contemplated tasks. A non pre-priced task will not be allowed because of Restricted Working Space for any CTC task.
- ☑ Confined Working Space is defined according to the OSHA definition 29 CFR 1926.21(b)(6)(i): "Any space having limited means of egress, which is subject to accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere, including, but not limited to, storage tanks, process vessels, bins, boilers, ventilation and exhaust duct, sewers, underground vaults, tunnels, pipelines and open top spaces more than 4 feet in depth such as pits and tubs." The Contractor shall conform to all OSHA and Owner requirements for working in Confined Working Spaces. Required ventilation and air monitoring equipment tasks shall be priced from the CTC.
- ☑ Whenever a material, article or piece of equipment is identified in the CTC or in the specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, or make, the identification is intended to establish a standard.

Any material, article or equipment of another manufacturer or vendor which performs satisfactorily the duties imposed by the general design may be considered equally acceptable provided that, in the opinion of the Owner, the material, article or equipment so proposed is of equal quality, substance and function. The Contractor shall not provide, furnish or install any proposed material, article or equipment without the prior written approval of the Owner. The burden of proof and all costs related thereto concerning the "or equal" nature of the substitute item, whether approved or disapproved, shall be borne by the Contractor.

SPECIFICATIONS:

- Specifications for tasks shall be interpreted as follows: All labor, material, equipment, spare parts, services, and work required by a specification shall be considered part of the unit price, unless the task description or technical specifications state otherwise.

Useful Information:

UNIT OF MEASURE DEFINITIONS:

ACR – Acre, **BAG** – Bag, **BBL** – Barrel, **BCY** - Bank (In-place) Cubic Yards, **BF** - Board Foot, **BOX** - Box (each), **BTU** - British Thermal Unit, **C** - One Hundred, **CCF** - One Hundred Cubic Feet, **CCY** - Compacted Cubic Yards, **CF** - Cubic Foot, **CFM** - Cubic Feet Per Minute, **CI** – Cubic Inch, **CLF** - One Hundred Linear Feet, **CSF** - One Hundred Square Feet, **CSY** - Hundred Square Yards, **CWT** - Hundred Weight, **CY** - Cubic Yard, **CYM** - Cubic Yard Mile, **DAY** – Day, **DRM** - Drum

February 2012

(each), **EA** – Each, **FLR** - Floor (Per Floor), **FT** – Foot, **GAL** – Gallon, **GSF** - Ground Square Foot, **HR** – Hour, **HWT** - Hundred Carton Weight, **HYR** – Half Year, **IN** – Inch, **JOB** – Job, **LAN** – Lane, **LB** – Pound, **LCY** - Loose (Excavated) Cubic Yards, **LF** - Linear Foot, **LFD** - Linear Feet Per Day, **LIT** – Liter, **LOT** – Lot, **MBF** - One Thousand Board Feet, **MBH** - One Thousand British Thermal Units, **MCF** – One Thousand Cubic Feet, **MF3** - One Thousand Cubic Feet Per Minute, **MGL** – One Thousand Gallons, **MI** – Mile, **MLF** - One Thousand Linear Feet, **MO** – Month, **MSF** - One Thousand Square Feet, **MSY** - One Thousand Square Yards, **MT** – Metric Ton, **MTK** – Metric Ton Kilometer, **M2** – Square Meter, **M3K** – Cubic Meter Kilometer, **NTE** – Note, **OPN** – Opening, **OUT** - Outlet or Output (each), **OZ** – Ounce, **PKG** – Package, **PNT** – Point, **PR** – Pair, **QT** – Quart, **ROL** - Roll (each), **ROM** – Room, **ROW** – Row, **RSR** - Riser (Per Rise), **SEA** – Seat, **SET** – Set, **SF** - Square Foot, **SHT** – Sheet, **SI** - Square Inch, **STP** - Stop (each), **SQ** - Square or One Hundred Square Feet, **SY** - Square Yard, **SYI** – Inches per Square Yard, **TNM** - Tons per Mile, **TON** – Ton, **TRK** – Truck Load, **UI** - United Inch, **UNT** – Unit, **VLf** - Vertical Linear Foot, **WK** – Week, **YD** – Yard, **YR** – Year

MATERIAL WEIGHTS:

EARTHEN MATERIAL

- The following engineering values for establishing shrink/swell factors shall be used unless otherwise directed by the Owner.

Material	Material Weight (Lbs Per CY)		
	In-place (Bank)	Loose (Excavated Materials)	Compacted
Earth, Common (Average)	3170	2536	3520
Sand	2880	2590	3240
Earth, Rock Mix. (75% E/ 25% R)	3380	2370	3720
Earth, Rock Mix. (50% E/50% R)	3750	2710	4000
Earth, Rock Mix. (25% E/ 75% R)	4120	3140	3680

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Material	Material Weight (Lbs Per CY)		
	In-place (Bank)	Loose (Excavated Materials)	Compacted
Gravel (Average)	3280	2730	3570
Limestone	4380	2690	3220
Riprap Rock (Average)	4500	2610	3150
Granite	4540	2640	3170
Basalt	4950	3020	3640
Clay	3220	2150	3570
Gneiss	4550	2720	3180

1 Mile = 5280 Feet = 1.6093 Kilometers

1 Pound = 0.4536 Kilograms

1 Square Foot = 144 Square Inches = .0929 Square Meters

1 Square Meter = 1.1960 Square Yards = 10.7639 Square Feet

1 Square Yard = 9 Square Feet = 0.8361 Square Meters

1 Ton = 2000 Pounds = 907.185 Kilograms

1 Yard = 3 Feet = 0.9144 Meters

BULK FACTORS FOR DEMOLITION:

The following bulk factors shall be used to calculate the volume of demolished material to be transported from the site, unless otherwise directed by the Owner.

- **Asphalt** = 1.25
- **Concrete** = 1.40

CONVERSIONS:

1 Acre = 43,560 Square Feet = 4046.8 Square Meters

1 Board Foot = 12" x 12" x 1" = 144 Cubic Inches

1 Centimeter = 0.3937 Inches = 0.0328 Feet

1 Cubic Foot = 0.03704 Cubic Yards = 0.02832 Cubic Meters

1 Cubic Meter = 1.3080 Cubic Yards = 35.3147 Cubic Feet

1 Cubic Yard = 27 Cubic Feet = 0.7646 Cubic Meters

1 Foot = 12 Inches = 0.3048 Meters

1 Inch = 2.54 Centimeters = 0.0254 Meters

1 Kilogram = 2.2046 Pounds

1 Kilometer = 0.6214 Miles = 3280 Feet

1 Meter = 100 Centimeters = 3.2808 Feet

Sheet Metal Thickness (inches)				
Gage No.	Steel Sheet	Galvanized Steel Sheet	Stainless Steel Sheet	Aluminum Sheet
10	.135	.138	.141	
11	.120	.123	.125	
12	.105	.108	.109	
13	.090	.093	.094	.072
14	.075	.079	.078	.064
15	.067	.071	.070	.057
16	.060	.064	.063	.051
17	.054	.058	.056	.045
18	.048	.052	.050	.040
19	.042	.046	.044	.036
20	.036	.040	.038	.032
21	.033	.037	.034	.028
22	.030	.034	.031	.025
23	.027	.031	.028	.023
24	.024	.028	.025	.020
25	.021	.025	.022	.018
26	.018	.022	.019	.017

STANDARD GEOMETRY:**Circle**

- Circumference = $2 \pi \text{ radius} = \pi \text{ diameter}$
- Area = $\pi \text{ radius}^2 = \pi (\text{diameter}^2 / 4)$

Cylinder

- Volume = $(\pi \text{ radius}^2)\text{height}$
- Surface Area = $2 \pi \text{ radius}^2 + (2 \pi \text{ radius})\text{height}$

Sphere

- Volume = $(4 \pi \text{ radius}^3) / 3$
- Surface Area = $4 \pi \text{ radius}^2$

 $\pi = 3.14159$ **United Inch**

- The industry standard for measuring windows is the United Inch or UI. The UI is determined by adding the width and the height in inches.

TRADEMARKS

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MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

01000 General Requirements

01200 Reimbursable Costs (01000)

01204 Reimbursable Fees (01200)

01204-0001 Reimbursable Fees (01204)

Note: Reimbursable fees include but are not limited to permits, special inspections, special insurance, additional warranties, tolls, etc, which are not included in a task or an Adjustment Factor as explained in the Contract or The Construction Task Catalog®.

01204-0002 EA Reimbursable Fees1.00

Note: Reimbursable Fees will be paid to the contractor for the actual cost of all permits, without mark-up, for which a receipt or bill is received. The Adjustment Factor applied to Reimbursable Fees will be 1.0000. The labor cost involved in obtaining all permits is in the Adjustment Factor. The base cost of the Reimbursable Fee is \$1.00. The quantity used will adjust the base cost to the actual Reimbursable Fee (e.g. quantity of 125 = \$125.00 Reimbursable Fee). If there are multiple Reimbursable Fees, each one shall be listed separately with a comment in the "note" block to identify the Reimbursable Fees (e.g. sidewalk closure, road cut, various permits, extended warrantee, expedited shipping costs, etc.). A copy of each receipt shall be included with the Proposal.

01350 Labor/Wage Rates (01000)

Note: For tasks not included in the Construction Task Catalog® and as directed by the Owner only.

01352 Wage Rates (01350)

Note: Wage rates include base rate, fringe and an allowance for payroll taxes, worker's compensation, unemployment insurance, etc.

01352-0001 Local Labor/Wage Rates (01352)

Note: Welders receive the rate prescribed for the craft performing the operation to which the welding is incidental.

01352-0002 HR Asbestos Removal Worker59.72

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 2.99

01MOD-0002 For Apprentice, Deduct -11.94

01352-0003 HR Insulator60.70

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 3.04

01MOD-0002 For Apprentice, Deduct -12.14

01352-0004 HR Boilermaker80.68

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 4.03

01MOD-0002 For Apprentice, Deduct -16.14

01352-0005 HR Brick Layer58.59

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 2.93

01MOD-0002 For Apprentice, Deduct -11.72

01352-0006 HR Carpenter63.02

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 3.15

01MOD-0002 For Apprentice, Deduct -12.60

01352-0007 HR Carpet, Linoleum53.41

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 2.67

01MOD-0002 For Apprentice, Deduct -10.68

01352-0008 HR Cement Mason59.79

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 2.99

01MOD-0002 For Apprentice, Deduct -11.96

01352-0009 HR Drywall Finisher58.60

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 2.93

01MOD-0002 For Apprentice, Deduct -11.72

01352-0010 HR Electrician65.07

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 3.25

01MOD-0002 For Apprentice, Deduct -13.01

01352-0011 HR Equipment Operator, Heavy (Crane)73.05

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 3.65

01MOD-0002 For Apprentice, Deduct -14.61

01352-0012 HR Equipment Operator, Medium (Bulldozer)72.68

Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.

01MOD-0001 For Foreman, Add 3.63

01MOD-0002 For Apprentice, Deduct -14.54

01000 General Requirements**01350 Labor/Wage Rates****01352 Wage Rates**

MINOR

CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

01352-0013	HR	Equipment Operator, Light (Backhoe, Bobcat).....	70.96	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.55	
	01MOD-0002	For Apprentice, Deduct	-14.19	
01352-0014	HR	Glazier.....	70.66	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.53	
	01MOD-0002	For Apprentice, Deduct	-14.13	
01352-0015	HR	Laborer.....	64.04	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
01352-0016	HR	Lather.....	60.16	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.01	
	01MOD-0002	For Apprentice, Deduct	-12.03	
01352-0017	HR	Marble Setter.....	58.71	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.94	
	01MOD-0002	For Apprentice, Deduct	-11.74	
01352-0018	HR	Millwright.....	60.40	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.02	
	01MOD-0002	For Apprentice, Deduct	-12.08	
01352-0019	HR	Painter, Ordinary.....	46.71	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.34	
	01MOD-0002	For Apprentice, Deduct	-9.34	
01352-0020	HR	Painter, Structural Steel.....	61.42	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.07	
	01MOD-0002	For Apprentice, Deduct	-12.28	
01352-0021	HR	Paperhanger.....	46.71	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.34	
	01MOD-0002	For Apprentice, Deduct	-9.34	
01352-0022	HR	Pile Drivers.....	75.60	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.78	
	01MOD-0002	For Apprentice, Deduct	-15.12	
01352-0023	HR	Plasterer.....	59.30	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.97	
	01MOD-0002	For Apprentice, Deduct	-11.86	
01352-0024	HR	Plumber.....	66.60	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.33	
	01MOD-0002	For Apprentice, Deduct	-13.32	
01352-0025	HR	Powderman.....	63.46	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.17	
	01MOD-0002	For Apprentice, Deduct	-12.69	
01352-0026	HR	Rodman (Reinforcing)/Ornamental Steel Worker.....	59.38	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.97	
	01MOD-0002	For Apprentice, Deduct	-11.88	
01352-0027	HR	Roofer, Composite.....	54.44	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.72	
	01MOD-0002	For Apprentice, Deduct	-10.89	
01352-0028	HR	Roofer, Tile/Slate.....	54.07	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.70	
	01MOD-0002	For Apprentice, Deduct	-10.81	
01352-0029	HR	Sheet Metal Worker.....	68.38	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	3.42	
	01MOD-0002	For Apprentice, Deduct	-13.68	
01352-0030	HR	Sprinkler Installer.....	59.23	
		Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.		
	01MOD-0001	For Foreman, Add	2.96	
	01MOD-0002	For Apprentice, Deduct	-11.85	



General Requirements 01000

Labor/Wage Rates 01350

Wage Rates 01352

01

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
01352-0031	HR	Steam / Pipe Fitter Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	66.60	
		01MOD-0001 For Foreman, Add	3.33	
		01MOD-0002 For Apprentice, Deduct	-13.32	
01352-0032	HR	Stone Mason Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	58.59	
		01MOD-0001 For Foreman, Add	2.93	
		01MOD-0002 For Apprentice, Deduct	-11.72	
01352-0033	HR	Structural Steel Worker Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	78.56	
		01MOD-0001 For Foreman, Add	3.93	
		01MOD-0002 For Apprentice, Deduct	-15.71	
01352-0034	HR	Tile Layer Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	56.28	
		01MOD-0001 For Foreman, Add	2.81	
		01MOD-0002 For Apprentice, Deduct	-11.26	
01352-0035	HR	Terrazzo Finisher Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	53.91	
		01MOD-0001 For Foreman, Add	2.70	
		01MOD-0002 For Apprentice, Deduct	-10.78	
01352-0036	HR	Truck Driver, Light Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	57.62	
		01MOD-0001 For Foreman, Add	2.88	
		01MOD-0002 For Apprentice, Deduct	-11.52	
01352-0037	HR	Truck Driver, Heavy Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	57.83	
		01MOD-0001 For Foreman, Add	2.89	
		01MOD-0002 For Apprentice, Deduct	-11.57	
01352-0038	HR	Class I Diver Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	149.19	
01352-0039	HR	Class III Diver Tender Note: Tasks in the CTC include appropriate costs to cover labor. These tasks will be requested specifically by the owner for miscellaneous work not covered in the CTC.	78.62	
01352-0040	Rates For Services (01352)			
01352-0041	HR	Watchman/Guard, Unarmed 01352-0042	16.78	
01352-0042	HR	Watchman/Guard, Armed.....	24.64	
01352-0043	HR	OSHA Testing	66.55	
01352-0044	HR	Investigating Engineer Or Specialty Consultant Note: For special investigating requirements or services outside required architectural and engineering services.	80.00	
01352-0045	HR	Investigating Senior Engineer Or Specialty Consultant Note: For special investigating requirements or services outside required architectural and engineering services.	125.00	
01352-0046	HR	Industrial Hygienist.....	42.76	
01352-0047	HR	On-site Material Testing Technician.....	49.50	
01352-0048	MI	Mileage For Professional Services (Engineering, Surveying, Etcetera) Note: For use only when the government orders the contractor to use personnel whose base of operations is outside of a 100 mile radius of the site (use only miles that exceed 100 mi)	0.56	
01352-0049	Rates For Traffic Control (01352)			
01352-0050	HR	Flagperson For Traffic Control	64.04	

END OF SECTION 01

01000 General Requirements

01350 Labor/Wage Rates

01352 Wage Rates



MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

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MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

02000 Site Construction

02110 Demolition (02000)

02119 Hauling And Disposal Processing Fee (02110)

02119-0001	Debris Processing Fee <small>(02119)</small>	
02119-0002	Recycler Fees <small>(02119-0001)</small>	
	Note: Excludes hauling.	
02119-0003	CY Drop-Off Asphalt At Recycling Center	17.39
02119-0004	CY Drop-Off Concrete At Recycling Center	14.49
02119-0005	Landfill Dump Fees <small>(02119-0001)</small>	
	Note: Does not apply when material is transferred to owner's site or facility, or with use of dumpsters. Excludes hauling.	
02119-0006	CY Traditional Building Construction Materials Landfill Dump Fee	11.59
02119-0007	CY Trees, Stumps And Brush Landfill Dump Fee	11.59
02119-0008	CY Rubbish Landfill Dump Fee	11.59
02119-0009	CY Hazardous Materials And Rubbish (Paint Cans, Etcetera) Landfill Dump Fee	20.29
02119-0010	CY Excavated Dirt Landfill Dump Fee	8.69
02119-0011	CY Asphalt, Concrete, Gravel And Subgrade Material Landfill Dump Fee	14.41
02119-0012	Hauling <small>(02119)</small>	
	Note: Includes driver and equipment, ten (10) to fifteen (15) minutes load time, time for travel, dump time and return (roundtrip). The task quantity is the number of miles to the disposal site/transfer station (one way mileage) times the number of cubic yards being transported. For example, to haul 8 CY to a site 14 miles away, the quantity is calculated as follows: 14 miles x 8 CY = 112 CYM. Use both hauling tasks for distances greater than 15 miles. To haul 28 CY to a site 32 miles away, the quantity for the task to haul the first 15 miles is calculated: 15 miles x 28 CY = 420 CYM. The quantity for the additional hauling task over the first 15 miles is calculated: 32 total miles less 15 initial miles equals 17 miles x 28 CY = 476 CYM.	
02119-0013	CYM Hauling Up To 15 Miles	0.85
02119-0014	CYM Hauling, Miles Over Initial 15 Miles	0.63

END OF SECTION 02

02

02000 Site Construction

02110 Demolition

02119 Hauling And Disposal Processing Fee



MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

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15000 Mechanical

15900 Controls And Instrumentation ⁽¹⁵⁰⁰⁰⁾

15905 HVAC Instrumentation ⁽¹⁵⁹⁰⁰⁾

15905-0001 HVAC Instrumentation ⁽¹⁵⁹⁰⁵⁾

15905-0002	EA	Heat Meter with M-Bus and RS-486. Panel Mount.....	867.82	32.75
		Note: Contrec Model #212.10.		
15905-0003	EA	Heat Meter with M-Bus and RS-486. Wall Mount.....	824.09	39.29
		Note: Includes high and low alarms. Contrec Model #212.20.		
15905-0004	EA	Flow Computer. Pulse input with signal conditioner. Panel Mount.....	851.64	32.75
		Note: Contrec Model #405D.10A.		
15905-0005	EA	Flow Computer. Pulse input with signal conditioner. Panel Mount.....	1,140.66	32.75
		Note: Includes isolated 4-20mA analog output. Contrec Model #405D.11A.		
15905-0006	EA	Flow Computer. Pulse input with signal conditioner. Panel Mount.....	1,038.93	32.75
		Note: Includes RS 232/422/485 Communications. Contrec Model #405D.12A.		
15905-0007	EA	Gas and Steam Flow Computer. 4-20mA temp. Panel Mount.....	1,334.89	32.75
		Note: Contrec Model #415A.10A.		
15905-0008	EA	Gas and Steam Flow Computer. 4-20mA temp. Panel Mount.....	1,621.60	32.75
		Note: Includes isolated 4-20mA analog output. Contrec Model #415A.11A.		
15905-0009	EA	Gas and Steam Flow Computer. 4-20mA temp. Panel Mount.....	1,522.18	32.75
		Note: Includes RS 232/422/485 communications. Contrec Model #415A.12A.		
15905-0010	EA	Gas and Steam Flow Computer. RTD temp. Panel Mount.....	1,361.48	32.75
		Note: Contrec Model #415R.10A.		
15905-0011	EA	Gas and Steam Flow Computer. RTD temp. Panel Mount.....	1,649.35	32.75
		Note: Includes isolated 4-20mA analog output. Contrec Model #415R.11A.		
15905-0012	EA	Gas and Steam Flow Computer. RTD temp. Panel Mount.....	1,548.77	32.75
		Note: Includes RS 232/422/485 communications. Contrec Model #415R.12A.		
15905-0013	EA	Base Model 500 Series Flow Computer. Panel Mount.....	1,132.57	32.75
		Note: Includes advanced output options, RS 232 communications. Contrec Model #505.112AFN-XX01.		
15905-0014	EA	Flow Computer, Class 1. Panel Mount.....	1,542.99	32.75
		Note: Includes advanced output option, logging and backlit display. Contrec Model #515.111AFN-XX01.		
15905-0015	EA	Flow Computer, Class 2. Panel Mount.....	1,948.78	32.75
		Note: Includes advanced output option, logging and backlit display. Contrec Model #515.111AFN-XX02.		
15905-0016	EA	Flow Computer, Class 3. Panel Mount.....	2,256.30	32.75
		Note: Includes advanced output option, logging and backlit display. Contrec Model #515.111AFN-XX03.		

15905-0017 HVAC Instrumentation; Johnson Controls, Inc. ⁽¹⁵⁹⁰⁵⁾

Note: Pricing includes material only.

15905-0018	EA	F-3500: Flow Meter, insertion electromagnetic type, with analog, dry contact and freq. outputs	2,614.50	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	117.65	
15905-0019	EA	F-3500-SUBMER: F-3500 Option, remote electronics with submersible sensor	619.50	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	27.88	
15905-0020	EA	F-1100: Flow Meter, single turbine insertion type, frequency output (for Btu system only)	701.40	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	31.56	
15905-0021	EA	F-1110: Flow Meter, single turbine insertion type, analog output (3-wire transmitter)	980.70	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	44.13	
15905-0022	EA	F-1111: Flow Meter, single turbine insertion type, isolated-analog output (4-wire transmitter)	1,035.30	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	46.59	
15905-0023	EA	F-1120: Flow Meter, single turbine insertion type, dry contact output, binary divider (for rate/total)	863.10	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	38.84	
15905-0024	EA	F-1130: Flow Meter, single turbine insertion type, dry contact output, scaled pulse (for totalization)	915.60	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	41.20	
15905-0025	EA	F-1200: Flow Meter, dual turbine insertion type, frequency output (for Btu system only)	1,115.10	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	50.18	
15905-0026	EA	F-1210: Flow Meter, dual turbine insertion type, analog output (3-wire transmitter)	1,350.30	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	60.76	
15905-0027	EA	F-1211: Flow Meter, dual turbine insertion type, isolated-analog output (4-wire transmitter)	1,420.65	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	63.93	
15905-0028	EA	F-1220: Flow Meter, dual turbine insertion type, dry contact output, binary divider (for rate/total)	1,248.45	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	56.18	
15905-0029	EA	F-1230: Flow Meter, dual turbine insertion type, dry contact output, scaled pulse (for totalization)	1,300.95	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	58.54	
15905-0030	EA	FB-1200: Flow Meter, bi-directional insertion type, frequency output (for Btu system only)	1,632.75	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	73.47	
15905-0031	EA	FB-1210: Flow Meter, bi-directional insertion type, analog output for rate, dry contact for direction	1,867.95	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	84.06	
15905-0032	EA	FB-1211: Flow Meter, bi-direction, iso-analog output, analog output for rate, dry contact for direction	1,925.70	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	86.66	
15905-0033	EA	F-1300: Flow Meter, inline turbine, 3/4" & 1", frequency output (for Btu system only)	405.30	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	18.24	
15905-0034	EA	F-1310: Flow Meter, inline turbine, 3/4" & 1", analog output (3-wire transmitter)	684.60	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	30.81	
15905-0035	EA	F-1311: Flow Meter, inline turbine, 3/4" & 1", iso-analog output (4-wire transmitter)	761.25	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	34.26	
15905-0036	EA	F-1320: Flow Meter, inline turbine, 3/4" & 1", dry contact output, binary divider (for rate/total)	569.10	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	25.61	
15905-0037	EA	F-1330: Flow Meter, inline turbine, 3/4" & 1", dry contact output, scaled pulse (for totalization)	569.10	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	25.61	
15905-0038	EA	F-1199-STANLS: F-1100 Series Option, 316 stainless steel wetted metal components	370.65	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	16.68	
15905-0039	EA	F-1299-STANLS: F-1200 Series Option, 316 stainless steel wetted metal components	514.50	
		15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	23.15	

15000 Mechanical**15900 Controls And Instrumentation****15905 HVAC Instrumentation**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15905-0040	EA	FB-1299-STANLS: FB-1200 Series Option, 316 stainless steel wetted metal components.....	514.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	23.15	
15905-0041	EA	F-OPT1-CONDUIT: 10 ft. sealtight conduit w/fitings	36.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	1.65	
15905-0042	EA	F-OPT2-25FT: Additional 25ft standard cable.....	31.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	1.42	
15905-0043	EA	F-OPT3-50FT: Additional 50ft standard cable.....	49.35	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	2.22	
15905-0044	EA	F-OPT4-100FT: Additional 100ft standard cable.....	85.05	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	3.83	
15905-0045	EA	F-OPT5-PLENUM: 10' plenum cable w/inline DIN connector (not for conduit installations).....	31.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	1.42	
15905-0046	EA	F-OPT6-25FTPL: 25' plenum cable w/inline DIN connector (not for conduit installations).....	57.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	2.60	
15905-0047	EA	F-OPT7-50FTPL: 50' plenum cable w/inline DIN connector (not for conduit installations).....	91.35	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	4.11	
15905-0048	EA	F-OPT8-100FTPL: 100' plenum cable w/inline DIN connector (not for conduit installations).....	139.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	6.28	
15905-0049	EA	F-OPT9-SUBMER: Submersible electronics enclosure, with 10' cable & connector (requires 316SS option).....	525.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	23.63	
15905-0050	EA	F-STD-INSTL1: Flow Meter Installation kit, standard, for welded steel pipe, all sizes 1.25" to 72" pipe.....	53.55	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	2.41	
15905-0051	EA	F-STD-INSTL5: Flow Meter Installation kit, standard 316SS, for welded steel pipe, all sizes 1.25" to 72".....	127.05	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	5.72	
15905-0052	EA	F-STD-INSTL7: Flow Meter Installation kit, standard, for 1.25-2" threaded steel (no welding required).....	102.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	4.63	
15905-0053	EA	F-STD-INSTL8: Flow Meter Installation kit, standard 316SS, for 1.25-2" threaded steel (no welding req'd).....	157.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	7.09	
15905-0054	EA	F-STD-INSTL3: Flow Meter Installation kit, standard, for 1"- 2" copper tube	86.10	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	3.87	
15905-0055	EA	F-STD-INSTL4: Flow Meter Installation kit, standard, for 2.5-3" copper tube.....	135.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	6.10	
15905-0056	EA	F-STD-INSTL9: Flow Meter Installation kit, standard, for 4" copper tube.....	245.70	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.06	
15905-0057	EA	F-STD-INSTL10: Flow Meter Installation kit, standard, for 3-6" ductile iron (With clamp-on saddle).....	157.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	7.09	
15905-0058	EA	F-STD-INSTL11: Flow Meter Installation kit, standard, for 8-16" ductile iron (With clamp-on saddle).....	262.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.81	
15905-0059	EA	F-STD-INSTL12: Flow Meter Installation kit, standard, SS, for 3-16" ductile iron (With clamp-on saddle).....	367.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	16.54	
15905-0060	EA	F-STD-INSTL13: Flow Meter Installation kit, standard, for 2-6" PVC pipe (With clamp-on saddle).....	157.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	7.09	
15905-0061	EA	F-STD-INSTL14: Flow Meter Installation kit, standard, for 8-12" PVC pipe (With clamp-on saddle).....	262.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.81	
15905-0062	EA	F-STD-INSTL15: Flow Meter Installation kit, standard, SS/PVC, for 2-4" PVC pipe (With clamp-on saddle).....	204.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.21	
15905-0063	EA	F-STD-INSTL16: Flow Meter Installation kit, standard, SS/PVC, for 6" PVC pipe (With clamp-on saddle).....	262.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.81	
15905-0064	EA	F-STD-INSTL17: Flow Meter Installation kit, standard, SS, for 2-12" PVC pipe (With clamp-on saddle).....	367.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	16.54	
15905-0065	EA	F-STD-INSTL18: Flow Meter Installation kit, standard, 316 SS, for welded stainless steel pipe.....	183.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	8.27	
15905-0066	EA	F-HTAP-INSTL2: Flow Meter Installation kit, hot tap, for welded steel pipe, all sizes 1.25" to 72" pipe	102.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	4.63	
15905-0067	EA	F-HTAP-INSTL6: Flow Meter Installation kit, hot tap, 316SS, for welded steel pipe, all sizes 1.25" to 72" pipe.....	205.80	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.26	
15905-0068	EA	F-HTAP-INSTL19: Flow Meter Installation kit, hot tap, for threaded steel pipe (With clamp-on saddle).....	204.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.21	
15905-0069	EA	F-HTAP-INSTL20: Flow Meter Installation kit, hot tap, 316SS, for threaded steel pipe (With clamp-on saddle).....	309.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	13.94	
15905-0070	EA	F-HTAP-INSTL21: Flow Meter Installation kit, hot tap, for 2" copper tube (w/clamp-on saddle)	236.25	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	10.63	
15905-0071	EA	F-HTAP-INSTL22: Flow Meter Installation kit, hot tap, for 2.5-6" copper tube (w/clamp-on saddle).....	309.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	13.94	
15905-0072	EA	F-HTAP-INSTL23: Flow Meter Installation kit, hot tap, for 3-6" ductile iron (With clamp-on saddle).....	204.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.21	
15905-0073	EA	F-HTAP-INSTL24: Flow Meter Installation kit, hot tap, for 8-16" ductile iron (With clamp-on saddle).....	309.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	13.94	
15905-0074	EA	F-HTAP-INSTL25: Flow Meter Installation kit, hot tap, 316SS, for 3-6" ductile iron (With clamp-on saddle).....	414.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	18.66	
15905-0075	EA	F-HTAP-INSTL26: Flow Meter Installation kit, hot tap, 316SS, for 8-16" ductile iron (With clamp-on saddle).....	472.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	21.26	
15905-0076	EA	F-HTAP-INSTL27: Flow Meter Installation kit, hot tap, for 2.5-6" PVC pipe (With clamp-on saddle)	204.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.21	
15905-0077	EA	F-HTAP-INSTL28: Flow Meter Installation kit, hot tap, for 8-12" PVC pipe (With clamp-on saddle)	309.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	13.94	
15905-0078	EA	F-HTAP-INSTL29: Flow Meter Installation kit, hot tap, 316SS, for 2-6" PVC pipe (With clamp-on saddle).....	414.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	18.66	
15905-0079	EA	F-HTAP-INSTL30: Flow Meter Installation kit, hot tap, 316SS, for 8-12" PVC pipe (With clamp-on saddle).....	472.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	21.26	
15905-0080	EA	F-HTAP-INSTL31: Flow Meter Installation kit, hot tap, 316SS, for stainless steel pipe.....	262.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.81	
15905-0081	EA	SYSTEM-10: BTU Meter, pulse output, NEMA 13 enclosure with LCD, electronic temp. sensors.....	934.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	42.05	
15905-0082	EA	SYSTEM-10-BAC: BTU Meter, BACnet MS/TP, NEMA 13 enclosure with LCD, electronic temp. sensors	1,249.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	56.23	
15905-0083	EA	SYSTEM-10-BAC-IP: BTU Meter, BACnet IP, NEMA 13 enclosure with LCD, electronic temp. sensors	1,249.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	56.23	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15905-0084	EA	SYSTEM-10-N2: BTU Meter, JCI Metasys N2, NEMA 13 enclosure with LCD, electronic temp. sensors.....	1,144.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	51.50	
15905-0085	EA	SYSTEM-10-OPT1: Upgrade thermowells to SS, required for 6" and larger pipes.....	57.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	2.60	
15905-0086	EA	SYSTEM-10-OPT2: Install kit adder for 2.5"-3" copper tees.....	93.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	4.21	
15905-0087	EA	SYSTEM-10-OPT3: Install kit adder for 4" copper tees.....	157.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	7.09	
15905-0088	EA	SYSTEM-10-OPT4: Install Kit adder for outdoor thermowells.....	52.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	2.36	
15905-0089	EA	SYSTEM-10-OPT5: Hot tap thermowells with installation kits for welded steel, SS & brass constr. (pair).....	367.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	16.54	
15905-0090	EA	SYSTEM-10-OPT6: Hot tap thermowells with installation kits for welded steel, all SS construction (pair).....	472.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	21.26	
15905-0091	EA	SYSTEM-10-OPT7: 240 VAC input power.....	49.35	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	2.22	
15905-0092	EA	SYSTEM-10-OPT8: BTU Meter Option, high temperature sensors (operating temp. over 200F).....	724.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	32.60	
15905-0093	EA	SYSTEM-10-OPT9: BTU Meter Option, single analog output (4-20 mA, 0-10 V or 0-5 V).....	265.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.95	
15905-0094	EA	SYSTEM-10-OPT10: BTU Meter Option, four analog outputs (4-20 mA, 0-10 V or 0-5 V).....	619.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.88	
15905-0095	EA	SYSTEM-10-OPT11: BTU Meter Option, auxiliary binary (pulse) input, adds to LON or BACnet point list.....	147.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	6.62	
15905-0096	EA	SYSTEM-10-OPT12: BTU Meter Option, NEMA 4 enclosure.....	157.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	7.09	
15905-0097	EA	SYSTEM-10-OPT13: BTU Meter Option, 25' sensor cables.....	44.10	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	1.98	
15905-0098	EA	SYSTEM-10-OPT14: BTU Meter Option, 50' sensor cables.....	74.55	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	3.35	
15905-0099	EA	SYSTEM-10-OPT15: BTU Meter Option, 100' sensor cables.....	123.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	5.58	
15905-0100	EA	SYSTEM-10-OPT16: BTU Meter Option, 10' plenum rated sensor cables.....	50.40	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	2.27	
15905-0101	EA	SYSTEM-10-OPT17: BTU Meter Option, 25' plenum rated sensor cables.....	91.35	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	4.11	
15905-0102	EA	SYSTEM-10-OPT18: BTU Meter Option, 50' plenum rated sensor cables.....	139.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	6.28	
15905-0103	EA	SYSTEM-10-OPT19: BTU Meter Option, 100' plenum rated sensor cables.....	237.30	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	10.68	
15905-0104	EA	SYSTEM-30: BTU Meter, Integral flow & temp. sensors, 3/4" & 1", pulse output.....	1,144.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	51.50	
15905-0105	EA	SYSTEM-30-BAC: BTU Meter, Integral flow & temp. sensors, 3/4" & 1", BACnet MS/TP compatible.....	1,459.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	65.68	
15905-0106	EA	SYSTEM-30-OPT1: BTU Meter Option, integral LCD display.....	126.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	5.67	
15905-0107	EA	SYSTEM-30-OPT2: BTU Meter Option, analog output (not available with LON or BAC versions).....	147.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	6.62	
15905-0108	EA	SYSTEM-30-OPT3: BTU Meter Option, 24 VDC power supply, 120 VAC input.....	82.95	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	3.73	
15905-0109	EA	D-1201: Flow Display, 1 LCD, rate & total, 6" x 6" x 4" NEMA 4 wall-mount enclosure.....	464.10	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	20.88	
15905-0110	EA	D-1202: Flow Display, 2 LCDs, rate & total, 6" x 6" x 4" NEMA 4 wall-mount enclosure.....	664.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	29.91	
15905-0111	EA	D-1203: Flow Display, 3 LCDs, rate & total, 8" x 10" x 4" NEMA 4 wall-mount enclosure.....	865.20	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	38.93	
15905-0112	EA	D-1204: Flow Display, 4 LCDs, rate & total, 8" x 10" x 4" NEMA 4 wall-mount enclosure.....	1,065.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	47.96	
15905-0113	EA	D-1205: Flow Display, 5 LCDs, rate & total, 8" x 10" x 4" NEMA 4 wall-mount enclosure.....	1,266.30	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	56.98	
15905-0114	EA	D-1206: Flow Display, 6 LCDs, rate & total, 8" x 10" x 4" NEMA 4 wall-mount enclosure.....	1,466.85	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	66.01	
15905-0115	EA	D-1299-AUX1: Display Option, isolated analog output (for D-1201 only).....	333.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	15.03	
15905-0116	EA	D-1299-AUX2: Display Option, dry contact divided output (for D-1201 only).....	161.70	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	7.28	
15905-0117	EA	D-1299-AUX3: Display Option, dry contact scaled pulse output (for D-1201 only).....	214.20	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.64	
15905-0118	EA	DB-1201: Flow Display, 1 LCD, With direction indicator, for use with FB-1200 Series Flow Meter.....	618.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.83	
15905-0119	EA	TW-HTAP-BR: Hot tap thermowell With installation kit for welded steel pipe.....	204.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.21	
15905-0120	EA	TW-HTAP-SS: Hot tap thermowell With installation kit for welded steel pipe, all wetted metal 316SS.....	309.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	13.94	
15905-0121	EA	F-2501-310: 1" vortex mass flow meter, ANSI class 300 flanges, 4-20 mA loop powered & pulse out.....	3,735.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	168.12	
15905-0122	EA	F-2515-310: 1.5" vortex mass flow meter, ANSI class 300 flanges, 4-20 mA loop powered & pulse out.....	3,870.30	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	174.16	
15905-0123	EA	F-2502-310: 2" vortex mass flow meter, ANSI class 300 flanges, 4-20 mA loop powered & pulse out.....	4,020.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	180.92	
15905-0124	EA	F-2503-310: 3" vortex mass flow meter, ANSI class 300 flanges, 4-20 mA loop powered & pulse out.....	4,324.95	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	194.62	
15905-0125	EA	F-2504-310: 4" vortex mass flow meter, ANSI class 300 flanges, 4-20 mA loop powered & pulse out.....	5,031.60	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	226.42	
15905-0126	EA	F-2506-310: 6" vortex mass flow meter, ANSI class 300 flanges, 4-20 mA loop powered & pulse out.....	5,973.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	268.81	
15905-0127	EA	F-2508-310: 8" vortex mass flow meter, ANSI class 300 flanges, 4-20 mA loop powered & pulse out.....	7,065.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	317.95	

15000 Mechanical

15900 Controls And Instrumentation

15905 HVAC Instrumentation



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15905-0128	EA	F-5100-1110-1NG: Thermal Mass Flow Meter for Natural Gas, Insertion type, 1" through 24".....	3,616.20	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	162.73	
15905-0129	EA	INSTL64: Thermal mass flow meter installation kit for steel pipe.....	155.40	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	6.99	
15905-0130	EA	F-5134-1111-3NG: Thermal Mass Flow Meter for Natural Gas, Inline 3/4".....	3,819.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	171.90	
15905-0131	EA	F-5101-1111-3NG: Thermal Mass Flow Meter for Natural Gas, Inline 1".....	3,832.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	172.46	
15905-0132	EA	F-5113-1111-3NG: Thermal Mass Flow Meter for Natural Gas, Inline 1.25".....	3,963.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	178.37	
15905-0133	EA	F-5115-1111-3NG: Thermal Mass Flow Meter for Natural Gas, Inline 1.5".....	4,003.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	180.16	
15905-0134	EA	F-5102-1111-3NG: Thermal Mass Flow Meter for Natural Gas, Inline 2".....	4,095.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	184.28	
15905-0135	EA	F-3101-211: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 1".....	2,549.40	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	114.72	
15905-0136	EA	F-3115-211: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 1.5".....	2,683.80	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	120.77	
15905-0137	EA	F-3102-211: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 2".....	2,776.20	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	124.93	
15905-0138	EA	F-3103-211: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 3".....	2,998.80	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	134.95	
15905-0139	EA	F-3104-211: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 4".....	3,108.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	139.86	
15905-0140	EA	F-3106-211: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 6".....	3,592.05	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	161.64	
15905-0141	EA	F-3108-311: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 8".....	4,364.85	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	196.42	
15905-0142	EA	F-3110-311: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 10".....	5,945.10	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	267.53	
15905-0143	EA	F-3112-311: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 12".....	6,709.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	301.93	
15905-0144	EA	F-3114-311: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 14".....	7,548.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	339.68	
15905-0145	EA	F-3116-311: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, low temp, 16".....	8,269.80	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	372.14	
15905-0146	EA	F-3101-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 1".....	2,894.85	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	130.27	
15905-0147	EA	F-3115-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 1.5".....	3,021.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	135.99	
15905-0148	EA	F-3102-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 2".....	3,066.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	137.97	
15905-0149	EA	F-3103-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 3".....	3,494.40	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	157.25	
15905-0150	EA	F-3104-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 4".....	3,671.85	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	165.23	
15905-0151	EA	F-3106-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 6".....	4,449.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	200.25	
15905-0152	EA	F-3108-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 8".....	4,846.80	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	218.11	
15905-0153	EA	F-3110-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 10".....	7,048.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	317.19	
15905-0154	EA	F-3112-111: Inline Electromagnetic Flow Meter, ANSI class 150 flanged, integral mount, high temp, 12".....	8,163.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	367.37	
15905-0155	EA	F-31XX-REMOTE: Option for F-31XX inline mag meter, add remote mount electronics and cable up to 64 ft.....	309.75	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	13.94	
15905-0156	EA	Energy Meter H8026-0100-2: N2 enhanced data datastream, max amps 100, CT size small.....	1,594.28	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	71.74	
15905-0157	EA	Energy Meter H8026-0300-2: N2 enhanced data datastream, max amps 300, CT size small.....	1,640.27	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	73.81	
15905-0158	EA	Energy Meter H8026-0400-3: N2 enhanced data datastream, max amps 400, CT size medium.....	1,670.93	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	75.19	
15905-0159	EA	Energy Meter H8026-0800-3: N2 enhanced data datastream, max amps 800, CT size medium.....	1,732.25	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	77.95	
15905-0160	EA	Energy Meter H8026-0800-4: N2 enhanced data datastream, max amps 800, CT size large.....	1,778.24	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	80.02	
15905-0161	EA	Energy Meter H8026-1600-4: N2 enhanced data datastream, max amps 1600, CT size large.....	1,808.90	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	81.40	
15905-0162	EA	Energy Meter H8026-2400-4: N2 enhanced data datastream, max amps 2400, CT size large.....	1,885.55	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	84.85	
15905-0163	EA	Energy Meter H8163-0100-0-3: 120VAC-480VAC, 3 CT, max amps 100 micro, with display.....	1,306.07	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	58.77	
15905-0164	EA	Energy Meter H8163-0200-1-3: 120VAC-480VAC, 3 CT, max amps 200 mini, with display.....	1,330.60	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	59.88	
15905-0165	EA	Energy Meter H8163-0300-2-3: 120VAC-480VAC, 3 CT, max amps 300 small, with display.....	1,385.83	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	62.36	
15905-0166	EA	Energy Meter H8163-0400-3-3: 120VAC-480VAC, 3 CT, max amps 400 medium, with display.....	1,447.11	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	65.12	
15905-0167	EA	Energy Meter H8163-0800-3-3: 120VAC-480VAC, 3 CT, max amps 800 medium, with display.....	1,480.88	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	66.64	
15905-0168	EA	Energy Meter H8163-0800-4-3: 120VAC-480VAC, 3 CT, max amps 800 large, with display.....	1,563.66	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	70.36	
15905-0169	EA	Energy Meter H8163-01600-4-3: 120VAC-480VAC, 3 CT, max amps 1600 large, with display.....	1,710.79	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	76.99	
15905-0170	EA	Energy Meter H8163-2400-4-3: 120VAC-480VAC, 3 CT, max amps 2400 large, with display.....	1,839.56	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	82.78	
15905-0171	EA	Energy Meter H8186-CB: BACnet Communications Board for H8100 Series.....	478.30	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	21.52	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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15905-0172	EA		Energy Meter H8126-CB: Metasys N2 Communications Board for H8100 Series	332.68	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	14.97	

15910 Energy Monitoring and Control Systems (15900)

15910-0001 EMCS General Costs (15910)

15910-0002 EMCS System Design Engineering (15910-0001)

Note: Hourly labor rates are used for engineering projects only. Not used in conjunction with construction tasks.

15910-0003	HR		EMCS Site Inspection Of Existing Facilities	162.10	
15910-0004	HR		EMCS Engineering Project Management	162.10	
15910-0005	HR		EMCS System Engineering, Schematic Design And Layout	171.93	
15910-0006	HR		EMCS System Software Programming And Graphics Programming	171.93	
15910-0007	HR		EMCS Graphics Picture Creation	110.55	
15910-0008	HR		EMCS System Controls Training	162.10	
15910-0009	HR		EMCS On-Site System Diagnostics Field Technician	162.10	
15910-0010	HR		EMCS Remote Technical Support Using Phone Or Internet	135.12	
15910-0011	HR		EMCS Travel Time (All Personnel)	140.03	

15910-0012 Post Warranty Field Tests, Checkout And Commissioning (15910-0001)

Note: Tasks used for building commissioning of other contractors' work or post warranty service work. A point is defined as any transmitter, switch, actuator, sensor or device (starter, VFD, controller, fan, electric coil, actuator, valve, etc.) that is monitored or controlled by the EMCS system. Most devices count as 1 point. Actuators, valves and thermostats count as 2 points.

15910-0013	PNT		EMCS Field Test	85.99	
			Note: Priced per point. Task used after warranty period only.		
15910-0014	PNT		EMCS Field Checkout And Startup	85.99	
			Note: Priced per point. Task used after warranty period only.		
15910-0015	PNT		EMCS Field Commissioning	85.99	
			Note: Priced per point. Used when the owner requires an independent commissioning firm.		
15910-0016	EA		EMCS Field Balance Support	73.68	
			Note: Priced per controller. Task used after warranty period only.		

15910-0017 EMCS System Engineering/Submittal Design And Layout (15910-0001)

Note: A point is defined as any transmitter, switch, actuator, sensor or device (starter, VFD, controller, fan, electric coil, actuator, valve, etc.) that is monitored or controlled by the EMCS system. Most devices count as 1 point. Actuators, valves and thermostats count as 2 points.

15910-0018	PNT		EMCS System Engineering/Submittal Design And Layout	28.69	
			Note: Priced per point.		

15910-0019 Install EMCS Field Devices And Controllers (Labor Only) (15910-0001)

Note: This section is used when equipment or devices are supplied by others, usually in a maintenance or trouble shooting situation. Excludes cable or conduit between panel and device.

15910-0020	EA		Mount An AHU Control Enclosure On Block, Masonry Or Gypsum Wall	148.61	24.56
15910-0021	EA		Install AHU Power Supply In A Control Enclosure	108.06	49.12
15910-0022	EA		Install Metal Box And Conduit Stub-Up For Sensor In Masonry Wall	148.61	24.56
15910-0023	EA		Install And Wire Room Sensor	40.54	24.56
15910-0024	EA		Install And Wire Duct Sensor	54.04	24.56
15910-0025	EA		Install And Wire AHU Averaging Sensor	175.59	122.80
15910-0026	EA		Install And Wire AHU Humidity Sensor	94.58	36.87
15910-0027	EA		Install And Wire AHU CO2 Sensor	135.12	36.87
15910-0028	EA		Install And Wire Fan Or Filter DP Switch	135.12	36.87
15910-0029	EA		Install And Wire Float Switch	108.06	24.56
15910-0030	EA		Install And Wire Freezestat	175.59	122.80
15910-0031	EA		Install And Wire Duct Static Pressure Sensor	94.58	49.12
15910-0032	EA		Install And Wire Duct High Static Sensor	54.04	24.56
15910-0033	EA		Install And Wire Emergency Stop Switch For AHU Or Other Equipment	54.04	24.56
15910-0034	EA		Install And Wire Emergency Stop Switch For AHU	162.10	49.12
15910-0035	EA		Install And Wire AHU Connection To Starter	162.10	122.80
15910-0036	EA		Install And Wire Connection To VFD	297.21	122.80
15910-0037	EA		Install And Wire AHU Valve Actuator	81.08	24.56
15910-0038	EA		Install And Wire AHU Damper Actuator	162.10	49.12
15910-0039	EA		Install And Wire AHU Smoke Detector Or Fire Alarm Relay	94.58	36.87
15910-0040	EA		Install And Wire AHU Electropneumatic Transducer	67.52	24.56
15910-0041	EA		Install And Wire Electric Heat Or Sequencer	162.10	49.12
15910-0042	EA		Install And Wire Connection To Outdoor Compressor	378.23	36.87
15910-0043	EA		Install And Wire AHU Magnahelic	135.12	24.56
15910-0044	EA		Install And Wire AHU Wireway For Control Enclosure	162.10	49.12
15910-0045	EA		Wire And Assemble AHU Control Enclosure	297.21	
			Note: Includes installing all panel devices for a medium size panel.		
15910-0046	EA		Field Install And Wire VAV Controller	108.06	49.12
			Note: Use when VAV box is previously installed.		
15910-0047	EA		Shop Install And Wire VAV Controller	94.58	
15910-0048	EA		Install And Wire VAV Power Supply	40.54	24.56
15910-0049	EA		Wire VAV Fan In Parallel Or Series Fan Box	54.04	24.56
15910-0050	EA		Install And Wire Fan Coil Unit Controller	270.17	73.68
15910-0051	EA		Mount Fan Coil Unit, Heat Pump, Or Unit Ventilator Controller	81.08	
15910-0052	EA		Install And Wire Central Plant Controller	378.23	221.05
			Note: For programmable DDC controller.		
15910-0053	EA		Mount Central Plant Enclosure For DDC Control Enclosure	148.61	24.56
			Note: For programmable DDC controller.		
15910-0054	EA		Install Central Plant Power Supply For DDC Programmable Controller	108.06	49.12
15910-0055	EA		Install Central Plant Wireway For Programmable Controller	162.10	49.12

15000 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**MINOR
CSI UOM DESCRIPTIONTOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

15910-0056	EA	Install And Wire Chiller Controls For Enable And Setpoint Controls.....	324.20	73.68
15910-0057	EA	Install And Wire Chiller Flow Switch	324.20	147.37
15910-0058	EA	Install And Wire Chiller DP Transmitter.....	1,215.79	73.68
		Note: Includes installing copper tubing connection to water piping.		
15910-0059	EA	Install And Wire Boiler Controls For Enable And Alarm.....	243.19	73.68
15910-0060	EA	Install And Wire Boiler Safeties	243.19	73.68
		Note: For high water, low water and flame safeguard.		
15910-0061	EA	Install Boiler Control Panel Enclosure On Block, Masonry Or Gypsum Wall.....	540.33	307.04
15910-0062	EA	Wire And Terminate Combustion Air Damper	675.45	49.12
15910-0063	EA	Wire Oil Tank Interlock For Oil Boiler	337.69	49.12
15910-0064	EA	Install And Wire Boiler Emergency Stop Switch	675.45	147.37
15910-0065	EA	Wire And Terminate Temperature Well Sensor.....	67.52	36.87
		Note: Excludes well.		
15910-0066	EA	Install And Wire Strap On Sensor.....	162.10	36.87
15910-0067	EA	Install And Wire CO2 Sensor For Room Or Space.....	135.12	36.87
		Note: Excludes stub-up.		
15910-0068	EA	Install And Wire Valve Actuator	135.12	98.24
15910-0069	EA	Install And Wire Outside Air Temperature Sensor.....	243.19	73.68
15910-0070	EA	Install And Wire Outside Air Humidity Sensor	121.56	73.68
15910-0071	EA	Install And Wire Flow Sensor	297.21	147.37
15910-0072	EA	Install And Wire Pressure Sensor For Pump Or Building	297.21	147.37
15910-0073	EA	Install And Wire Pump Starter	162.10	36.87
15910-0074	EA	Install And Wire Pump VFD.....	297.21	73.68
15910-0075	EA	Install And Wire Pump DP Switch	405.29	147.37
		Note: Includes installing copper tubing connection to water piping.		
15910-0076	EA	Install And Wire System DP Transmitter	1,350.90	147.37
		Note: Includes installing copper tubing connection to water piping and wiring remote transmitter.		
15910-0077	EA	Mount Starter Sized Up To 100 HP.....	108.06	73.68
15910-0078	EA	Mount VFD Sized Up To 100 HP.....	270.17	245.61
15910-0079	EA	Install And Wire Cooling Tower Control Enclosure.....	486.31	147.37
15910-0080	EA	Install And Wire Vibration Switch For Cooling Tower	297.21	147.37
15910-0081	EA	Install And Wire Cooling Tower Basin Heater.....	162.10	147.37
15910-0082	EA	Install And Wire Basin Water Temperature Switch	162.10	73.68
15910-0083	EA	Install And Wire Cooling Tower Make-Up Water Valve	162.10	147.37
15910-0084	EA	Install And Wire Cooling Tower Make-Up Water Valve	162.10	147.37
15910-0085	EA	Install And Wire Refrigerant Monitor Panel	810.56	307.04
15910-0086	EA	Install And Wire Break Glass Switch	162.10	73.68
15910-0087	EA	Install And Wire Horn/Strobe For Refrigerant Monitor.....	121.56	49.12
15910-0088	EA	Install And Wire Damper Actuator	162.10	49.12
15910-0089	EA	Install And Wire Chemical Feed System	1,350.90	307.04
15910-0090	EA	Wire And Assemble Control Enclosure	324.20	
		Note: Includes installing all panel devices in large size panel.		
15910-0091	EA	Install And Wire Exhaust Fan DDC Control	337.69	61.43
		Note: Start or stop and status.		
15910-0092	EA	Install And Wire Exhaust Fan Thermostat Control.....	108.06	36.87
15910-0093	EA	Wire Lighting Contactor (Contactor Installed By Others).....	337.69	49.12
15910-0094	EA	Wire And Terminate Unit Heater	108.06	36.87
15910-0095	EA	Wire Domestic Water Heater For Enable Or Disable	337.69	49.12
15910-0096	EA	Wire And Install Current Transformer KWH Meter (With Power Off).....	1,080.73	294.73
15910-0097	EA	Wire Water Meter (Meter Installed By Others).....	1,080.73	73.68
15910-0098	EA	Wire Gas Meter (Meter Installed By Others).....	1,080.73	73.68
15910-0099	EA	Install Wireless Receiver And Wire To DDC Controls	135.12	49.12
15910-0100	EA	Install Wireless Sensor.....	27.05	12.31
15910-0101	EA	Wire Split System AC Thermostat.....	540.33	36.87
15910-0102	EA	Wire Sump Pump Monitor Status Switch.....	405.29	73.68
15910-0103	EA	Install Locking Cover/Wire Guard For Thermostat Or Wall Temperature Sensor.....	54.04	24.56
15910-0104	EA	Install And Wire Combination Outside Air Temperature/Outside Air Humidity Sensor	364.74	147.37

15910-0105 Honeywell Controls (15910)**15910-0106 EMCS Central Equipment And Controllers (15910-0105)****15910-0107 Computer Equipment And Printers (15910-0106)****15910-0108 EMCS Network Area Controllers (BACnet Or Lon) (15910-0106)**

Note: Includes loading software, software license, loading data base and mounting on wall.

15910-0109	EA	Network Area Java Controller Supporting 126 Devices (Honeywell WC2003B2004).....	6,091.23	319.29
		Note: Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 1 minimum RS-232 serial ports, 1 minimum RS-485 electrically isolated ports, 1 LonWorks port (supports 126 devices), and web user interface software.		
15910-0110	EA	Network Area Java Controller Supporting 27 Devices (Honeywell WC2003B1022).....	4,217.28	319.29
		Note: Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 1 RS-232 port, 1 RS-485 port, 1 LonWorks port with driver, Lon tunnel service, BACnet driver, wind river VxWorks OS with Jeode java virtual machine, Niagara control engine and web user interface software (supports 27 devices).		
15910-0111	EA	Network Area Java Controller Supporting 10 Devices (Honeywell WEB-201).....	3,267.29	319.29
		Note: Includes 128 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, 1 RS-232 serial port, 1 RS-485 serial port, NDIO port, 2 communication card option slots, BACnet IP Client, and BACnet MS/TP. Supports up to 10 devices.		
15910-0112	EA	Network Area Java Controller Supporting 10 Devices (Honeywell WEB-201-EZ).....	4,023.26	319.29
		Note: Includes 128 MB RAM / 64 MB Flash, 2 10/100 Mb ethernet ports, 1 RS-232 serial port, 1 RS-485 serial port, NDIO port, 2 communication card option slots, BACnet IP Client, and BACnet MS/TP. Includes WEB user interface and Enterprise connectivity pack.		
15910-0113	EA	Niagara Network Area Java Controller Supporting 10 Devices (Honeywell WEB-201-LN).....	3,241.26	319.29
		Note: Includes 128 MB RAM / 64 MB Flash, 2 10/100 Mb ethernet ports, factory installed LON card, NDIO port and MODBus TCP driver. Excludes RS232 and RS485 communications. Includes Niagara network ethernet communication between stations.		



	MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
	15910-0114	EA	Web UI Network Area Java Controller Supporting 10 Devices (Honeywell WEB-201-LU)..... Note: Includes 128 MB RAM / 64 MB Flash, 2 10/100 Mb ethernet ports, factory installed LON card, NDIO port and MODBus TCP driver. Excludes RS232 and RS485.	3,241.26	319.29
	15910-0115	EA	16 Point BACnet IP Network Area Java Controller (Honeywell WEB-216-B)..... Note: Includes 16 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this controller.	3,502.72	319.29
	15910-0116	EA	16 Point Web UI And BACnet IP Network Area Java Controller (Honeywell WEB-216-BU)..... Note: Includes 16 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this controller.	3,777.19	319.29
	15910-0117	EA	16 Point Niagara Network Area Java Controller (Honeywell WEB-216-N)..... Note: Includes 16 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this controller.	3,502.72	319.29
	15910-0118	EA	16 Point Web UI And Niagara Network Area Java Controller (Honeywell WEB-216-NU)..... Note: Includes 16 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this controller.	3,777.19	319.29
	15910-0119	EA	34 Point BACnet IP Network Area Java Controller (Honeywell WEB-234-B)..... Note: Includes 34 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this controller.	3,779.55	319.29
	15910-0120	EA	34 Point Web UI and BACnet IP Network Area Java Controller (Honeywell WEB-234-BU)..... Note: Includes 34 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this.	4,054.02	319.29
	15910-0121	EA	34 Point Niagara Network Area Java Controller (Honeywell WEB-216-N)..... Note: Includes 34 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this controller.	3,779.55	319.29
	15910-0122	EA	34 Point Web UI and Niagara Network Area Java Controller (Honeywell WEB-216-NU)..... Note: Includes 34 IO point equipment controller consisting of a controller, one IO-16 module and BACnet IP client communications. Includes 64 MB RAM / 64 MB Flash, 2 10/100 MB ethernet ports, NDIO port and 2 communication card option slots. Excludes RS232 and RS485. The LON card is not an option on this.	4,054.02	319.29
	15910-0123	EA	Network Area Java Controller Supporting 27 Devices (Controller Only) (Honeywell WEB-403-AX)..... Note: Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 1 RS-485 port, 1 RS-232 port, 1 LonWorks FTT 10 port, 6 universal inputs (analog or contact/pulse input), 4 form C (SPDT) relay outputs. Excludes UI service and Enterprise connectivity service.	4,010.25	319.29
	15910-0124	EA	Unrestricted Network Area Java Controller Supporting 27 Devices (Controller Only)..... Note: Unrestricted limit on connected devices. Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 1 RS-485 port, 1 RS-232 port, 1 LonWorks FTT 10 port, 6 universal inputs (analog or contact/pulse input), 4 form C (SPDT) relay outputs. Excludes UI service and Enterprise connectivity service. Honeywell WEB-403-EXP-AX. As with other WEBS controllers, capacity is limited by the characteristics of the application including size and complexity.	4,927.11	319.29
	15910-0125	EA	Easy Pack Network Area Java Controller Supporting 27 Devices (Honeywell WEB-403-EZ)..... Note: Includes controller plus User Interface Station Pack and Enterprise Connectivity Station Pack bundled as an "easy-order" bundle. Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 1 RS-485 port, 1 RS-232 port, 1 LonWorks FTT 10 port, 6 universal inputs (analog or contact/pulse input), 4 form C (SPDT) relay outputs. Excludes UI service and Enterprise connectivity service.	5,209.86	319.29
	15910-0126	EA	Expanded Easy Pack Network Area Java Controller Supporting 27 Devices (Honeywell WEB-403-EXP-EZ)..... Note: Unrestricted limit on connected devices. Includes controller plus User Interface Station Pack and Enterprise Connectivity Station Pack bundled as an "easy-order" bundle. Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 1 RS-485 port, 1 RS-232 port, 1 LonWorks FTT 10 port, 6 universal inputs (analog or contact/pulse input), 4 form C (SPDT) relay outputs. Excludes UI service and Enterprise connectivity service. As with other WEBS controllers, capacity is limited by the characteristics of the application including size and complexity.	6,126.72	319.29
	15910-0127	EA	Network Area Java Controller Supporting 124 Devices (Controller Only) (Honeywell WEB-545-AX)..... Note: Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 4 RS-485 port, 2 RS-232 port, 1 LonWorks port. As with other WEBS controllers, capacity is limited by the characteristics of the application. Unit is supplied with a steel, wall mountable enclosure, and 120 volt power supply. Excludes UI service and Enterprise connectivity service.	5,222.87	319.29
	15910-0128	EA	Easy Pack Network Area Java Controller Supporting 124 Devices (Honeywell WEB-545-EZ)..... Note: Includes 128 MB RAM / 32 MB Flash, 10/100 MB ethernet port, 4 RS-485 port, 2 RS-232 port, 1 LonWorks port. As with other JACES, capacity is limited by the characteristics of the application. Unit is supplied with a steel, wall mountable enclosure, and 120 volt power supply. Includes WEB-545-AX plus User Interface Station Pack (UI-SP-5XX) and Enterprise Connectivity Station Pack (EC-SP-5XX) bundled as an "easy-order" bundle.	6,970.24	319.29
	15910-0129	EMCS Network Interfaces <small>(15910-0106)</small>			
		Note: Includes installation, start-up and tech labor.			
	15910-0130	EA	Serial LonTalk Adapter For LonWorks Bus And A PC (Honeywell Q7760A2001)..... Note: For desktop computer.	866.55	88.42
	15910-0131	EA	Serial LonTalk Card For LonWorks Bus And A PC (Honeywell Q7752B2009)..... Note: For laptop computer.	739.37	58.95
	15910-0132	EA	FTT-10 To FTT-10 Router (Honeywell Q7751A2010).....	946.15	110.55
	15910-0133	EA	4FTT-10 To TP/FTT-1250 Multi Port Router (Honeywell Q7751J2002).....	1,437.70	159.68
	15910-0134	EA	Two Way Lon Repeater (Honeywell Q7740A1008).....	752.72	159.68
	15910-0135	EA	FTT Termination Module For Network Bus (Honeywell 209541B).....	56.39	19.65
	15910-0136	DDC Application Specific Controller Assemblies <small>(15910-0106)</small>			
		Note: Includes submittal generation, installation, installation, field test, checkout and start-up. Includes control enclosure, transformer, terminal strip and ancillary devices. (For example, fan coil unit include valves, actuators with controller and thermostat; VAVs include controller, thermostat and hot water valve if VAV has reheat coil). Excludes graphics and database generation. Excludes discharge air sensor.			
	15910-0137	EA	Up To 10 Factory Installed Cooling Only Or Electric Reheat VAV Or FPB Controller Assemblies.....	1,413.76	456.83
	15910-0138	EA	> 10 Factory Installed Cooling Only Or Electric Reheat VAV Or FPB Controller Assemblies.....	1,168.16	270.49
	15910-0139	EA	Up To 10 Field Installed Cooling Only Or Electric Reheat VAV Or FPB Controller Assemblies.....	1,516.92	456.83
	15910-0140	EA	> 10 Field Installed Cooling Only Or Electric Reheat VAV Or FPB Controller Assemblies.....	1,271.32	297.34
	15910-0141	EA	Up To 10 Factory Installed Steam Or Hot Water Heating VAV Or FPB Controller Assemblies.....	1,672.57	508.43

15000 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**MINOR
CSI UOM DESCRIPTIONTOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

15910-0142	EA	> 10 Factory Installed Steam Or Hot Water Heating VAV Or FPB Controller Assemblies.....	1,488.33	381.18
15910-0143	EA	Up To 10 Field Installed Steam Or Hot Water Heating VAV Or FPB Controller Assemblies	2,033.57	508.43
15910-0144	EA	> 10 Field Installed Steam Or Hot Water Heating VAV Or FPB Controller Assemblies.....	1,775.72	389.04
15910-0145	EA	Up To 10 Factory Installed Application Specific Heat Pump Or Gas Heat With DX Cooling Controller Assemblies.....	1,257.82	508.43
15910-0146	EA	> 10 Factory Installed Application Specific Heat Pump Or Gas Heat With DX Cooling Controller Assemblies	1,012.22	300.62
15910-0147	EA	Up To 10 Field Installed Application Specific Heat Pump Or Gas Heat With DX Cooling Controller Assemblies	1,392.95	508.43
15910-0148	EA	> 10 Field Installed Application Specific Heat Pump Or Gas Heat With DX Cooling Controller Assemblies	1,147.27	338.61
15910-0149	EA	Up To 10 Factory Installed Application Specific Fan Coil Unit Controller Assemblies.....	1,661.28	508.43
15910-0150	EA	> 10 Factory Installed Application Specific Fan Coil Unit Controller Assemblies.....	1,410.77	299.97
15910-0151	EA	Up To 10 Field Installed Application Specific Fan Coil Unit Controller Assemblies	1,796.40	508.43
15910-0152	EA	> 10 Field Installed Application Specific Fan Coil Unit Controller Assemblies.....	1,545.81	337.95
15910-0153	EA	Up To 10 Factory Installed Application Specific Unit Ventilator Controller Assemblies	2,084.84	508.43
15910-0154	EA	> 10 Factory Installed Application Specific Unit Ventilator Controller Assemblies.....	1,861.37	324.86
15910-0155	EA	Up To 10 Field Installed Application Specific Unit Ventilator Controller Assemblies	2,355.07	508.43
15910-0156	EA	> 10 Field Installed Application Specific Unit Ventilator Controller Assemblies.....	2,131.54	380.52

15910-0157 DDC Programmable Controller Assemblies (15910-0106)

Note: Includes installation, field test, checkout and start-up. Includes control enclosure, transformer and terminal strip only. Excludes ancillary devices. Excludes submittal generation/system engineering and database generation. See CSI section 15910-0164 for additional components.

15910-0158	EA	3 AO, 6 UI, 8 DO And 4 DI Small Programmable Controller Assemblies	1,445.76	390.54
15910-0159	EA	Oversized Enclosure 3 AO, 6 UI, 8 DO And 4 DI Small Programmable Controller Assemblies	1,670.07	390.54
15910-0160	EA	6 AO, 8 AI, 8 DO And 8 DI Medium Programmable Controller Assemblies.....	2,225.14	459.31
15910-0161	EA	Oversized Enclosure 6 AO, 8 AI, 8 DO And 8 DI Medium Programmable Controller Assemblies	2,449.45	459.31
15910-0162	EA	10 AO, 16 AI, 16 DO And 16 DI Large Programmable Controller Assemblies	4,020.45	537.91
15910-0163	EA	Oversized Enclosure 10 AO, 16 AI, 16 DO And 16 DI Large Programmable Controller Assemblies	4,279.76	537.91

15910-0164 EMCS Optional DDC Controller Hardware (15910-0106)

Note: Used to expand the capacity of DDC programmable controller assemblies.

15910-0165	EA	6 DO (Repay), 3 AI, 3 DI AHU Controller (Honeywell W7750A2005).....	269.74	
		Note: For constant volume single zone and heat pump AHUs.		
15910-0166	EA	6 AI, 5 DI, 8 DO (Triac) AHU Controller (Honeywell W7750B2011).....	311.73	
		Note: For constant volume single zone and heat pump AHUs.		
15910-0167	EA	3 AO, 6 AI, 5 DI, 5 DO (Triac) AHU Controller (Honeywell W7750C2001).....	326.52	
		Note: For constant volume single zone and heat pump AHUs.		
15910-0168	EA	VAV Controller Compatible Printed Wiring Board (Honeywell W7751B2010).....	308.18	
15910-0169	EA	VAV Controller With Internally Wired Subbase (Honeywell W7751D2016).....	312.92	
15910-0170	EA	VAV Controller With Externally Wired Subbase (Honeywell W7751F2011).....	305.82	
15910-0171	EA	VAV Controller With Premounted ML6161 Actuator (Honeywell W7751H2025).....	263.23	
15910-0172	EA	VAV Controller With Premounted ML6161 Actuator (Honeywell W7751J2004).....	228.92	
15910-0173	EA	Fan Coil Unit Controller With Electric Reheat Relay (Honeywell W7752F2002).....	335.39	
15910-0174	EA	Fan Coil Unit Controller Without Electric Reheat Relay (Honeywell W7752G2000).....	299.90	
15910-0175	EA	Unit Ventilator Controller With Heating, Cooling, Actuator And Fan Control (Honeywell W7753A2002).....	331.25	
15910-0176	EA	Building Manager, Monitor And Control HVAC Equipment (Honeywell W7760A2011).....	703.32	
15910-0177	EA	Plant Controller, Monitor And Control HVAC Equipment (Honeywell W7760C2017).....	874.87	
15910-0178	EA	Remote IO Device For Ancillary Point Monitoring And Control (Honeywell W7761A2002).....	437.14	
15910-0179	EA	Remote IO, UJKL-UL 864 Approved (Honeywell W7761A2010).....	430.63	
15910-0180	EA	Hydronic Controller Without Wall Module (Honeywell W7762B1027).....	211.17	
15910-0181	EA	Hydronic Controller With Built-in Wall Module (Honeywell W7763C1016).....	240.16	
15910-0182	EA	IO Module, 24 VAC Without Overrides (Honeywell XFC3A06001).....	443.64	
15910-0183	EA	IO Module, 24 VAC With Overrides (Honeywell XFC3D06001).....	474.40	
15910-0184	EA	AI Module (Honeywell XFL521B).....	296.95	
15910-0185	EA	AO Module (Honeywell XFL522B).....	296.95	
15910-0186	EA	DI Module (Honeywell XFL523B).....	296.95	
15910-0187	EA	DO Module (Honeywell XFL524B).....	296.95	
15910-0188	EA	Distributed IO, Lonwork Bus Connector Module With Endplate (Honeywell XSL511).....	52.65	
15910-0189	EA	Distributed IO, Terminal Block For AI, AO And DI Modules (Honeywell XSL513).....	99.38	
15910-0190	EA	Distributed IO, Terminal Block For DO Modules (Honeywell XSL514).....	97.60	
15910-0191	EA	Lon Analog IO Module, 24V AC/DC, 10 Digital Inputs (Honeywell XIO-10DI).....	298.72	
15910-0192	EA	Lon Hub (Honeywell XIO-HUB).....	44.36	
15910-0193	EA	Lon Analog IO, 24V AC/DC, 4 Analog Outputs (Honeywell XIO-4AO).....	298.72	
15910-0194	EA	Lon Digital IO, 24V AC/DC, 4 Digital Inputs (Honeywell XIO-4DI).....	275.06	
15910-0195	EA	Lon Digital IO, 24V AC/DC, 4 Digital Outputs (Honeywell XIO-4DO).....	275.06	
15910-0196	EA	Lon Analog IO, 24V AC/DC, 4 Analog Inputs (Honeywell XIO-4NTC).....	289.85	
15910-0197	EA	Lon Analog IO, 24V AC/DC, 4 Analog PT1000 Inputs (Honeywell XIO-4PT1000).....	289.85	
15910-0198	EA	Lon Analog IO, 24V AC/DC, 8 Analog Inputs (Honeywell XIO-8AI).....	417.03	
15910-0199	EA	16 Point IO Module For Network Area Controllers (Honeywell WEB-IO-16).....	492.15	
		Note: Includes 8 universal inputs, 4 relay outputs, and 4 analog outputs.		
15910-0200	EA	34 Point IO Module For Network Area Controllers (Honeywell W7750A2005).....	1,045.82	
		Note: Includes 16 universal inputs, 10 relay outputs, and 8 analog outputs.		

15910-0201 EMCS Software (15910-0105)**15910-0202 Software Packages And License (15910-0201)**

Note: Includes installation on equipment.

15910-0203	EA	On Board Programming Tool For Network Area Controllers (Honeywell WP-AX-WEB).....	333.62	
		Note: Requires UI services to be installed on NAC.		
15910-0204	EA	Software Upgrade To Provide Unrestricted Connected Device Limit (Honeywell WEB-403-EXUP-AX).....	1,283.58	
		Note: Upgrade existing network area controller. As with other WEBs controllers, capacity is limited by the characteristics of the application including size and complexity.		
15910-0205	EA	WEBStation-AX Software For Windows (Honeywell WEB-S-AX).....	3,726.61	
		Note: Includes Archon database. WEBs controllers must have Enterprise Connectivity Station Pack (EC-SP). Includes one copy of WP-AX (WEBPro-AX).		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0206	EA	Small Building WEBStation-AX Based Software (Honeywell WEB-S-AX-SBS) Note: For up to 3 NAC controllers. NAC controllers must have Enterprise Connectivity Station Pack (EC-SP). Includes Archon database.	2,218.22	
15910-0207	EA	Upgrade Small Building To Large Building Software Note: Upgrade WEB-S-AX-SBS to WEB-S-AX.	2,525.78	
15910-0208	EA	Additional Copy Of WEBPro-AX (Honeywell WEB-S-AX-W) Note: One copy is included with WEB-S-AX and WEBStation-AX.	1,776.34	
15910-0209	EA	WEBS Energy Suite (WES) Base Software (Honeywell WES-BASE-AX) Note: Includes license for 10 points of E ² Profiler and 2 licensed meters of Cost Profiler. Limit of one WES-BASE per WEBStation-AX Supervisor. Additional E ² Profiler point requirements or Cost Profiler meter requirements may use one or any combination of point/meter bundles. One WES-BASE required per WES project.	3,163.47	
15910-0210	EA	Perpetual License One Meter Point Bundle Of A Cost Profiler Meter And Two E ² Profiler Points (Honeywell WES- CP-AX) Note: Can be combined with the required single instance of VES-BASE as well as with any combination of other EP points and CP meters.	415.83	
15910-0211	EA	Perpetual License For One Point Of E ² Profiler (Honeywell WES-E2-AX) Note: Can be combined with the required single instance of VES-BASE as well as with any number of other EP Points and Cost Profiler meters.	276.83	
15910-0212	EA	Perpetual License For An Unlimited Bundle Of E2 Points And CP Meters Note: Sold on a per server basis. Purchase of this product must be accompanied by VES-M1-ENT-AX maintenance. The first year price of maintenance is included with VES-ENT-AX.	17,125.82	
15910-0213	EA	Annual Maintenance For Enterprise WEBS-AX Energy Suite (Honeywell WES-M1-ENT-AX) Note: The first year cost of VES-M1-ENT-AX is included with VES-ENT-AX. After the first year VES-M1-ENT-AX maintenance fee will be invoiced annually.	15,625.26	
15910-0214	EA	Standard WEBStation-AX Supervisor Bundled With WES-BASE-AX (Honeywell WES-S-AX) 15910-0215 EA Small WEBStation-AX Supervisor Bundled With WES-BASE-AX (Honeywell WES-S-AX-SBS) 15910-0216 EA Add 500 Modbus TCP Points To WEBStation With WS-OSD Option (Honeywell WS-MTCP-500) 15910-0217 EA Add 500 OPC Points To WEBStation With WS-OSD Option (Honeywell WS-OPC-500) 15910-0218 EA Vikon Oracle Driver For Support Of Oracle Database (Honeywell WS-ORCL) Note: Excludes Oracle.	5,942.46 4,434.07 1,281.83 1,281.83 8,872.88	
15910-0219	EA	Open System Driver Option (Honeywell WS-SNMP-500) Note: Adds 25 points each of BACnet IP, OPC (client), Modbus TCP and SNMP to a standard WEBStation. Can be purchase with the WS or added later. Web Supervisor required to purchase this option.	1,183.05	
15910-0220	EA	Add 500 SNMP Points To WEBStation With WS-OSD Option (Honeywell WS-SNMP-500) 15910-0221 EA WEBStation Software WS-1 And First Copy Of WEBPro Software (Honeywell ZW2000A1003) Note: For a single Honeywell WEB NP controller. Excludes software keys for the additional nodes.	1,281.83 3,352.17	
15910-0222	EA	WEBStation Additional Node (Honeywell ZW2000B1002) 15910-0223 EA WEBStation Software And 20 Pack Of Node Software Keys (Honeywell ZW2000C1001) 15910-0224 EA WEBStation Software And 50 Pack Of Node Software Keys (Honeywell ZW2000D1000) 15910-0225 EA WEBStation Software And 100 Pack Of Node Software Keys (Honeywell ZW2000E1009) 15910-0226 EA Master WEBStation Software For Monitoring Multiple WEBStations (Honeywell ZW2000F1008) 15910-0227 EA Additional Master WEBStation Software Licenses (Honeywell ZW200G1007) 15910-0228 EA Additional Copies Of Workplace Pro WP-1 (Web Pro) (Honeywell ZW2001A1001) 15910-0229 EA Upgrade Existing NAC To Provide Unrestricted Connected Device Limit (Honeywell WC2003B1055) Note: As with other WEBS, capacity is limited by the characteristics of the application including size and complexity.	1,281.83 21,492.47 39,435.20 69,011.45 3,549.15 1,774.58 1,411.96 1,549.76	
15910-0230	Initial Database Generation (15910-0201)			
15910-0231	PNT	Database Generation For Central Plant 15910-0232 PNT Database Generation For Programmable Controller Note: For VAV AHU, large CV AHU, or heat exchanger, etc.	43.95 43.95	
15910-0233	EA	Database Generation For Application Specific Controller Note: Price per each VAV box, fan coil unit, unit ventilator or small CV AHU. Task used for the first piece of each equipment.	43.95	
15910-0234	EA	Replication Of Database Generation For Application Specific Controller Note: Price per copy made.	30.59	
15910-0235	EA	Database Generation For Remote IO Modules, Sensors, Etcetera.....	30.59	
15910-0236	Application Software Programs (15910-0201)			
15910-0237	EA	Basic Application Program Package Note: One per project. Includes program inputs, command priorities, alarms, trends for analog and digital points, energy totalization, schedules, calendars, special events, occupied and unoccupied setpoints, ventilation and recirculation modes, hot water reset program, chilled water reset program, condenser water reset program, and fail-over logic.	1,833.85	
15910-0238	EA	Optimum Start/Stop Program Note: Priced per controller requiring optimum start programming.	61.30	
15910-0239	EA	Duty Cycling Program 15910-0240 EA Hot Deck/Cold Deck Reset Application Program 15910-0241 EA Boiler Optimization Program 15910-0242 EA Chiller Optimization Program 15910-0243 EA Lighting Control Program 15910-0244 EA Demand Limiting Program..... Note: Priced per controller requiring optimum start programming.	28.95 3,150.50 4,128.53 5,592.51 2,698.73 53.77	
15910-0245	EA	Email Alarm Server Configuration.....	2,081.96	
15910-0246	Color Graphics Generation (15910-0201)			
15910-0247	EA	Single Site Home Page Graphics Page With HTML Navigation Code 15910-0248 EA Multi Site Home Page Graphics Page With HTML Navigation Code 15910-0249 EA Color Graphics Page For Central Plant 15910-0250 EA Color Graphics Page For Building Floor Plan 15910-0251 EA Replication Of Color Graphics Page For Central Plant 15910-0252 EA Color Graphics Page For Programmable Controller Note: For VAV AHU, large CV AHU, or heat exchanger, etc.	1,098.88 1,951.02 499.27 461.02 250.45 561.69	

15000 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0253	EA	Replication Of Color Graphics Page For Programmable Controller Note: Priced per copy made.	120.12	
15910-0254	EA	Color Graphics Page For Application Specific Controller Note: Price per each VAV box, fan coil unit, unit ventilator or small CV AHU. Task used for the first piece of each equipment.	519.51	
15910-0255	EA	Replication Of Color Graphics Page For Application Specific Cont..... Note: Priced per copy made.	51.94	
15910-0256		Sensors, Actuators And Control Devices <small>(15910-0105)</small> Note: Includes installation, startup, checkout and miscellaneous parts for installation. Excludes conduit, wire and cable. Excludes engineering and programming labor. Each device is considered one control point. No engineering or programming time required for replacement parts.		
15910-0257		Special Sensors <small>(15910-0256)</small>		
15910-0258	EA	Dewpoint Sensor (Honeywell C7232B1014)	1,063.05	40.54
15910-0259	EA	Enthalpy Sensor -25 To 125 F.....	1,108.75	40.54
15910-0260	EA	Outdoor Mounted Temperature And Humidity Transmitter (Honeywell H7635C1002).....	516.03	81.08
15910-0261	EA	Freezestat (Honeywell L482A1004)	358.60	135.12
15910-0262	EA	Wall Mounted Occupancy Sensor	253.79	40.54
15910-0263	EA	Ceiling Mounted Occupancy Sensor	203.40	40.54
15910-0264	EA	I/P Positioner With Gauge	239.30	40.54
15910-0265	EA	Non Communicating Duct Mounted Smoke Detector With Sampling Tube	286.68	40.54
15910-0266	EA	EP Transducer	239.30	27.05
15910-0267	EA	Electric Heat Sequencer.....	381.41	54.04
15910-0268	EA	Refrigerant leak detector R-134A: The RLD-134A is a solid-state HFC refrigerant leak detector capable of detecting the presence of escaping refrigerant R-134a.....	1,620.14	
15910-0269	EA	Refrigerant leak detector: The RLD-5 is a solid-state CFC refrigerant leak detector capable of detecting the presence of escaping refrigerants. The RLD-5 is field adjustable for five different CFC refrigerant types: R-11, R-12, R-22, R-113, and R-502.....	1,460.16	
15910-0270		Meters <small>(15910-0256)</small>		
15910-0271	EA	KW/KWh Meter/Current Transformer 208-480V, Up To 2400 Amps	2,439.06	324.20
15910-0272	EA	KW/KWh Meter/Current Transformer 208-480V, Up To 2400 Amps With LON interface.....	3,549.55	378.23
15910-0273	EA	Current Transformer For KW Meter 1-300A.....	859.28	135.12
15910-0274	EA	Current Transformer For KW Meter 300-800A.....	977.05	135.12
15910-0275	EA	Current Transformer For KW Meter 800-2400A	1,202.90	135.12
15910-0276		Direct Coupled Actuators <small>(15910-0256)</small>		
15910-0277	EA	44 IN-LB, 2 Position, 120 VAC Spring Return Direct Coupled Damper Actuator (Honeywell MS4105A1002).....	342.85	56.95
15910-0278	EA	88 IN-LB, 2 Position, 120 VAC Spring Return Direct Coupled Damper Actuator (Honeywell MS4110A1200).....	376.03	56.95
15910-0279	EA	175 IN-LB, 2 Position, 120 VAC Spring Return Direct Coupled Damper Actuator (Honeywell MS4120A1209).....	433.08	56.95
15910-0280	EA	44 IN-LB, 2 Position, 24 VAC Spring Return Direct Coupled Damper Actuator (Honeywell MS8105A1008).....	323.44	56.95
15910-0281	EA	88 IN-LB, 2 Position, 24 VAC Spring Return Direct Coupled Damper Actuator (Honeywell MS8110A1206).....	359.12	56.95
15910-0282	EA	175 IN-LB, 2 Position, 24 VAC Spring Return Direct Coupled Damper Actuator (Honeywell MS8120A1205).....	394.45	56.95
15910-0283	EA	44 IN-LB, 24 VAC, 4-20mA, 0-10 VDC Or Floating Control, Spring Return Direct Coupled Damper Actuator.....	361.07	56.95
15910-0284	EA	88 IN-LB, 24 VAC, 4-20mA, 0-10 VDC Or Floating Control, Spring Return Direct Coupled Damper Actuator (Honeywell MS7510A2206)	411.95	56.95
15910-0285	EA	175 IN-LB, 24 VAC, 4-20mA, 0-10 VDC Or Floating Control, Spring Return Direct Coupled Damper Actuator (Honeywell MS7520A2205)	466.87	56.95
15910-0286	EA	44 IN-LB, 24 VAC, 4-20mA, 0-10 VDC Or Floating Control, Non- Spring Return Direct Coupled Damper Actuator (Honeywell MN7505A2209).....	296.97	56.95
15910-0287	EA	88 IN-LB, 24 VAC, 4-20mA, 0-10 VDC Or Floating Control, Non- Spring Return Direct Coupled Damper Actuator (Honeywell MN7510A2209).....	324.06	56.95
15910-0288	EA	175 IN-LB, 24 VAC, 4-20mA, Floating Control, Non-Spring Return Direct Coupled Damper Actuator (Honeywell MN6120A1200).....	378.49	56.95
15910-0289	EA	175 IN-LB, 24 VAC, 4-20mA, 0-10 VDC, Non-Spring Return Direct Coupled Damper Actuator (Honeywell MN7220A2007).....	404.11	56.95
15910-0290	EA	300 IN-LB, 24 VAC, 4-20mA, Floating Control, Non-Spring Return Direct Coupled Damper Actuator (Honeywell MN6134A10030).....	403.79	56.95
15910-0291	EA	300 IN-LB, 24 VAC, 4-20mA, 0-10 VDC, Non-Spring Return Direct Coupled Damper Actuator (Honeywell MN7234A2008).....	474.04	56.95
15910-0292	EA	Pneumatic Spring Return Damper Actuator Without Positive Positioner (Honeywell MP909E1018)	308.07	56.95
15910-0293	EA	Pneumatic Spring Return Damper Actuator With Positive Positioner (Honeywell MP909H1368)	532.79	56.95
15910-0294	EA	Foot Mount Kit With Damper Linkage And Connectors For Direct Coupled Actuator.....	234.13	56.95
15910-0295	EA	Direct Coupled Damper Actuator Enclosure For Outdoor Use	353.13	56.95
15910-0296		Thermostats <small>(15910-0105)</small>		
15910-0297		Electric And Electronic Thermostats <small>(15910-0296)</small> Note: Includes installation, startup and checkout labor. Excludes engineering and programming labor. Each thermostat counts as one control point.		
15910-0298	EA	Line Voltage 120V Heat/Cool Thermostat (Honeywell T651A3018).....	132.71	49.12
15910-0299	EA	Electronic Non-Programmable Heat/Cool Fan Coil Unit Thermostat (Honeywell T8575D)	153.27	49.12
15910-0300	EA	Electronic Non-Programmable Heat/Cool Heat Pump Or Conventional Unit Thermostat (Honeywell TH5320).....	137.42	49.12
15910-0301	EA	Electronic Programmable Heating/Cooling Heat Pump Or Conventional Unit Thermostat (Honeywell TH6110).....	145.16	49.12
15910-0302	EA	Electronic Programmable Two Heating/Two Cooling Heat Pump Or Conventional Unit Thermostat (Honeywell TH8321)	244.57	49.12
15910-0303	EA	Humidity Control Electronic Programmable Heat/Cool Heat Pump Or Conventional Unit Thermostat (Honeywell T7350D).....	410.52	49.12
15910-0304	EA	Lon Communicating Humidity Control Programmable Heat/Cool Heat Pump Or Conventional Unit Thermostat (Honeywell T7350H)	506.79	65.49
15910-0305	EA	Modulating Lon Communicating Humidity Control Programmable Heat/Cool Heat Pump Or Conventional Unit Thermostat (Honeywell T7350M).....	536.96	65.49



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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15910-0306			Pneumatic Thermostats <small>(15910-0296)</small> Note: Includes installation, startup and checkout labor. Excludes engineering and programming labor. Each thermostat counts as two control point.		
	15910-0307	EA	Pneumatic Thermostat (Honeywell TP970B2182)	180.40	39.29
15910-0308			Thermostats Guards <small>(15910-0296)</small>		
	15910-0309	EA	9-3/4" x 7-1/4" x 3-3/8" Universal Thermostat Guard (Honeywell TG512A1009)	101.04	32.75
	15910-0310	EA	7-1/2" x 6-1/2" x 2-15/16" Universal Thermostat Guard (Honeywell TG511)	96.88	32.75
	15910-0311	EA	5-7/8" x 5-7/8" x 2-1/2" Deep Universal Thermostat Guard (Honeywell TG510)	94.08	32.75
15910-0312			Delta Controls <small>(15910)</small>		
15910-0313			Software <small>(15910-0312)</small> Note: Excludes programming, set-up and commissioning of application.		
	15910-0314	EA	Orca Software Unlimited Points License (Delta Controls DOW333-USB)	1,187.38	
	15910-0315	EA	Orca Graphics Module, Delta Controls Orca View With Graphics Creation Capabilities (Delta Controls DOW333-I-USB)	1,966.32	
	15910-0316	EA	Orca Historical Module, Delta Controls Historian Package With Unlimited Archiving Trend Logs (Delta Controls DHS330-HL-USB)	4,260.36	
	15910-0317	EA	Web Server Unlimited Points License, Delta Controls Web Server Front End (Delta Controls DWS330-L-USB)	6,758.62	
	15910-0318	EA	Web Server Limited Points (Maximum I/O 2500) License, Delta Controls Web Server Front End (Delta Controls DWS330-M-USB)	3,481.42	
	15910-0319	EA	Web Server Limited Points (Maximum I/O 250) License, Delta Controls Web Server Front End (Delta Controls DWS330-S-USB)	1,187.38	
	15910-0320	EA	100 User Energy Portal, Data Collection Controller, Web PC Server Program License (Delta Controls EP-2.01)	2,825.98	
	15910-0321	EA	1000 User Energy Portal, Data Collection Controller, Web PC Server Program License (Delta Controls EP-2.02)	3,481.42	
	15910-0322	EA	KW Meter With H8163-2400-4-3 Series, With 3, 2400A CT's And BACnet MS/TP Interface (Delta Controls H8186-CB)	1,251.69	65.49
	15910-0323	EA	Delta Controls Touch Screen (Delta Controls DHMI-7-I)	1,337.08	
15910-0324			EMCS Central Equipment And Controllers <small>(15910-0312)</small>		
	15910-0325	EA	Fully Programmable, Native BACnet Building Controller, 32 Universal Inputs/32 Analog Or Binary Outputs HOA's, Twisted-Pair Ethernet Port, BACnet IP, BACnet Over Ethernet, Main LAN RS-485 BACnet MS/TP (Maximum Of 99 Devices), SubLAN (Net2) BACnet MS/TP (Maximum 99 Devices) Or Delta LINKnet @ 76800 bps, Serial RS-232 BACnet PTP, Real-Time Clock With Lithium Battery And SRAM Backup (Delta Controls DSC-1616E + DFM1616)	4,443.95	261.98
	15910-0326	EA	Fully Programmable, Native BACnet Building Controller, 16 Universal Inputs/16 Analog Or Binary Outputs HOA'S, Twisted-Pair Ethernet Port, BACnet IP, BACnet Over Ethernet, Main LAN RS-485 BACnet MS/TP (Maximum Of 99 Devices), Sublan (Net2) BACnet MS/TP (Maximum 99 Devices) Or Delta LINKnet @ 76800 Bps (Maximum 12 Devices On LINKnet, With 2 DFM Devices) Serial RS-232 BACnet PTP, Real-Time Clock With Lithium Battery And SRAM Backup (Delta Controls DSC-1616E)	3,395.25	261.98
	15910-0327	EA	Fully Programmable, Native BACnet Advanced Application Controller That Communicates On A RS-485 LAN Using The BACnet MS/TP Protocol, 11 Universal Inputs, 4 Analog Output Or 6 Binary (Triac) Outputs (Delta Controls DAC-1146)	2,521.88	261.98
	15910-0328	EA	Fully Programmable, Native BACnet Advanced Application Controller That Communicates On A RS-485 LAN Using The BACnet MS/TP Protocol, 11 Universal Inputs, 8 Analog Or Binary Outputs (Delta Controls DAC-1180)	2,521.88	261.98
	15910-0329	EA	Fully Programmable, Native BACnet Advanced Application Controller That Communicates On A RS-485 LAN Using The BACnet MS/TP Protocol, 11 Universal Inputs, 4 Analog Output Or 6 Binary (Triac) Outputs (Delta Controls DAC-1146)	2,521.88	261.98
	15910-0330	EA	Fully Programmable, Native BACnet Advanced Application Controller That Communicates On A RS-485 LAN Using The BACnet MS/TP Protocol, 6 Universal Inputs, 3 Binary (Triac) Outputs And 3 Analog Outputs (Delta Controls DAC-633 R3)	2,362.16	261.98
	15910-0331	EA	VAV Controllers Are Native BACnet Application Controllers That Are Fully Programmable, Communicate On A RS-485 LAN Using The MS/TP BACnet Protocol, 3 Universal Inputs, 4 Binary Outputs, Actuator Position Feedback, Supports 4 BACstat Network Sensors On LINKnet For Room Sensing And Control Or 2 Delta Field Modules On LINKnet For I/O Expansion (Delta Controls DVC-304AF)	813.99	130.99
	15910-0332	EA	Fully Programmable, Native BACnet Advanced Application Controller That Communicates On A RS-485 LAN Using The BACnet MS/TP Protocol, 4 Binary Triac Outputs (24 VAC), 3 Binary Relay Outputs For Fan Speed Control, 240 VAC, 1 HP (60 LRA/10 FLA) LED Status Indication Of Each Output (Delta Controls DFC-304R3-240)	743.53	130.99
	15910-0333	EA	Fully Programmable, Native BACnet Advanced Application Controller That Communicates On A RS-485 LAN Using The BACnet MS/TP Protocol, 6 Universal Inputs, 3 Binary (Triac) Outputs And 3 Analog Outputs (Delta Controls DAC-633 R3)	790.28	130.99
	15910-0334	EA	Fully Programmable, Native BACnet Advanced Application Controller That Communicates On A RS-485 LAN Using The BACnet MS/TP Protocol, 4 Binary Triac Outputs (24 VAC), 3 Binary Relay Outputs For Fan Speed Control, 240 VAC, 1 HP (60 LRA/10 FLA) LED Status Indication Of Each Output (Delta Controls DFC-304R3-240)	743.53	130.99
	15910-0335	EA	Remotely Expandable I/O To Delta's BACnet Controllers, 16 Universal Inputs, 16 Analog Outputs (Delta Controls DFM-1616)	1,703.65	163.74
	15910-0336	EA	Remotely Expandable I/O To Delta's BACnet Controllers, 4 Universal Inputs, 4 Analog Outputs (Delta Controls DFM-440)	433.79	65.49
	15910-0337	EA	Remotely Expandable I/O To Delta's BACnet™ Controllers, 4 Universal Inputs, 4 Binary Triac Outputs (Delta Controls DFM-404)	463.50	65.49
	15910-0338	EA	Remotely Expandable I/O To Delta's BACnet™ Controllers, 16 Universal Inputs (Delta Controls DFM-1600)	540.54	65.49
15910-0339			Network, VAV And Special Sensors <small>(15910-0312)</small>		
	15910-0340	EA	BACnet MS/TP VAV Network Room Temperature Sensor With LCD Display (Delta Controls DNS-24)	140.84	20.96
	15910-0341	EA	BACnet MS/TP VAV Network Temperature And Humidity Sensor With LCD Display (Delta Controls DNS-H24)	190.04	23.58
	15910-0342	EA	Programmable BACnet MS/TP Thermostat With 8 Button Keypad And LCD Display For DX Unit, Fan Coils And RTU (Delta Controls DAC-T305-G2B)	387.96	28.82

1500 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**

MINOR

CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0343			Trane Controls <small>(15910)</small>		
15910-0344			Software <small>(15910-0343)</small>		
			Note: Excludes programming, set-up and commissioning of application.		
15910-0345	EA		Summit + Building Management Package (Trane 40201152).....	1,867.78	
15910-0346	EA		Summit Current Version Software (Trane 40201111).....	1,545.47	
15910-0347	EA		Summit Customer Upgrade Package, Currently V10-V16 To V17 (Trane 40201113).....	356.72	
15910-0348	EA		Rover Service Software And Hardware, Complete Kit (Trane X1365150001).....	1,402.47	
15910-0349	EA		Tracer SC With -X1365152401 - BACnet (2 Pack) (Trane BMS000AAA011000).....	4,851.56	
15910-0350			EMCS Central Equipment And Controllers <small>(15910-0343)</small>		
15910-0351	EA		Summit BTMX Operator Display Upgrade (Trane 40201224).....	2,972.55	261.98
15910-0352	EA		Summit BTMX Retrofit Kit For BMTS And BMTW BCU (Trane 49500531).....	5,866.48	261.98
15910-0353	EA		Summit BTMX Retrofit Kit For Tracer 100 (Trane 49500532).....	5,866.48	261.98
15910-0354	EA		Summit BTMX/120V (Trane BMTX-001-A-A-B0-00).....	5,866.48	261.98
15910-0355	EA		Summit BTMX/120V With Display (Trane BMTX-001-A-A-B0-10).....	6,743.18	261.98
15910-0356	EA		Summit CCP Upgrade ROM Kit (Trane 40201095).....	70.08	16.37
15910-0357	EA		Summit Comm5 Repeater (Trane 49500457).....	820.27	130.99
15910-0358	EA		AHU Controller MP580/581 E Board Only (Trane 40201157).....	1,331.31	163.74
15910-0359	EA		AHU Controller MP581 120 VAC With Enclosure And Display (Trane BMTM000AAC01).....	1,693.62	196.49
15910-0360	EA		AHU Controller MP581 120 VAC With Enclosure, No Display (Trane BMTM000AAC00).....	1,373.21	196.49
15910-0361	EA		AHU Controller MP581 Operator Door Display (Trane 40201156).....	1,224.87	196.49
15910-0362	EA		AHU Controller MP581 Portable, Rugged, With Case (Trane 49500491).....	1,279.92	196.49
15910-0363	EA		Controller MP503 I/O Module With Metal Enclosure (Trane 49500590).....	513.18	65.49
15910-0364	EA		Controller MP503 I/O Module With Plastic Cover (Trane 49500490).....	473.41	65.49
15910-0365	EA		Controller MP581 EX2 Expansion Module With Metal Enclosure (Trane 49500500).....	866.92	130.99
15910-0366	EA		Controller MP581 EX2 Expansion Module With Plastic Cover (Trane 49500499).....	834.04	130.99
15910-0367	EA		2 Position, FCU Controller ZN511 Zone With Metal Enclosure (Trane 49500569).....	458.50	65.49
15910-0368	EA		2 Position, FCU Controller ZN511 Zone With Plastic Cover (Trane 4950-0469).....	418.74	65.49
15910-0369	EA		4 Position, FCU Controller ZN517 Zone With Metal Enclosure (Trane 49500596).....	524.27	65.49
15910-0370	EA		4 Position, FCU Controller ZN517 Zone With Plastic Cover (Trane 49500496).....	484.50	65.49
15910-0371	EA		Modulating FCU Controller ZN520 Zone With Plastic Cover (Trane 49500499).....	484.50	65.49
15910-0372	EA		Modulating FCU Controller ZN520 Zone With Plastic Cover (Trane 49500496).....	484.50	65.49
15910-0373	EA		Modulating Tri ST FCU Controller ZN521 Zone With Metal Cover (Trane 49500570).....	512.80	65.49
15910-0374	EA		Modulating Tri ST FCU Controller ZN521 Zone With Plastic Cover (Trane 49500470).....	473.03	65.49
15910-0375	EA		DDC VAV Retrofit Kit (Trane VRTODD01).....	843.21	130.99
15910-0376	EA		DDC VAV Retrofit Kit With Belimo Actuator (Trane VRTODD01BLMO).....	881.45	130.99
15910-0377			Network, VAV And Special Sensors <small>(15910-0343)</small>		
15910-0378	EA		Digital Display Zone Sensor (Trane X13790464010).....	108.22	20.96
15910-0379	EA		Single Setpoint Wall Mounted Zone Temperature Sensor (Trane X13511529010).....	76.49	20.96
15910-0380	EA		Wall Mounted Zone Temperature-Only Sensor (Trane X13511528010).....	71.13	20.96
15910-0381	EA		Ceiling Mount Zone Occupancy Sensor (Trane X13790421-01).....	131.98	23.58
15910-0382	EA		Zone LCD O/C Setpoint, 3 Speed Fan (Trane 41901121).....	132.69	20.96
15910-0383	EA		Zone Sensor LCD O/C Setpoint (Trane 41901120).....	118.54	20.96
15910-0384	EA		Duct CO2 Sensor, 0 To 2000 ppm (Trane X13790423010).....	420.06	37.73
15910-0385	EA		Room CO2 Sensor, 0 To 2000 ppm (Trane X13790422010).....	335.33	20.96
15910-0386	EA		Transformer 120/24 40 VA (Trane X13550284010).....	68.46	20.96
15910-0387	EA		Transformer 24 VAC Wall Plug-In (Trane 35803005).....	66.16	20.96
15910-0388	EA		Transformer UL Listed 120 VAC, 40 VA (Trane 35812022).....	63.11	20.96
15910-0389			Johnson Controls <small>(15910)</small>		
15910-0390			EMCS General Costs <small>(15910-0389)</small>		
			Note: The following labor values are used for all projects. A point is defined as any transmitter, switch, actuator, relay, sensor or device that is monitored or controlled by the EMCS. Most devices count as 1 point. Thermostats, controllers and extension modules count as 2 points. Valve and damper actuators with end switches or position feedback count as 3 points. BTU Meters count as 4 points. All VFD's count as 5 points. A large project is defined as any project with 250+ points. A small project is defined as any project that has less than 250 points.		
15910-0391	PT		Large Project Labor Cost/ Point: Includes technical labor for project management, subcontract coordination, field team coordination, travel time, hardware engineering, submittal generation, software engineering, device verification, point to point checkout, system commissioning, project support, installation of control devices, conduit and wire. Excludes graphics, 3rd party commissioning, test and balance support, custom integrations, customer training, or any material, tax, freight, and warranty.....	524.10	
15910-0392	PT		Small Project Labor Cost/ Point: Includes technical labor for project management, subcontract coordination, field team coordination, travel time, hardware engineering, submittal generation, software engineering, device verification, point to point checkout, system commissioning, project support, installation of control devices, conduit and wire. Excludes graphics, 3rd party commissioning, test and balance support, custom integrations, customer training, or any material, tax, freight, and warranty.....	786.15	
15910-0393	HR		Customer Training Cost/Hour: This labor cost includes preparation, travel time, training time, and basic training materials. The required number of training hours shall be 24 unless the construction documents, general contractor or owner request otherwise.....	173.52	
15910-0394	PT		3rd Party Commissioning Cost/ Point: This labor cost is applicable for projects that require a 3rd party commissioning agent.....	92.05	
15910-0395	EA		Integration Labor/ System: This unit labor cost is applicable for every piece of equipment, system, or device that is not furnished with either BACnet or N2 communication capability but requires monitoring and/or control through the DDC/EMCS system. This unit labor cost is not applicable for I/O points that can be monitored or controlled through available dry contacts.....	5,241.00	
15910-0396	EA		Field Test and Balance Support Cost/Controller: This unit cost is applicable for every network area controller and programmable DDC controller on the project. This cost includes supporting as well as purchasing extra commissioning tools for the air and water test and balance contractor as necessary.....	78.87	
15910-0397	EA		Color Graphics for Programmable Controllers: Lump sum for each programmable controller.....	601.25	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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15910-0398	EA		Replication of Color Graphics for Programmable Controllers: This unit cost is applicable when the graphics that were created for one controller can be re-used for another. Common examples include VAV boxes, fan coil units, air handling units and exhaust fans.....	128.57	
15910-0399	EA		Color Graphics for Building Floor Plan/Floor or Page: Lump sum cost for each floor that requires a graphics page. CAD floor plans and/or pictures shall be provided to the EMCS contractor.....	493.49	
15910-0400	EA		Color Graphics for Building Homepage: Lump sum cost for each building that requires a graphics page. Pictures shall be provided by others.....	1,176.28	
15910-0401	EA		Post Warranty/ Project Development Labor.....	173.52	

15910-0402

EMCS Network Area Controllers (BACnet or N2) (15910-0389)

Note: Includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure for NAE35XX, NAE45XX, NCM45XX and NCE25XX models. Includes a 20in. W x 24 in. H x 9.25 in. D steel (NEMA 1) enclosure for NAE55XX, NCE2517, NIE55XX models. In addition to the controller, the assembly also contains a 5-port Ethernet switch and a power supply incorporating a 5 A circuit breaker, a 96 VA 120/24 VAC transformer, and two 120 VAC outlets. Includes material only.

15910-0403	EA		MS-NAE3510-2 Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.....	6,749.28	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	303.72	
15910-0404	EA		MS-NAE3510-2U Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for 50 devices on the N2 or BACnet MS/TP trunk. optional external modem; supports up to Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.....	6,749.28	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	303.72	
15910-0405	EA		MS-NAE3511-2 Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an internal modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.....	7,053.37	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	317.40	
15910-0406	EA		MS-NAE3514-2 Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; features Basic Access support; includes an additional RS-232-C serial port for optional external modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.....	5,001.91	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	225.09	
15910-0407	EA		MS-NAE3515-2 Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; features Basic Access support; includes an internal modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.....	5,293.11	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	238.19	
15910-0408	EA		MS-NAE4510-2 Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk.....	11,942.94	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	537.43	
15910-0409	EA		MS-NAE4510-2U Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk. Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.....	11,942.94	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	537.43	
15910-0410	EA		MS-NAE4511-2 Panel Assembly: Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an internal modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk.....	12,429.74	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	559.34	
15910-0411	EA		MS-NAE5510-1 Panel Assembly: Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk).....	17,495.19	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	787.28	
15910-0412	EA		MS-NAE5510-1U Panel Assembly: Supports two N2 or two BACnet MS/TP trunks (or one N2 trunk and one BACnet MS/TP trunk). Note: This model is UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.....	17,495.19	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	787.28	
15910-0413	EA		MS-NAE5511-1 Panel Assembly: Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk); includes an internal modem.....	18,131.12	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	815.90	
15910-0414	EA		MS-NCM4510-2 Panel Assembly: Supports one N2 trunk (RS-485 port). Up to 100 devices (60 to 200 TC-9100s or up to 63 VMAs) are supported on the N2 trunk with the use of a repeater.....	14,900.83	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	670.54	
15910-0415	EA		MS-NCE2510-0 Panel Assembly: Supports one N2 Bus trunk with up to 32 N2 devices with display.....	5,016.14	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	225.73	
15910-0416	EA		MS-NCE2511-0 Panel Assembly: Supports one N2 Bus trunk with up to 32 N2 devices. Includes an internal modem with display.....	5,132.24	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	230.95	
15910-0417	EA		MS-NCE2516-0 Panel Assembly: Supports one N2 Bus trunk with up to 32 N2 devices. Includes integral display screen.....	4,904.10	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	220.68	
15910-0418	EA		MS-NCE2517-0 Panel Assembly: Supports one N2 Bus trunk with up to 32 N2 devices. Includes integral display screen and an internal modem.....	5,338.06	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	240.21	
15910-0419	EA		MS-NCE2560-0 Panel Assembly: Supports one MS/TP Bus trunk with up to 32 MS/TP devices with display.....	5,016.14	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	225.73	
15910-0420	EA		MS-NCE2561-0 Panel Assembly: Supports one MS/TP Bus trunk with up to 32 MS/TP devices. Includes an internal modem with display.....	5,132.24	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	230.95	
15910-0421	EA		MS-NCE2566-0 Panel Assembly: Supports one MS/TP Bus trunk with up to 32 MS/TP devices. Includes integral display screen.....	4,904.10	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	220.68	
15910-0422	EA		MS-NCE2567-0 Panel Assembly: Supports one MS/TP Bus trunk with up to 32 MS/TP devices. Includes integral display screen and an internal modem.....	5,020.19	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	225.91	
15910-0423	EA		MS-NIE5510-1 Panel Assembly: Supports N1 network migrations.....	17,495.19	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	787.28	
15910-0424	EA		MS-NIE5511-1 Panel Assembly: Supports N1 network migrations, includes an internal modem.....	18,131.12	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	815.90	
15910-0425	EA		PHX200: Interface for up to two Phoenix lab/ fume hoods. MIJ not included.....	5,004.98	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	225.22	
15910-0426	EA		PHX600: Interface for up to six Phoenix lab/ fume hoods. MIJ not included.....	6,528.64	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	293.79	
15910-0427	EA		MS-MIG3520-0: Metasys Integrator 3500 Series: Requires a 24 VAC power supply. Each model includes two RS-232-C serial ports, one Ethernet port, one N2 Bus port, one RS-485 port, and a battery.....	8,683.61	
	15MOD-0001		Warranty For Every Year Material Warranty Is Required, Add	390.76	

15000 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0428		EMCS Network Interfaces (15910-0389) Notes: Includes material only		
15910-0429	EA	Laptop Computer.....	4,526.06	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	203.67	
15910-0430	EA	Laptop Case.....	262.39	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.81	
15910-0431	EA	Desktop computer.....	3,798.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	170.94	
15910-0432	EA	19 Inch Monitor.....	618.06	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.81	
15910-0433	EA	Alarm Printer: Includes Cable and Paper.....	1,544.95	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	69.52	
15910-0434	EA	Report Printer: Includes Cable and Paper.....	1,792.59	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	80.67	
15910-0435	EA	PDA: Used as remote access portal interface.....	1,100.61	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	49.53	
15910-0436	EA	BC/TV Tool: Wireless Commissioning Converter, with Bluetooth technology.....	909.91	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	40.95	
15910-0437	EA	Repeater: Used to increase communication trunk signal. Recommended for each network area controller.....	960.79	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	43.24	
15910-0438	EA	CVTPro300: The AS-CVTProX00-1 Zone Bus/N2 Interface Converter is portable converter designed to provide a communication interface between the room sensors and controllers operating on a Zone Bus or N2 Bus and a Personal Computer (PC) or specified models of the PalmTM family of Personal Digital Assistants (PDAs).....	1,202.69	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	54.12	
15910-0439	EA	Zigbee USB Interface.....	457.85	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	20.60	
15910-0440		DDC Programmable Controllers (15910-0389) Notes: Includes material only		
15910-0441	EA	FEC1621 Panel Assembly: BACnet 10-Point Field Equipment Controller with 2 UI, 1 BI, 3 BO, and 4 CO; 24 VAC; SA Bus; Mounting Base; integral Display. Panel assembly includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure.....	2,013.80	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	90.62	
15910-0442	EA	FEC2621 Panel Assembly: BACnet 17-Point Field Equipment Controller with 6 UI, 2 BI, 3 BO, 2 AO and 4 CO; 24 VAC; SA Bus; Integral Display; Mounting Base. Panel assembly includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure.....	2,283.04	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	102.74	
15910-0443	EA	IOM1711 Panel Assembly: BACnet4-Point IOM with 4 BI, FC Bus and SA Bus Support.....	1,279.11	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	57.56	
15910-0444	EA	IOM2711 Panel Assembly: BACnet 6-Point IOM with 2 UI, 2 UO, 2 BO, FC Bus, and SA Bus Support.....	1,372.56	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	61.77	
15910-0445	EA	IOM3711 Panel Assembly: BACnet 12- Point IOM with 4 UI, 4 UO, 4 BO, FC Bus, and SA Bus Support.....	1,512.77	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	68.07	
15910-0446	EA	IOM4711 Panel Assembly: BACnet 17-Point IOM with 6 UI, 2 BI, 3 BO, 2 AO, 4 CO, 24 VAC, and SA Bus with Mounting Base.....	1,531.44	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	68.91	
15910-0447	EA	AS-UNT111-1 Panel Assembly: N2 Unitary Controller Spade lug 6 AI, 4 BI, 2 AO, 6 BO 24x24x9.25 TB. Panel assembly includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure.....	2,637.16	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	118.67	
15910-0448	EA	AS-UNT141-1 Panel Assembly: N2 Unitary Controller. Screw terminal 6 AI, 4 BI, 2 AO, 6 BO. Panel assembly includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure.....	2,145.20	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	96.53	
15910-0449	EA	AS-UNT1108-0 Panel Assembly: N2 Unitary Controller. Spade lug 6 AI, 6 BI, 0 AO, 8 BO. Panel assembly includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure.....	2,364.12	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	106.39	
15910-0450	EA	AS-UNT1126-0 Panel Assembly: N2 Unitary Controller. Spade lug 6 AI, 6 BI, 2 AO, 6 BO. Panel assembly includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure.....	2,364.12	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	106.39	
15910-0451	EA	AS-UNT1144-0 Panel Assembly: N2 Unitary Controller. Spade lug 6 AI, 6 BI, 4 AO, 4 BO. Panel assembly includes a 16 in. W x 20 in. H x 6.62 in. D steel enclosure.....	2,364.12	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	106.39	
15910-0452	EA	DX9100-8454 Panel Assembly: N2 Extended Digital Plant Controller. 8 AI, 8 BI, 6 AO, 4 BO. Panel assembly includes a 20 in. W x 24 in. H x 6.62 in. D steel enclosure.....	5,534.31	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	249.04	
15910-0453	EA	VMA1610: BACnet Variable Air Volume Controller. No Panel Assembly. Integrated VAV Controller/Actuator/Pressure Sensor (Cooling only), FC Bus, and SA Bus.....	583.10	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	26.24	
15910-0454	EA	VMA1620: BACnet Variable Air Volume Controller. No Panel Assembly. Integrated VAV Controller/Actuator/Pressure Sensor (with Reheat and Fan Control), FC Bus, and SA Bus.....	638.63	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	28.74	
15910-0455	EA	VMA1410-0: N2 Variable Air Volume Controller. No Panel Assembly. Integrated VAV Controller/Actuator/Pressure Sensor (Cooling only).....	772.52	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	34.76	
15910-0456	EA	VMA1420-0: N2 Variable Air Volume Controller. No Panel Assembly. Integrated VAV Controller/Actuator/Pressure Sensor (with Reheat and Fan-Powered).....	844.65	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	38.01	
15910-0457	EA	TEC2601-4: BACnet Network Capability. Used To Control Fan Coil Units, Unit Heaters, and Single-Stage Packaged Heating/Cooling Equipment.....	431.97	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	19.44	
15910-0458	EA	TEC2602-4: BACnet Network Capability. Used To Control One or Two Heat Pump Stages with Optional Auxiliary Heat Stage.....	559.57	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	25.18	
15910-0459	EA	TEC2603-4: BACnet Network Capability. Used To Control Multi-Stage Packaged Heating/Cooling Equipment.....	610.50	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.47	
15910-0460	EA	TEC2604-4: BACnet Network Capability. Used To Control Economizer Operation for Single- and Multi-Stage Unitary Rooftop Equipment.....	648.36	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	29.18	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0461	EA	TEC2616-4: BACnet Network Capability. Two On/Off Control Outputs. 3 Speed Fan Control.....	625.52	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	28.15	
15910-0462	EA	TEC2626-4: BACnet Network Capability. Two On/Off or Floating Control Outputs. 3 Speed Fan Control.....	649.56	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	29.23	
15910-0463	EA	TEC2627-4: BACnet Network Capability. Two On/Off or Floating Control Outputs.....	433.04	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	19.49	
15910-0464	EA	TEC2636-4:2 BACnet Network Capability. Two On/Off or floating Control Outputs With Dehumidification Capability. 3 Speed Fan Control.....	871.26	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	39.21	
15910-0465	EA	TEC2645-4: Networked BACnet MS/TP, Two-Pipe, Proportional 0 to 10 VDC Control Output, and One-Speed Fan Control Thermostat.....	433.04	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	19.49	
15910-0466	EA	TEC2646-4: BACnet Network Capability. 2 proportional 0 to 10 VDC Control Outputs. 3 Speed Fan Control.....	697.69	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	31.40	
15910-0467	EA	TEC2647-4: BACnet Network Capability. Two Proportional 0 to 10 VDC Control Outputs.....	457.09	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	20.57	
15910-0468	EA	TEC2656-4: BACnet Network Capability. 2 proportional 0 to 10 VDC Control Outputs With Dehumidification Capability. 3 Speed Fan Control.....	902.38	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	40.61	
15910-0469	EA	TEC2101-4: N2 Network Capability. Used To Control Fan Coils, Unit Heaters and Single-Stage Packaged Heating/Cooling Equipment.....	416.55	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	18.74	
15910-0470	EA	TEC2102-4: N2 Network Capability. Used To Control Heat Pumps with up to 3 Heating/2 Cooling Stages.....	546.72	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	24.60	
15910-0471	EA	TEC2103-4: N2 Network Capability. Used To Control Multi-Stage Packaged Heating/Cooling Equipment.....	598.68	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	26.94	
15910-0472	EA	TEC2104-4: N2 Network Capability. Used To Control Economizer Operation for Single- and Multi-Stage Unitary Rooftop Equipment.....	637.29	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	28.68	
15910-0473	EA	TEC2116-4: N2 Network Capability. Two On/Off Control Outputs. 3 Speed Fan Control. 3 Speed Fan Control.....	601.44	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.06	
15910-0474	EA	TEC2126-4: N2 Network Capability. Two On/Off or Floating Control Outputs. 3 Speed Fan Control.....	625.52	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	28.15	
15910-0475	EA	TEC2127-4: N2 Network Capability. Two On/Off or Floating Control Outputs.....	408.98	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	18.40	
15910-0476	EA	TEC2136-4: N2 Network Capability. Two On/Off or Floating Control Outputs, Dehumidification Capability. 3 Speed Fan Control.....	838.98	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	37.75	
15910-0477	EA	TEC2145-4: N2 Network Capability. Proportional 0 to 10 VDC Control Output, and Single Speed Fan Control.....	408.98	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	18.40	
15910-0478	EA	TEC2146-4: N2 Network Capability. Two Proportional 0 to 10 VDC Control Outputs. 3 Speed Fan Control.....	673.63	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	30.31	
15910-0479	EA	TEC2147-4: N2 Network Capability. Two Proportional 0 to 10 VDC Control Outputs.....	433.04	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	19.49	
15910-0480	EA	TEC2156-4: N2 Network Capability. Two Proportional 0 to 10 VDC Control Outputs, Dehumidification Capability. 3 Speed Fan Control.....	862.64	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	38.82	
15910-0481	EA	TEC20-3C-2: BACnet IP Wireless Coordinator; Requires 15 VDC Power Supply.....	4,057.55	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	182.59	
15910-0482	EA	TEC20-6C-2: BACnet MS/TP Wireless Coordinator; Requires 15 VDC Power Supply.....	3,814.05	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	171.63	
15910-0483	EA	TEC2001-4: Wireless BACnet Network Capability. Used To Control Fan Coil Units, Unit Heaters, and Single- Stage Packaged Heating/Cooling Equipment.....	511.35	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	23.01	
15910-0484	EA	TEC2002-4: Wireless BACnet Network Capability. Used To Control One or Two Heat Pump Stages with Optional Auxiliary Heat Stage.....	576.58	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	25.95	
15910-0485	EA	TEC2003-4: Wireless BACnet Network Capability. Used To Control Multi-Stage Packaged Heating/Cooling Equipment.....	576.58	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	25.95	
15910-0486	EA	TEC2004-4: Wireless BACnet Network Capability. Used To Control Economizer Operation for Single- and Multi- Stage Unitary Rooftop Equipment.....	642.15	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	28.90	
15910-0487	EA	TEC2016-4: Wireless BACnet Network Capability. Two On/Off Control Points. 3 Speed Fan Control.....	616.53	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.74	
15910-0488	EA	TEC2026-4: Wireless BACnet Network Capability. Two On/Off or Floating Control Points. 3 Speed Fan Control.....	687.73	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	30.95	
15910-0489	EA	TEC2027-4: Wireless BACnet Network Capability. Two On/Off or Floating Control Points.....	519.41	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	23.37	
15910-0490	EA	TEC2036-4: Wireless BACnet Network Capability. Two On/Off or Floating Control Points. Dehumidification Capability. 3 Speed Fan Control.....	943.49	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	42.46	
15910-0491	EA	TEC2045-4: Wireless BACnet Network Capability. One Proportional 0 to 10 VDC Control Point. Single Speed Fan Control.....	520.16	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	23.41	
15910-0492	EA	TEC2046-4: Wireless BACnet Network Capability. Two Proportional 0 to 10 VDC Control Points. 3 Speed Fan Control.....	726.53	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	32.69	
15910-0493	EA	TEC2047-4: Wireless BACnet Network Capability. Two Proportional 0 to 10 VDC Control Points. No Fan Control.....	567.73	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	25.55	
15910-0494	EA	TEC2056-4: Wireless BACnet Network Capability. Two Proportional 0 to 10 VDC Control Points. Dehumidification Capability. 3 Speed Fan Control.....	979.11	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	44.06	

15910-0495 EMCS Optional DDC Controller Hardware and Enclosures (15910-0389)

Notes: BACnet IOM devices expand the FEC and NCE input/ output capability. XT/XP combinations expand the DX-9100 input/ output capability. Each XP needs an XT. A custom panel is required for applications other than NEMA 1 and for any controller needing an expansion device or any face mounted items. Includes material only.

15000 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0496	EA	IOM1711: BACnet Input/output Module. 4-Point IOM with 4 BI, FC Bus and SA Bus Support.....	380.99	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	17.14	
15910-0497	EA	IOM2711: BACnet Input/output Module.6-Point IOM with 2 UI, 2 UO, 2 BO, FC Bus, and SA Bus Support.....	476.22	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	21.43	
15910-0498	EA	IOM3711: BACnet Input/output Module.12-Point IOM with 4 UI, 4 UO, 4 BO, FC Bus, and SA Bus Support.....	619.09	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.86	
15910-0499	EA	IOM4711: BACnet Input/output Module.17-Point IOM with 6 UI, 2 BI, 3 BO, 2 AO, 4 CO, 24 VAC, and SA Bus with Mounting Base	638.13	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	28.72	
15910-0500	EA	IOM1710-OU: 4-Point IOM with 4 BI, FC Bus and SA Bus Support.....	380.99	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	17.14	
15910-0501	EA	IOM2710-OU: BACnet Input/output Module. 6-Point IOM with 2 UI, 2 UO, 2 BO, FC Bus, and SA Bus Support	476.22	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	21.43	
15910-0502	EA	IOM3710-OU: BACnet Input/output Module. 12-Point IOM with 4 UI, 4 UO, 4 BO, FC Bus, and SA Bus Support	619.09	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	27.86	
15910-0503	EA	IOM4710-OU: BACnet Input/output Module. 17-Point IOM with 6 UI, 2 BI, 3 BO, 2 AO, 4 CO, 24 VAC, and SA Bus with Mounting Base.....	638.13	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	28.72	
15910-0504	EA	XT9100: DX-9100Extension Module.....	586.09	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	26.37	
15910-0505	EA	XP9102: DX-9100 Expansion Module with 2 Analog Outputs and 6 Analog Inputs	667.06	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	30.02	
15910-0506	EA	XP9103: DX-9100 Expansion Module with 8 Digital Outputs (triacs)	386.36	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	17.39	
15910-0507	EA	XP9104: DX-9100 Expansion Module with 4 Digital Inputs, 4 Digital Outputs (triacs).....	386.36	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	17.39	
15910-0508	EA	XP9105: DX-9100 Expansion Module with 8 Digital Inputs	386.36	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	17.39	
15910-0509	EA	XP9107: DX-9100 Expansion Module with 4 Digital Outputs (24V Relay)	334.00	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	15.03	
15910-0510	EA	ZFR1810: Wireless Field Bus Coordinator, 10 mW Transmission Power. Functions with NAE35xx, NAE45xx, NAE55xx, and NCE25xx models.....	653.02	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	29.39	
15910-0511	EA	ZFR1811: Wireless Field Bus Router, 10 mW Transmission Power. Functions with Metasys BACnet FECs, VMA1600s, and WRZ-TTx Series Wireless Mesh Room Temperature Sensors.....	221.61	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.97	
15910-0512	EA	MS-ZFRCBL-0: An optional cable harness accessory that is intended for use with the ZFR1800 Series Wireless Field Bus System.	32.42	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	1.46	
15910-0513	EA	MS-ZFRPT-0: Optional Repeater Accessory for use with ZFR1811 Router as a repeater. Includes 20-28 VAC or 16-30 VDC input power, 12 VDC output power supply (regulated at 500 mA maximum, 6 VA), and 4 x 4 in. electrical box with cover.	114.34	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	5.15	
15910-0514	EA	WRZ-7840-0: One-to-One Wireless Receiver. Functions with a WRZ-TTx wireless sensor; and a FEC Series or VMA1600 Series field controller. Up to five WRZ-TTx sensors may be used per WRX-7840-0 receiver for averaging temperature in a zone.....	211.21	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	9.50	
15910-0515	EA	WRZ-SST-100: Wireless Sensing System Tool consisting of a WRZ-7840-0 receiver and a battery pack is a light weight, portable wireless receiver designed to receive wireless data transmissions from a WRZ-TTx Series Sensor. In One-to-One sensing system applications, this tool assists during a site survey, to determine the optimum locations for sensors and receivers. It can also work as a signal test receiver or "site survey tool" prior to installing a Mesh Network System.	311.25	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	14.01	
15910-0516	EA	WRZ-SST-110: Wireless Sensing System Tool consisting of a WRZ-7850-0 receiver and battery pack is a light weight portable wireless receiver designed to receive wireless data transmissions from a WRZ-TTx Series Sensor. In One-to-One sensing system applications, this tool assists during a site survey, to determine the optimum locations for sensors and receivers. It can also work as a signal test receiver or site survey tool prior to installing a Mesh Network System.	308.17	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	13.87	
15910-0517	EA	WRZ-THB0000-0: Wireless Temperature/Humidity Sensor with Display, Warmer/Cooler (+/-) Set point Adjustment or Set point Adjustment Scale: 13 to 29°C/55 to 85°F, F/C Button, RH Button and Occupancy Button, 10 mW Transmission Power.....	436.94	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	19.66	
15910-0518	EA	WRZ-THN0000-0: Wireless Temperature/Humidity Sensor, Occupancy Button, No Temperature adjustment and No LCD temperature/humidity display, 10 mW Transmission Power	389.62	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	17.53	
15910-0519	EA	WRZ-THP0000-0: Wireless Temperature/Humidity Sensor, Warmer/Cooler (+/-) Set point Adjustment and Occupancy Button, No LCD temperature/humidity display, 10 mW Transmission Power.....	396.22	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	17.83	
15910-0520	EA	WRZ-TTB0000-0: Wireless Temperature Sensor with Display and F/C Button, 10 mW Transmission Power.....	260.12	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.71	
15910-0521	EA	WRZ-TTD0000-0: Wireless Temperature Sensor with Display, F/C Button and Fan Speed Control, 10 mW Transmission Power.....	260.12	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.71	
15910-0522	EA	WRZ-TTP0000-0: Wireless Room Temperature Sensor, Warmer/Cooler (+/-) Set point Adjustment, 10 mW Transmission Power	262.62	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.82	
15910-0523	EA	WRZ-TTR0000-0: Wireless Room Temperature Sensor, No Set point Adjustment, 10 mW Transmission Power.....	254.45	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.45	
15910-0524	EA	WRZ-TTS0000-0: Wireless Room Temperature Sensor, Set point Adjustment Scale: 13 to 29°C/55 to 85°F, 10 mW Transmission Power	262.62	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	11.82	
15910-0525	EA	WRS - RTN0000 - 0: Receiver for Many - to - One Wireless Room Temperature Sensing System, Includes Omni directional Antenna, 15 dBm Transmission Power.....	850.05	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	38.25	
15910-0526	EA	WRS-SST - 100: Wireless Sensing System Tool (Monitors RF Signal Strength and Temperature Data between a WRS-TTx0000-0 Series Sensor and the Associated WRS-RTN0000-0 Series or TE-7800 Series Receiver), 15 dBm Transmission Power	311.25	
	15MOD-0001	Warranty For Every Year Material Warranty Is Required, Add	14.01	



	MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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15910-0527	EA	WRS	- TTP0000	0: Wireless Room Temperature Sensor, Warmer/Cooler (+/-) Set point Adjustment, 15 dBm Transmission Power	276.87	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	12.46	
15910-0528	EA	WRS	- TTR0000	0: Wireless Room Temperature Sensor, No Set point Adjustment, 15 dBm Transmission Power	252.58	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	11.37	
15910-0529	EA	WRS	- TTS0000	0: Wireless Room Temperature Sensor, Set point Adjustment Scale: 55 to 85°F/13 to 29°C, 15 dBm Transmission Power	276.87	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	12.46	
15910-0530	EA	DT	9100-6801	: Cable for LCD Display (recommended for every DX-9100).....	54.90	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	2.47	
15910-0531	EA	DT	9100-8902	: Wall Mounting Kit (recommended for every DX-9100).....	51.12	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	2.30	
15910-0532	EA	DT	9100-8104	: LCD Display Unit for DX-9100 (recommended for every DX-9100).....	1,821.09	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	81.95	
15910-0533	EA			Custom Panel Cost: This cost is applicable for every control panel assembly that requires extension module(s) (IOM's and DX/DT combinations).....	825.46	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	37.15	
15910-0534	EA			Custom Panel Cost: This cost is applicable for every control panel assembly that needs an outdoor rated enclosure (weatherproof).....	1,100.61	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	49.53	
15910-0535	EA			Custom Panel Cost: This cost is applicable for every face mounted item such as a display, meter, or gauge	275.15	
				15MOD-0001 Warranty For Every Year Material Warranty Is Required, Add	12.38	
15910-0536				EMCS Software (15910-0389)		
15910-0537	EA	MS-ADXS	WOSQL-0	: new ADX project software for up to 25 concurrent users; includes Microsoft SQL Server 2008 software with a Processor License for unlimited users/devices	77,082.98	
15910-0538	EA	MS-ADXS	WOS-SCS	: ADX server site subscription service with ADX upgrade software and all NAE/NIE software image upgrades (25 concurrent users). ADX package also includes: SCT and Export Utility software. (1 year).....	7,635.40	
15910-0539	EA	MS-ADX	10SQL-0	: new ADX project software for up to 10 concurrent users; includes Microsoft SQL Server™ 2008 software with a Processor License for unlimited users/devices	49,186.70	
15910-0540	EA	MS-ADX	10U-SCS	: ADX server site subscription service with ADX upgrade software and all NAE/NIE software image upgrades (10 concurrent users). ADX package also includes: SCT and Export Utility software. (1 year).....	6,189.52	
15910-0541	EA	MS-ADS	05U-0	: new ADS project software for up to 5 concurrent users. Includes SQL server express.....	23,019.26	
15910-0542	EA	MS-ADS	05U-0-SCS	: ADS server site subscription service with ADS upgrade software and all NAE/NIE software image upgrades (5 concurrent users). ADS package also includes: SCT and Export Utility software. (1 year).....	5,684.25	
15910-0543	EA	MS-RAP	Ready Access Portal	: The Ready Access Portal software provides a natural, complementary extension of the Metasys® Site Management Portal User Interface (UI). The Ready Access Portal UI allows targeted users to access only specific key functions of the Metasys system and perform typical tasks through a more intuitive navigation process. Available on a computer or handheld platform, the Ready Access Portal UI requires only a Web browser.....	2,267.26	
15910-0544	EA	MS-ADV	GRF-0	: Advanced Graphics: The Advanced Graphics application is an enhanced graphics programming package that provides dynamic graphic capabilities such as animation, color changing, and flashing for the Metasys system extended architecture.	743.61	
15910-0545	EA	MS-ERE	PORT-0	: Energy Essentials: An add-on to the Metasys® Advanced Reporting System, Energy Essentials provides seven fundamental energy reports that no site should live without.....	1,700.44	
15910-0546	EA	MS-E	PORT-0	: Export Utility: The Export Utility extracts historical trend, alarm, and audit data from the system and presents the historical data in a variety of formats. Using these flexible formats, in programs such as Microsoft® Excel and Access, users can easily sort, compare, and archive data in spreadsheets and databases.	2,383.32	
15910-0547	EA	MS-SCT	SWO-0	: System Configuration Tool: As an integral part of the Metasys® system extended architecture, the System Configuration Tool (SCT) supports the engineering, installing, and commissioning of your building automation system.	3,217.64	
15910-0548	EA	Symantec	Antivirus	790.85	
15910-0549	EA	Microsoft	Office 2007	2,201.18	
15910-0550				Siemens Controls (15910)		
15910-0551				Siemens, Landis-Staefa Controller (15910-0550)		
15910-0552	EA	Siemens, Landis-Staefa	MS-2000	System.....	4,961.30	
15910-0553				Siemens Control Devices (15910-0550)		
15910-0554	EA	Room Temp	Sensor, Siemens 598-61020-08	136.17	35.96	
15910-0555	EA	Room Temp	Trim Ring, Siemens 594-61010-01.....	16.18	2.03	
15910-0556	EA	Controller, Siemens	091-60230-10 SM2 + VAV8661	688.43	65.49	
15910-0557	EA	Base, Siemens	594-60000-01 SM2	60.31	8.19	
15910-0558	EA	Enclosure, Siemens	540 153 SM2	83.02	8.19	
15910-0559	EA	Actuator, Siemens	GBB171.1U.....	246.37	50.47	
15910-0560	EA	1/2" Valve, Siemens	26502029	70.77	16.83	
15910-0561				Cypress Envirosystems Controls (15910)		
15910-0562				Wireless Pneumatic Thermostat (15910-0561)		
				Note: Wireless pneumatic thermostats, hub and repeaters must be installed by installers certified by the manufacturer.		
15910-0563	EA	Two-Pipe Direct Acting	Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T2DP).....	562.20	6.55	
			Note: One for every thermostat to be retrofitted.			
			15MOD-0002 For > 50 To 200, Deduct	-30.05		
			15MOD-0003 For > 200, Deduct	-60.04		
15910-0564	EA	Two-Pipe Reverse Acting	Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T2RP).....	562.20	6.55	
			Note: One for every thermostat to be retrofitted.			
			15MOD-0002 For > 50 To 200, Deduct	-30.05		
			15MOD-0003 For > 200, Deduct	-60.04		
15910-0565	EA	Single-Pipe Direct Acting	Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T1DP).....	562.20	6.55	
			Note: One for every thermostat to be retrofitted.			
			15MOD-0002 For > 50 To 200, Deduct	-30.05		
			15MOD-0003 For > 200, Deduct	-60.04		

15000 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**MINOR
CSI UOM DESCRIPTIONTOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

15910-0566	EA	Single-Pipe Indirect Acting Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T1RP).....	562.20	6.55
		Note: One for every thermostat to be retrofitted.		
		15MOD-0002 For > 50 To 200, Deduct	-30.05	
		15MOD-0003 For > 200, Deduct	-60.04	
15910-0567	EA	Two-Pipe Direct Acting Deadband Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T2DP-DB).....	642.67	6.55
		Note: One for every thermostat to be retrofitted.		
		15MOD-0002 For > 50 To 200, Deduct	-34.52	
		15MOD-0003 For > 200, Deduct	-68.98	
15910-0568	EA	Two-Pipe Reverse Acting Deadband Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T2RP-DB).....	642.67	6.55
		Note: One for every thermostat to be retrofitted.		
		15MOD-0002 For > 50 To 200, Deduct	-34.52	
		15MOD-0003 For > 200, Deduct	-68.98	
15910-0569	EA	Single-Pipe Direct Acting Deadband Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T1DP-DB).....	642.67	6.55
		Note: One for every thermostat to be retrofitted.		
		15MOD-0002 For > 50 To 200, Deduct	-34.52	
		15MOD-0003 For > 200, Deduct	-68.98	
15910-0570	EA	Single-Pipe Indirect Acting Deadband Wireless Pneumatic Thermostat (Cypress Envirosystems WPT-800-T1RP-DB).....	642.67	6.55
		Note: One for every thermostat to be retrofitted.		
		15MOD-0002 For > 50 To 200, Deduct	-34.52	
		15MOD-0003 For > 200, Deduct	-68.98	
15910-0571	EA	Wireless Pneumatic Thermostat Blank Cover (Cypress Envirosystems WPT-800-MCOV)	41.05	6.55
		Note: Optional cover.		
		15MOD-0002 For > 50 To 200, Deduct	-1.92	
		15MOD-0003 For > 200, Deduct	-3.83	
15910-0572	EA	Green Box Controller (Cypress Envirosystems GBC-800-001).....	3,335.51	6.55
		Note: One unit for up to 100 thermostats.		
		15MOD-0004 For 2, Deduct	-170.89	
		15MOD-0005 For > 2, Deduct	-341.47	
15910-0573	EA	WPT USB Hub (Cypress Envirosystems WPT-800-HUSB).....	390.51	6.55
		Note: One unit for up to 100 thermostats.		
		15MOD-0004 For 2, Deduct	-21.35	
		15MOD-0005 For > 2, Deduct	-42.66	
15910-0574	EA	WPT Repeater (Cypress Envirosystems WPT-800-RWAL)	435.15	6.55
		Note: One unit for up to 15 thermostats.		
		15MOD-0006 For >5 To 10, Deduct	-22.37	
		15MOD-0007 For >10, Deduct	-44.71	
15910-0575	EA	24V WPT Repeater (Cypress Envirosystems WPT-800-RWAL24V).....	533.43	6.55
		Note: One unit for up to 15 thermostats.		
		15MOD-0006 For >5 To 10, Deduct	-26.02	
		15MOD-0007 For >10, Deduct	-51.99	

15910-0576 Control Sensors, Meters, Relays, Power Supplies, Valves, Dampers And Actuators (15910)

15910-0577 Air Temperature Sensors (15910-0576)

15910-0578	EA	Wall Mounted Air Temp Sensor.....	72.54	30.59
15910-0579	EA	Wall Mounted Air Temp Sensor With Override.....	95.90	30.59
15910-0580	EA	Wall Mounted Air Temp Sensor With Override And Setpoint	112.46	30.59
15910-0581	EA	Wall Mounted Air Temp Sensor With Override, Setpoint And Fan Speed Control	126.76	30.59
15910-0582	EA	Wall Mounted Air Temp Sensor With Override, Setpoint And LCD Display	161.76	30.59
15910-0583	EA	Wall Mounted Air Temp Sensor With Override, Setpoint, Fan Speed Control And LCD Display	175.30	30.59
15910-0584	EA	Wall Mounted Air Temp Sensor with Override, Setpoint, Humidity And LCD Display	238.75	30.59
15910-0585	EA	Wall Mounted Air Temp Sensor With Override, Setpoint, Humidity, Fan Speed Control And LCD Display.....	248.42	30.59
15910-0586	EA	6" Probe Duct Temp Sensor.....	71.06	30.59
15910-0587	EA	12" Probe Duct Temp Sensor.....	91.20	40.15
15910-0588	EA	18" Probe Duct Temp Sensor.....	92.91	40.15
15910-0589	EA	Outdoor Plastic Weather Proof Enclosure Temp Sensor	283.51	85.99
15910-0590	EA	12" Averaging Temp Sensor	280.94	146.84
15910-0591	EA	24" Averaging Temp Sensor	289.51	146.84
15910-0592	EA	Brushed Stainless Steel Wall Plate Temp Sensor.....	60.35	30.59

15910-0593 Water Temperature Sensors (15910-0576)

15910-0594	EA	5" Immersion Water Temp Sensor	85.92	40.54
		Note: Honeywell C7041D2001.		
15910-0595	EA	Strap-On Water Temp Sensor.....	204.75	40.54

15910-0596 Temperature Sensors (15910-0576)

15910-0597	EA	Thermistor Duct Temperature Sensor	114.48	37.73
15910-0598	EA	Thermistor Duct Temperature Sensor, 1/2" LB Conduit Fitting	135.48	37.73
15910-0599	EA	Thermistor Duct Temperature Sensor With Greenfield Fitting.....	116.38	37.73
15910-0600	EA	Thermistor Duct Temperature Sensor With Handibox Housing.....	117.09	37.73
15910-0601	EA	Thermistor Duct Temperature Sensor With Handibox Housing, 18" Probe.....	154.20	37.73
15910-0602	EA	Thermistor Duct Temperature Sensor With Handibox Housing, 6" Probe.....	124.45	37.73
15910-0603	EA	Thermistor Duct Temperature Sensor With Non Metallic Handibox Housing.....	117.70	37.73
15910-0604	EA	Thermistor Duct Temperature Sensor With 4" Probe	131.23	37.73
15910-0605	EA	Thermistor Duct Temperature Sensor With Weatherproof Housing	127.92	37.73
15910-0606	EA	Thermistor Outdoor Air Temperature Sensor	163.37	52.40
15910-0607	EA	Thermistor Outdoor Air Temperature Sensor With 25' Lead	170.48	52.40
15910-0608	EA	Delta Style Surface Mounted 10K Ohm Thermistor Room Temperature Sensor	68.47	20.96
15910-0609	EA	Delta Style Surface Mounted AD592 Room Temperature Sensor.....	70.59	20.96
15910-0610	EA	Stainless Steel Plate 1K Ohm Room Temperature Sensor	70.59	20.96



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0611		Relative Humidity Sensors (15910-0576)		
15910-0612	EA	3% Duct Mounted RH Sensor	255.99	37.73
15910-0613	EA	10K Ohm Thermistor 3% Duct Mounted RH Sensor	264.36	37.73
15910-0614	EA	3% RH Outdoor Air Sensor	299.95	52.40
15910-0615	EA	2% Surface Mounted RH Transmitter	219.86	20.96
15910-0616		Pressure Sensors (15910-0576)		
15910-0617	EA	Differential Pressure Transmitters With NEMA 1 Case, 0 To .5" W.C.	321.44	44.25
15910-0618	EA	Differential Pressure Transmitters With NEMA 1 Case, 0 To 5" W.C.	294.90	44.25
15910-0619	EA	Adjustable Differential Pressure Switches, .05 To 12" W.C.	136.53	44.25
15910-0620	EA	Adjustable Differential Pressure Switches, .05 To 2" W.C.	137.84	44.25
15910-0621	EA	Manual Reset Adjustable Differential Pressure Switches, .4 To 2" W.C.	147.27	44.25
15910-0622	EA	Adjustable Differential Pressure Switches, .05 To 12" W.C., 1/8" NPT	135.67	44.25
15910-0623	EA	Water Differential Pressure Transmitter, 0 To 100psid, Bypass Valve Assembly Option..... Note: Excludes pipe fittings.	1,272.96	44.25
15910-0624	EA	Water Differential Pressure Transmitter, 0 To 60psid, Bypass Valve Assembly Option..... Note: Excludes pipe fittings.	1,272.96	44.25
15910-0625	EA	Magnahelic Gauge	359.55	27.05
15910-0626		Air Flow Monitoring Stations (15910-0576)		
15910-0627	EA	Air Flow Monitoring Station	8,301.89	
15910-0628	EA	Analog Transmitter, 2 Point, 3 Sensor Air Flow Monitoring Station..... Note: 10' cable, 36" x 24" typical duct size.	1,836.62	66.27
15910-0629	EA	Analog Transmitter, 3 Point, 4 Sensor Air Flow Monitoring Station..... Note: 10' cable, 48" x 36" typical duct size.	2,621.40	66.27
15910-0630	EA	Analog Transmitter, 4 Point, 4 Sensor Air Flow Monitoring Station..... Note: 10' cable, 60" x 48" typical duct size.	3,254.11	66.27
15910-0631		Gas Sensors (15910-0576)		
15910-0632	EA	6-1/4" x 6-1/8" CO2 Sensor, 0-2000 ppm.....	965.10	31.43
15910-0633	EA	Wall Mounted CO2 Sensor, 0-2000 ppm With LCD Display.....	357.21	20.96
15910-0634	EA	CO Monitor/Transmitter, 0 To 250 ppm..... Note: Solid state sensor.	769.67	31.43
15910-0635	EA	CO2 Transmitter, Duct Mount, No Display, 0-10VDC Out, 24 Vac/Vdc, 0-10 Or 4-20mA, 0-2000 ppm Range With CD-AD Duct Probe Assembly	426.40	37.73
15910-0636	EA	Gas Monitor/Transmitter: The GMT Series Gas Monitor/Transmitter is a microprocessor-based system for continuous effective monitoring of toxic and combustible gases. The GMT provides a 4-20 mA output in proportion to the level of gas present, and a factory calibrated DPDT alarm relay. A 10-step LED display in the attractive case gives a visual indication of the gas level in the atmosphere. Gases detected include: Carbon Monoxide, Nitrogen Dioxide (diesel exhaust), Hydrogen, Chlorine, Combustibles, Ammonia, Hydrogen Sulfide, Oxygen and Sulfur Dioxide	2,498.65	
15910-0637	EA	Oxygen Sensor: The OS-1 is a dependable, economical oxygen sensor designed to monitor oxygen levels in ambient air.	1,576.38	
15910-0638	EA	Duct CO Sensor	1,387.53	
15910-0639		Current Switches And Current Sensors (15910-0576)		
15910-0640	EA	Current Sensor, 0-20A, 0-5 VDC.....	66.38	20.96
15910-0641	EA	Current Sensor, 0-20A, 4-20mA.....	68.13	20.96
15910-0642	EA	VFD Current Switch, 0.5-135A Range, Split Core	86.48	20.96
15910-0643	EA	Current Switch, 0.15-100A Range, Split Core With NC Command Relay	71.63	20.96
15910-0644	EA	DC Current Sensor, Split Core, 0-50/100/200A (Selectable), 4-20mA, 0-5VDC (Veris H970HCA).....	130.51	20.96
15910-0645	EA	DC Current Sensor, Split Core, 0-20/40/80A (Selectable), 0-20mA, 0-5VDC (Veris H970LCC)	130.51	20.96
15910-0646	EA	Current Switch, 1-135A, N.O. Contact 1A @ 110V (Veris H709).....	87.73	20.96
15910-0647	EA	Current Switch, 0-10/20/40A, 4-20mA Analog Output, Solid Core, Loop Powered (Veris H721)	95.45	20.96
15910-0648	EA	Current Transducer, 0-20A, 0-5VDC.....	128.15	20.96
15910-0649	EA	Solid Core Fixed Setpoint Digital Output Current Switch (Veris H-800)	168.17	55.67
15910-0650	EA	Split Core Fixed Setpoint Digital Output Current Switch (Veris H-900).....	174.57	55.67
15910-0651	EA	Solid Core Adjustable Setpoint Digital Output Current Sensor (Veris H-708).....	181.88	55.67
15910-0652	EA	Split Core Adjustable Setpoint Digital Output Current Sensor (Veris H-908).....	191.02	55.67
15910-0653	EA	Solid And Split Core Adjustable Setpoint Digital Output VFD Current Switch (Veris H-904).....	212.96	55.67
15910-0654	EA	Toggle Switch.....	71.89	26.20
15910-0655	EA	Maintained Pushbutton Switch	76.00	26.20
15910-0656	EA	Manual Time Switch	114.86	26.20
15910-0657	EA	Emergency Stop Switch	184.33	26.20
15910-0658	EA	Float Switch.....	189.50	26.20
15910-0659	EA	Break Glass Switch.....	580.44	26.20
15910-0660	EA	Boiler E-Stop Switch	380.82	26.20
15910-0661		Relays (15910-0576)		
15910-0662	EA	DPDT, 24VAC, Blade, Standard Relay	61.14	20.96
15910-0663	EA	SPDT, 24VAC/VDC, 120VAC Multi-Voltage Relay Module.....	69.08	20.96
15910-0664	EA	SPDT, 24VAC/VDC, 120VAC Power Relay	90.05	26.20
		Note: Box type.		
15910-0665	EA	Motor Starter Interface, 300msec Pulse	113.21	20.96
15910-0666	EA	DP Relay Socket, DIN Rail Mounted.....	58.07	20.96
15910-0667	EA	SP Relay Socket, DIN Rail Mounted	56.97	20.96
15910-0668	EA	SPDT, 24VAC, Blade, Standard Relay	60.86	20.96
15910-0669	EA	DPDT, 24VAC, Blade, Indicator Light Relay	63.45	20.96

15000 Mechanical**15900 Controls And Instrumentation****15910 Energy Monitoring and Control Systems**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15910-0670	EA	SPDT, 24VAC, Blade, Indicator Light Relay.....	63.18	20.96
15910-0671	EA	SPDT Pilot Relay, Universal.....	82.05	26.20
		Note: Box type.		
15910-0672	EA	SPST Pilot Relay With HOA Switch.....	89.22	26.20
		Note: Box type.		
15910-0673	EA	SPDT 3 Phase Line Voltage Monitor, .1-5 Minute Delay On Break Timer.....	183.41	26.20
15910-0674	EA	SPDT 3-Phase Line Voltage Monitor, 0-10 Minute Delay On Break Timer.....	218.37	26.20
15910-0675		Surge Protectors <small>(15910-0576)</small>		
15910-0676	EA	Surge Protector, T100's, Summit, BCU, UPCM, PCM, TCM.....	155.54	5.24
15910-0677	EA	Surge Protector, 1AC Outlet.....	117.96	5.24
15910-0678	EA	Surge Protector, 2 AC Outlets.....	182.63	5.24
15910-0679	EA	Surge Protector, DB-15 Connection.....	99.61	5.24
15910-0680	EA	Surge Protector, DB-25 Connection.....	99.61	5.24
15910-0681	EA	Surge Protector, DB-9 Connection.....	99.61	5.24
15910-0682	EA	Surge Protector, Individual Wire Connection.....	143.30	5.24
15910-0683	EA	Surge Protector, Trane Communication Links.....	89.12	5.24
15910-0684		Transformers <small>(15910-0576)</small>		
15910-0685	EA	50VA, 120/240/277/480-24 VAC, CB Foot And Single Hub Control Transformer (Veris X050CBA).....	75.69	20.96
15910-0686	EA	75VA, 120-24 VAC, CB Foot And Dual Hub Control Transformer (Veris X075CAB).....	82.08	20.96
15910-0687	EA	75VA, 120/208/240/480-24 VAC, CB Foot And Single Hub Control Transformer (Veris X075CBA).....	84.92	20.96
15910-0688	EA	100VA, 120-24 VAC, CB Foot And Dual Hub Control Transformer (Veris X100CAB).....	87.90	20.96
15910-0689	EA	100VA, 120/240/277/480-24 VAC, CB Foot And Single Hub Control Transformer (Veris X100CBA).....	95.22	20.96
15910-0690		Power Supplies <small>(15910-0576)</small>		
15910-0691	EA	Solid Core Current Operated Switch, Terminals, Adjustable Trip, 0.5-150A, SPST.....	97.91	20.96
15910-0692	EA	AC/DC Power Supply, 1.2A @ 24V Output.....	115.41	20.96
15910-0693	EA	DC Power Supply, 5VDC And 24VDC Output.....	105.62	20.96
15910-0694	EA	DC Power Supply, 24VDC, DIN Rail Mounted.....	109.21	20.96
15910-0695	EA	DC Power Supply, 24VDC, Hub Mounted.....	109.21	20.96
15910-0696	EA	DC Power Supply, 24VDC, Panel Mounted.....	109.21	20.96
15910-0697	EA	DC Power Supply, 24 VAC In To Custom DC Out (At 1.5A).....	88.08	20.96
15910-0698	EA	Uninterruptable Power Supply (UPS).....	736.48	
15910-0699		Actuators <small>(15910-0576)</small>		
15910-0700	EA	44 IN-LB, 24 VAC, 4-20mA, 2-10 VDC, Proportional Control, Non-Spring Return Direct Coupled Damper (Belimo LMB24-SR).....	312.15	57.03
15910-0701	EA	90 IN-LB, 24 VAC/DC, 4-20mA, 2-10 VDC, Proportional Control, Non-Spring Return Direct Coupled Damper (Belimo NMB24-SR).....	327.75	57.03
15910-0702	EA	90 IN-LB, 2 Position, 24 To 240 VAC Spring Return Direct Coupled Damper Actuator (Belimo NFBUP).....	380.06	57.03
15910-0703	EA	175 IN-LB, 24 VAC, 4-20mA, 2-10 VDC, Proportional Control, Non-Spring Return Direct Coupled Damper (Belimo AMB24-SR).....	390.15	57.03
15910-0704	EA	90 IN-LB, 24 VAC, 4-20mA, 2-10 VDC, Proportional Control, Spring Return Direct Coupled Damper (Belimo NFB24-SR).....	414.01	57.03
15910-0705	EA	360 IN-LB, 24 VAC, 4-20mA, 2-10 VDC, Proportional Control, Non-Spring Return Direct Coupled Damper (Belimo GMB24-SR).....	449.80	57.03
15910-0706		Valves With Actuator <small>(15910-0576)</small>		
15910-0707	EA	1/2" 2-Way Bronze Globe Valve.....	358.48	8.68
15910-0708	EA	3/4" 2-Way Bronze Globe Valve.....	371.52	11.70
15910-0709	EA	1" 2-Way Bronze Globe Valve.....	407.05	14.16
15910-0710	EA	1-1/4" 2-Way Bronze Globe Valve.....	444.94	17.94
15910-0711	EA	1-1/2" 2-Way Bronze Globe Valve.....	506.90	20.70
15910-0712	EA	2" 2-Way Bronze Globe Valve.....	573.20	24.47
15910-0713	EA	2-1/2" 2-Way Bronze Globe Valve.....	1,072.99	48.93
15910-0714	EA	3" 2-Way Bronze Globe Valve.....	1,164.47	57.26
15910-0715	EA	4" 2-Way Bronze Globe Valve.....	1,573.83	84.11
15910-0716	EA	5" 2-Way Bronze Globe Valve.....	2,314.35	121.54
15910-0717	EA	6" 2-Way Bronze Globe Valve.....	2,563.46	134.56
15910-0718	EA	1/2" 3-Way Bronze Globe Valve.....	386.76	13.02
15910-0719	EA	3/4" 3-Way Bronze Globe Valve.....	399.92	17.55
15910-0720	EA	1" 3-Way Bronze Globe Valve.....	433.93	21.24
15910-0721	EA	1-1/4" 3-Way Bronze Globe Valve.....	482.04	26.91
15910-0722	EA	1-1/2" 3-Way Bronze Globe Valve.....	618.11	31.05
15910-0723	EA	2" 3-Way Bronze Globe Valve.....	686.36	36.70
15910-0724	EA	2-1/2" 3-Way Bronze Globe Valve.....	1,214.89	73.40
15910-0725	EA	3" 3-Way Bronze Globe Valve.....	1,336.97	85.89
15910-0726	EA	4" 3-Way Bronze Globe Valve.....	1,960.21	126.16
15910-0727	EA	5" 3-Way Bronze Globe Valve.....	2,822.31	182.31
15910-0728	EA	6" 3-Way Bronze Globe Valve.....	3,137.26	201.84
15910-0729	EA	1/2" 2-Way Brass Zone Valve.....	96.04	8.68
15910-0730	EA	3/4" 2-Way Brass Zone Valve.....	110.92	11.70
15910-0731	EA	1" 2-Way Brass Zone Valve.....	140.95	14.16
15910-0732	EA	1/2" 3-Way Brass Zone Valve.....	114.23	13.02
15910-0733	EA	3/4" 3-Way Brass Zone Valve.....	131.97	17.55
15910-0734	EA	1" 3-Way Brass Zone Valve.....	165.99	21.24
15910-0735	EA	1/2" 2-Way Brass Ball Valve.....	133.66	8.68
15910-0736	EA	3/4" 2-Way Brass Ball Valve.....	158.63	11.70
15910-0737	EA	1" 2-Way Brass Ball Valve.....	179.49	14.16



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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15910-0738	EA		1-1/4" 2-Way Brass Ball Valve	233.89	17.94
15910-0739	EA		1-1/2" 2-Way Brass Ball Valve	241.71	20.70
15910-0740	EA		2" 2-Way Brass Ball Valve	308.01	24.47
15910-0741	EA		2-1/2" 2-Way Brass Ball Valve	662.82	48.93
15910-0742	EA		3" 2-Way Brass Ball Valve	778.15	57.26
15910-0743	EA		1/2" 3-Way Brass Ball Valve	161.94	13.02
15910-0744	EA		3/4" 3-Way Brass Ball Valve	186.11	17.55
15910-0745	EA		1" 3-Way Brass Ball Valve	240.31	21.24
15910-0746	EA		1-1/4" 3-Way Brass Ball Valve	342.56	26.91
15910-0747	EA		1-1/2" 3-Way Brass Ball Valve	360.26	31.05
15910-0748	EA		2" 3-Way Brass Ball Valve	474.39	36.70
15910-0749	EA		2" 2-Way Butterfly Valve	391.10	44.86
15910-0750	EA		2-1/2" 2-Way Butterfly Valve	409.55	48.93
15910-0751	EA		3" 2-Way Butterfly Valve	539.57	57.26
15910-0752	EA		4" 2-Way Butterfly Valve	852.34	96.12
15910-0753	EA		5" 2-Way Butterfly Valve	1,630.72	121.54
15910-0754	EA		6" 2-Way Butterfly Valve	1,762.39	134.56
15910-0755	EA		8" 2-Way Butterfly Valve	2,454.61	153.79
15910-0756	EA		10" 2-Way Butterfly Valve	3,010.94	188.39
15910-0757	EA		12" 2-Way Butterfly Valve	3,645.81	228.35
15910-0758	EA		14" 2-Way Butterfly Valve	4,047.81	269.13
15910-0759	EA		16" 2-Way Butterfly Valve	5,366.73	296.05
15910-0760	EA		18" 2-Way Butterfly Valve	6,510.49	328.88
15910-0761	EA		2" 3-Way Butterfly Valve	725.19	67.28
15910-0762	EA		2-1/2" 3-Way Butterfly Valve	855.18	73.40
15910-0763	EA		3" 3-Way Butterfly Valve	1,057.10	85.89
15910-0764	EA		4" 3-Way Butterfly Valve	1,405.60	144.17
15910-0765	EA		5" 3-Way Butterfly Valve	2,623.19	182.31
15910-0766	EA		6" 3-Way Butterfly Valve	3,003.29	201.84
15910-0767	EA		8" 3-Way Butterfly Valve	3,715.92	230.70
15910-0768	EA		10" 3-Way Butterfly Valve	4,925.67	282.59
15910-0769	EA		12" 3-Way Butterfly Valve	4,607.53	342.53
15910-0770	EA		14" 3-Way Butterfly Valve	5,785.43	403.69
15910-0771	EA		16" 3-Way Butterfly Valve	10,552.42	444.06
15910-0772	EA		18" 3-Way Butterfly Valve	15,793.09	493.32

15910-0773 Rectangular Control Dampers (15910-0576)

Note: Excludes actuators.

15910-0774	EA		12" x 12" Low Leakage Volume Control Damper (Johnson Controls VOPSN-012X012)	127.01	25.89
15910-0775	EA		16" x 16" Low Leakage Volume Control Damper (Johnson Controls VOPSN-016X016)	166.30	34.51
15910-0776	EA		20" x 20" Low Leakage Volume Control Damper (Johnson Controls VOPSN-020X020)	206.50	43.14
15910-0777	EA		24" x 24" Low Leakage Volume Control Damper (Johnson Controls VOPSN-024X024)	246.69	51.77
15910-0778	EA		32" x 32" Low Leakage Volume Control Damper (Johnson Controls VOPSN-032X032)	314.88	60.40
15910-0779	EA		48" x 48" Low Leakage Volume Control Damper (Johnson Controls VOPSN-048X048)	461.06	69.03
15910-0780	EA		60" x 60" Low Leakage Volume Control Damper (Johnson Controls VOPSN-060X060)	830.22	77.66
15910-0781	EA		72" x 72" Low Leakage Volume Control Damper (Johnson Controls VOPSN-072X072)	1,050.74	86.29

15910-0782 Round Control Dampers (15910-0576)

Note: Excludes actuators.

15910-0783	EA		6" Diameter Round Low Leakage Volume Control Damper (Johnson Controls RCG06)	102.70	25.89
15910-0784	EA		8" Diameter Round Low Leakage Volume Control Damper (Johnson Controls RCG08)	104.53	25.89
15910-0785	EA		10" Diameter Round Low Leakage Volume Control Damper (Johnson Controls RCG10)	106.83	25.89
15910-0786	EA		12" Diameter Round Low Leakage Volume Control Damper (Johnson Controls RCG12)	111.87	25.89
15910-0787	EA		14" Diameter Round Low Leakage Volume Control Damper (Johnson Controls RCG14)	127.01	25.89
15910-0788	EA		16" Diameter Round Low Leakage Volume Control Damper (Johnson Controls RCG16)	146.11	34.51

15915 Control Air Compressor And Dryer (15900)

15915-0001 Air Cooled Service Air Compressor, 208 Volt (15915)

Note: Includes V-belt drive, receiver, motor, starter mounted and wired. Excludes piping, pressure reducing valve station, or air dryer. See CSI section 15915-0045 for compressed air dryers.

15915-0002 Single Stage Compressor (15915-0001)

Note: Includes receiver, reciprocating air cooled, 140 PSIG working pressure, splash lubricated, tank mounted.

15915-0003	EA		1/2 HP 1-Stage Air Compressor, 1.5 ACFM Air Cooled With 30 Gallon Receiver, 140 PSIG Working Pressure	1,247.81	222.63
15915-0004	EA		3/4 HP 1-Stage Air Compressor, 2.0 ACFM Air Cooled With 30 Gallon Receiver, 140 PSIG Working Pressure	1,317.29	256.95
15915-0005	EA		1 HP 1-Stage Air Compressor, 2.5 ACFM Air Cooled With 30 Gallon Receiver, 140 PSIG Working Pressure	1,508.88	303.44
15915-0006	EA		2 HP 1-Stage Air Compressor, Air Cooled With 30 Gallon Receiver, 140 PSIG Working Pressure	1,712.98	334.82
15915-0007	EA		3 HP 1-Stage Air Compressor, Air Cooled With 30 Gallon Receiver, 140 PSIG Working Pressure	2,064.21	353.64
15915-0008	EA		3 HP 1-Stage Air Compressor, Air Cooled With 60 Gallon Receiver, 140 PSIG Working Pressure	2,199.03	366.18
15915-0009	EA		5 HP 1-Stage Air Compressor, Air Cooled With 60 Gallon Receiver, 140 PSIG Working Pressure	2,473.47	418.52
15915-0010	EA		5 HP 1-Stage Air Compressor, Air Cooled With 80 Gallon Receiver, 140 PSIG Working Pressure	2,650.09	443.62
15915-0011	EA		7.5 HP 1-Stage Air Compressor, Air Cooled With 80 Gallon Receiver, 140 PSIG Working Pressure	3,162.88	502.23

15915-0012 Two Stage Compressor (15915-0001)

Note: With receiver, reciprocating air cooled, discharge pressure 80-200 PSIG, receiver capacity as noted, splash lubricated, tank mounted.

15915-0013	EA		1-1/2 HP 2-Stage Air Compressor, 60 Gallon Receiver, 5.0 ACFM, 80-200 PSIG Discharge Pressure	2,366.73	391.29
15915-0014	EA		2 HP 2-Stage Air Compressor, 60 Gallon Receiver, 7.0 ACFM, 80-200 PSIG Discharge Pressure	2,563.18	460.37
15915-0015	EA		3 HP 2-Stage Air Compressor, 60 Gallon Receiver, 12 ACFM, 80-200 PSIG Discharge Pressure	2,690.88	502.23
15915-0016	EA		5 HP 2-Stage Air Compressor, 80 Gallon Receiver, 15 ACFM, 80-200 PSIG Discharge Pressure	3,126.17	669.63
15915-0017	EA		5 HP 2-Stage Air Compressor, 120 Gallon Receiver, 16.5 ACFM, 80-200 PSI Max Discharge Pressure	3,341.17	669.63

MINOR CSI UOM DESCRIPTION

TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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15915-0018	EA	7.5 HP 2-Stage Air Compressor, 80 Gallon Receiver, 19.8 ACFM, 80-200 PSIG Discharge Pressure.....	3,652.93	837.04
15915-0019	EA	7.5 HP 2-Stage Air Compressor, 120 Gallon Receiver, 25.6 ACFM, 80-200 PSI Max Discharge Pressure.....	3,847.93	837.04
15915-0020	EA	10 HP 2-Stage Air Compressor, 80 Gallon Receiver, 35.0 ACFM, 80-200 PSI Max Discharge Pressure.....	4,918.67	1,035.32
15915-0021	EA	10 HP 2-Stage Air Compressor, 120 Gallon Receiver, 38 ACFM, 80-200 PSIG Discharge Pressure.....	5,300.35	1,066.69
15915-0022	EA	15 HP 2-Stage Air Compressor, 120 Gallon Receiver, 50 ACFM, 80-200 PSIG Discharge Pressure.....	5,720.05	1,246.65
15915-0023	EA	20 HP 2-Stage Air Compressor, 120 Gallon Receiver, 70 ACFM, 80-200 PSIG Discharge Pressure.....	8,362.73	1,411.17
15915-0024	EA	25 HP 2-Stage Air Compressor, 120 Gallon Receiver, 84.4 ACFM, 175 PSI Max Discharge Pressure.....	9,027.25	1,594.58
15915-0025	EA	30 HP 2-Stage Air Compressor, 120 Gallon Receiver, 97.2 ACFM, 175 PSI Max Discharge Pressure.....	10,052.85	1,762.36
15915-0026	EA	30 HP 2-Stage Air Compressor, 250 Gallon Receiver, 101 ACFM, 175 PSI Max Discharge Pressure.....	10,944.22	1,931.47

15915-0027 Rotary Screw Air Compressor, Base Mounted Without Receiver (15915-0001)

Note: Oil flooded.

15915-0028	EA	3 HP, 8.5 SCFM Rotary Screw Air Compressor With Enclosure, 150 PSIG Max Discharge Pressure, Lubricated.....	3,945.38	536.91
15915-0029	EA	5 HP, 16.6 SCFM Rotary Screw Air Compressor With Enclosure, 150 PSIG Max Discharge Pressure, Lubricated.....	4,459.51	715.88
15915-0030	EA	7.5 HP, 27 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	5,706.64	897.55
15915-0031	EA	10 HP, 37 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	6,663.33	1,143.79
15915-0032	EA	15 HP, 56 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	7,629.45	1,345.64
15915-0033	EA	20 HP, 79 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	9,205.57	1,513.85
15915-0034	EA	25 HP, 114 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	10,104.70	1,682.06
15915-0035	EA	30 HP, 137 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	12,072.84	1,883.90
15915-0036	EA	40 HP, 183 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	13,245.67	2,018.46
15915-0037	EA	50 HP, 214 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	14,825.21	2,175.23
15915-0038	EA	60 HP, 256 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	19,037.74	2,354.88
15915-0039	EA	75 HP, 320 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	21,065.56	2,489.44
15915-0040	EA	100 HP, 494 SCFM Rotary Screw Air Compressor With Enclosure, 100 PSIG Max Discharge Pressure, Lubricated.....	33,204.99	2,691.29
15915-0041	EA	125 HP, 592 SCFM Rotary Screw Air Compressor With Enclosure, 100 PSIG Max Discharge Pressure, Lubricated.....	41,215.29	2,909.96
15915-0042	EA	150 HP, 695 SCFM Rotary Screw Air Compressor With Enclosure, 100 PSIG Max Discharge Pressure, Lubricated.....	47,758.79	3,131.98
15915-0043	EA	220 HP, 996 SCFM Rotary Screw Air Compressor With Enclosure, 100 PSIG Max Discharge Pressure, Lubricated.....	61,796.46	3,364.11
15915-0044	EA	250 HP, 1000 SCFM Rotary Screw Air Compressor With Enclosure, 125 PSIG Max Discharge Pressure, Lubricated.....	70,098.58	3,579.41

15915-0045 Refrigerated Air Dryers With Ambient Air Filters (15915)

15915-0046	EA	3 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	462.97	56.47
15915-0047	EA	5 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	526.07	58.04
15915-0048	EA	7.5 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	669.16	59.61
15915-0049	EA	10 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	778.49	62.75
15915-0050	EA	15 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	866.14	70.59
15915-0051	EA	20 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	961.71	80.31
15915-0052	EA	30 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	1,361.91	101.96
15915-0053	EA	40 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	1,532.17	119.22
15915-0054	EA	50 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	1,665.51	127.38
15915-0055	EA	60 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	1,810.36	141.18
15915-0056	EA	75 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	2,038.73	156.87
15915-0057	EA	85 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	2,269.11	172.55
15915-0058	EA	100 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	2,389.14	191.37
15915-0059	EA	125 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	2,784.85	203.92
15915-0060	EA	175 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	3,352.54	211.77
15915-0061	EA	200 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	3,957.22	219.62
15915-0062	EA	250 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	4,396.51	227.45
15915-0063	EA	300 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	4,786.60	235.30
15915-0064	EA	400 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	5,348.98	250.98
15915-0065	EA	500 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	6,252.47	313.73
15915-0066	EA	600 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	7,905.96	376.48
15915-0067	EA	800 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	8,809.45	439.22
15915-0068	EA	1000 SCFM Capacity Refrigerated Air Dryers With Ambient Air Filters.....	10,363.94	501.98

15915-0069 Oil And Water Separator For Air Compressor (15915)

15915-0070	EA	0-60 SCFM Oil/Water Separator.....	477.10	21.53
15915-0071	EA	85 SCFM Oil/Water Separator.....	572.47	25.23
15915-0072	EA	190 SCFM Oil/Water Separator.....	669.19	28.60
15915-0073	EA	245 SCFM Oil/Water Separator.....	840.28	33.64
15915-0074	EA	320 SCFM Oil/Water Separator.....	998.74	40.37
15915-0075	EA	700 SCFM Oil/Water Separator.....	2,013.20	84.11

15915-0076 Heavy Duty Industrial Pressure Regulator (15915)

15915-0077	EA	3/8" Pressure Regulator, Max 300 PSI Input, 2-125 PSI Output.....	74.65	18.82
15915-0078	EA	1/2" Pressure Regulator, Max 300 PSI Input, 2-125 PSI Output.....	104.20	25.09
15915-0079	EA	3/4" Pressure Regulator, Max 300 PSI Input, 2-125 PSI Output.....	177.55	31.38
15915-0080	EA	1" Pressure Regulator, Max 300 PSI Input, 2-125 PSI Output.....	222.92	47.06
15915-0081	EA	1-1/4" Pressure Regulator, Max 300 PSI Input, 2-125 PSI Output.....	311.15	54.90
15915-0082	EA	1-1/2" Pressure Regulator, Max 300 PSI Input, 2-125 PSI Output.....	326.83	62.75

15915-0083 Combination Air System; Filter Regulator Lubricator (15915)

15915-0084	EA	3/8" Filter Regulator Lubricator, Max 150 PSI Input, 150 CFM, 40 Micron Filter.....	282.93	56.47
15915-0085	EA	1/2" Filter Regulator Lubricator, Max 150 PSI Input, 150 CFM, 40 Micron Filter.....	350.59	75.29



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
15915-0086 Heatless Desiccant Air Dryers (15915)				
15915-0087	EA	5 SCFM Heatless Desiccant Air Dryer	1,655.64	56.47
15915-0088	EA	10 SCFM Heatless Desiccant Air Dryer	1,990.49	62.75
15915-0089	EA	15 SCFM Heatless Desiccant Air Dryer	2,010.04	69.02
15915-0090	EA	20 SCFM Heatless Desiccant Air Dryer	2,295.90	78.43
15915-0091	EA	30 SCFM Heatless Desiccant Air Dryer	3,162.24	94.12
15915-0092	EA	50 SCFM Heatless Desiccant Air Dryer	3,123.98	125.49
15915-0093	EA	85 SCFM Heatless Desiccant Air Dryer	4,195.73	156.87
15915-0094	EA	100 SCFM Heatless Desiccant Air Dryer	4,453.28	188.24
15915-0095	EA	125 SCFM Heatless Desiccant Air Dryer	5,098.42	219.62
15915-0096	EA	175 SCFM Heatless Desiccant Air Dryer	5,854.48	250.98
15915-0097	EA	200 SCFM Heatless Desiccant Air Dryer	6,291.72	282.36
15915-0098	EA	300 SCFM Heatless Desiccant Air Dryer	7,692.47	313.73
15915-0099	EA	400 SCFM Heatless Desiccant Air Dryer	8,545.96	376.48
15915-0100	EA	500 SCFM Heatless Desiccant Air Dryer	9,877.45	439.22
15915-0101	EA	600 SCFM Heatless Desiccant Air Dryer	11,396.94	501.98
15915-0102 Air Cooled Aftercoolers (15915)				
15915-0103	EA	20 SCFM Air-Cooled Aftercooler	418.45	39.21
15915-0104	EA	35 SCFM Air-Cooled Aftercooler	565.13	47.06
15915-0105	EA	43 SCFM Air-Cooled Aftercooler	620.81	54.90
15915-0106	EA	70 SCFM Air-Cooled Aftercooler	758.49	62.75
15915-0107	EA	125 SCFM Air-Cooled Aftercooler	1,056.17	70.59
15915-0108	EA	185 SCFM Air-Cooled Aftercooler	1,185.87	78.43
15915-0109	EA	260 SCFM Air-Cooled Aftercooler	2,294.64	94.12
15915-0110	EA	365 SCFM Air-Cooled Aftercooler	2,399.22	109.81
15915-0111	EA	560 SCFM Air-Cooled Aftercooler	2,502.98	125.49
15915-0112	EA	650 SCFM Air-Cooled Aftercooler	2,935.16	141.18
15915-0113	EA	750 SCFM Air-Cooled Aftercooler	3,208.93	156.87
15915-0114	EA	900 SCFM Air-Cooled Aftercooler	3,679.51	172.55
15915-0115	EA	1100 SCFM Air-Cooled Aftercooler	4,722.88	188.24
15915-0116	EA	1460 SCFM Air-Cooled Aftercooler	5,401.85	203.92
15915-0117	EA	1800 SCFM Air-Cooled Aftercooler	5,578.22	219.62
15915-0118	EA	2500 SCFM Air-Cooled Aftercooler	5,981.60	235.30
15915-0119 Compressed Air Coalescing Filters (15915)				
15915-0120 1.0 Micron Filter Rated Compressed Air Coalescing Filters (15915-0119)				
15915-0121	EA	10 SCFM, 3/8", Coalescing Filter, 1.0 Micron Filter Rating	143.74	21.87
15915-0122	EA	20 SCFM, 3/8", Coalescing Filter, 1.0 Micron Filter Rating	171.74	21.87
15915-0123	EA	50 SCFM, 1/2", Coalescing Filter, 1.0 Micron Filter Rating	187.47	25.23
15915-0124	EA	75 SCFM, 3/4", Coalescing Filter, 1.0 Micron Filter Rating	215.86	28.93
15915-0125	EA	100 SCFM, 3/4", Coalescing Filter, 1.0 Micron Filter Rating	251.92	31.96
15915-0126	EA	140 SCFM, 1", Coalescing Filter, 1.0 Micron Filter Rating	285.37	38.68
15915-0127	EA	175 SCFM, 1-1/4" Coalescing Filter, 1.0 Micron Filter Rating	401.86	42.05
15915-0128	EA	250 SCFM, 1-1/2" Coalescing Filter, 1.0 Micron Filter Rating	372.92	50.47
15915-0129	EA	280 SCFM, 2" Coalescing Filter, 1.0 Micron Filter Rating	478.56	67.28
15915-0130	EA	350 SCFM, 2" Coalescing Filter, 1.0 Micron Filter Rating	547.39	75.69
15915-0131 0.01 Micron Filter Rated Compressed Air Coalescing Filters (15915-0119)				
15915-0132	EA	16 SCFM, 3/8" Coalescing Filter, 0.01 Micron Filter Rating	175.74	21.87
15915-0133	EA	30 SCFM, 1/2" Coalescing Filter, 0.01 Micron Filter Rating	190.46	25.23
15915-0134	EA	60 SCFM, 3/4" Coalescing Filter, 0.01 Micron Filter Rating	218.66	28.93
15915-0135	EA	100 SCFM, 1" Coalescing Filter, 0.01 Micron Filter Rating	257.52	28.60
15915-0136	EA	140 SCFM, 1-1/4" Coalescing Filter, 0.01 Micron Filter Rating	291.77	38.68
15915-0137	EA	180 SCFM, 1-1/4" Coalescing Filter, 0.01 Micron Filter Rating	331.11	42.05
15915-0138	EA	250 SCFM, 1-1/2" Coalescing Filter, 0.01 Micron Filter Rating	380.12	50.47
15915-0139	EA	280 SCFM, 2" Coalescing Filter, 0.01 Micron Filter Rating	490.56	67.28
15915-0140	EA	350 SCFM, 2" Coalescing Filter, 0.01 Micron Filter Rating	563.39	75.69
15915-0141 Compressed Air Storage Tanks (15915)				
15915-0142 Horizontal Compressed Air Storage Tanks (15915-0141)				
15915-0143	EA	12 Gallon Horizontal Compressed Air Storage Tank, ASME	240.40	50.20
15915-0144	EA	15 Gallon Horizontal Compressed Air Storage Tank, ASME	355.60	54.90
15915-0145	EA	20 Gallon Horizontal Compressed Air Storage Tank, ASME	376.60	57.72
15915-0146	EA	30 Gallon Horizontal Compressed Air Storage Tank, ASME	428.27	62.75
15915-0147	EA	60 Gallon Horizontal Compressed Air Storage Tank, ASME	560.08	84.70
15915-0148	EA	80 Gallon Horizontal Compressed Air Storage Tank, ASME	673.21	94.12
15915-0149	EA	120 Gallon Horizontal Compressed Air Storage Tank, ASME	998.63	109.81
15915-0150	EA	200 Gallon Horizontal Compressed Air Storage Tank, ASME	1,475.48	125.49
15915-0151	EA	240 Gallon Horizontal Compressed Air Storage Tank, ASME	1,642.66	133.34
15915-0152	EA	325 Gallon Horizontal Compressed Air Storage Tank, ASME	2,356.22	141.18
15915-0153	EA	400 Gallon Horizontal Compressed Air Storage Tank, ASME	3,096.72	164.71
15915-0154	EA	660 Gallon Horizontal Compressed Air Storage Tank, ASME	4,440.06	196.08
15915-0155 Vertical Compressed Air Storage Tanks (15915-0141)				
15915-0156	EA	10 Gallon Vertical Compressed Air Storage Tank, ASME	330.83	50.20

15000 Mechanical**15900 Controls And Instrumentation****15915 Control Air Compressor And Dryer**
 MINOR
 CSI UOM DESCRIPTION

 TOTAL DIRECT DEMOLITION
 UNIT COST UNIT COST

15915-0157	EA	15 Gallon Vertical Compressed Air Storage Tank, ASME.....	347.92	54.90
15915-0158	EA	20 Gallon Vertical Compressed Air Storage Tank, ASME.....	376.60	57.72
15915-0159	EA	30 Gallon Vertical Compressed Air Storage Tank, ASME.....	443.48	62.75
15915-0160	EA	60 Gallon Vertical Compressed Air Storage Tank, ASME.....	605.70	84.70
15915-0161	EA	80 Gallon Vertical Compressed Air Storage Tank, ASME.....	695.19	94.12
15915-0162	EA	120 Gallon Vertical Compressed Air Storage Tank, ASME.....	950.85	109.81
15915-0163	EA	200 Gallon Vertical Compressed Air Storage Tank, ASME.....	1,377.01	125.49
15915-0164	EA	240 Gallon Vertical Compressed Air Storage Tank, ASME.....	1,517.15	133.34
15915-0165	EA	325 Gallon Vertical Compressed Air Storage Tank, ASME.....	2,048.99	141.18
15915-0166	EA	400 Gallon Vertical Compressed Air Storage Tank, ASME.....	2,619.89	164.71
15915-0167	EA	500 Gallon Vertical Compressed Air Storage Tank, ASME.....	3,404.00	180.40
15915-0168	EA	660 Gallon Vertical Compressed Air Storage Tank, ASME.....	5,623.25	203.92

15917 Pneumatic Tubing (15900)

15917-0001	Tubing	<small>(15917)</small>		
15917-0002	Urethane Tubing, Fire Retardant	<small>(15917-0001)</small>		
15917-0003	LF	1/8" Outside Diameter x 1/16" Inside Diameter Urethane Tubing.....	1.09	0.53
15917-0004	LF	1/4" Outside Diameter x 1/8" Inside Diameter Urethane Tubing.....	1.16	0.53
15917-0005	LF	3/8" Outside Diameter x 1/4" Inside Diameter Urethane Tubing.....	1.21	0.53
15917-0006	Polyethylene Tubing	<small>(15917-0001)</small>		
15917-0007	LF	.17" Inside Diameter x .25" Outside Diameter Polyethylene Tubing.....	1.09	0.53
15917-0008	LF	.295" Inside Diameter x .375" Outside Diameter Polyethylene Tubing.....	1.16	0.53
15917-0009	LF	.375" Inside Diameter x .5" Outside Diameter Polyethylene Tubing.....	1.23	0.53
15917-0010	Nylon Tubing	<small>(15917-0001)</small>		
15917-0011	LF	.08" Inside Diameter x 1/8" Outside Diameter Nylon Tubing.....	1.19	0.53
15917-0012	LF	.18" Inside Diameter x 1/4" Outside Diameter Nylon Tubing.....	1.38	0.53
15917-0013	LF	.275" Inside Diameter x .3/8" Outside Diameter Nylon Tubing.....	1.61	0.53
15917-0014	Flexible Vinyl Tubing	<small>(15917-0001)</small>		
15917-0015	LF	1/4" Outside Diameter Flexible Vinyl Tubing.....	1.17	0.53
15917-0016	LF	3/8" Outside Diameter Flexible Vinyl Tubing.....	1.25	0.53
15917-0017	LF	1/2" Outside Diameter Flexible Vinyl Tubing.....	1.40	0.60
15917-0018	LF	5/8" Outside Diameter Flexible Vinyl Tubing.....	1.59	0.60
15917-0019	LF	3/4" Outside Diameter Flexible Vinyl Tubing.....	2.05	0.81
15917-0020	LF	1" Outside Diameter Flexible Vinyl Tubing.....	2.98	1.08
15917-0021	Braided Vinyl Tubing	<small>(15917-0001)</small>		
15917-0022	LF	5/8" Outside Diameter Braided Vinyl Tubing.....	2.32	0.60
15917-0023	LF	3/4" Outside Diameter Braided Vinyl Tubing.....	2.81	0.88
15917-0024	LF	1" Outside Diameter Braided Vinyl Tubing.....	3.19	1.01
15917-0025	Brass Tubing Accessories	<small>(15917)</small>		
15917-0026	Straight Coupling, Barb x Barb	<small>(15917-0025)</small>		
15917-0027	EA	1/4" x 1/4" Straight Coupling, Brass.....	6.34	3.02
15917-0028	EA	3/8" x 1/4" Straight Coupling, Brass.....	6.38	3.02
15917-0029	EA	3/8" x 3/8" Straight Coupling, Brass.....	6.43	3.02
15917-0030	Elbow Coupling, Barb x Barb	<small>(15917-0025)</small>		
15917-0031	EA	1/4" x 1/4" Elbow Coupling, Brass.....	6.60	3.02
15917-0032	EA	3/8" x 3/8" Elbow Coupling, Brass.....	6.75	3.02
15917-0033	Tee Coupling, Barb x Barb	<small>(15917-0025)</small>		
15917-0034	EA	1/4" x 1/4" x 1/4" Tee Coupling, Brass.....	10.14	4.71
15917-0035	EA	3/8" x 3/8" x 1/4" Tee Coupling, Brass.....	11.38	5.04
15917-0036	EA	3/8" x 3/8" x 3/8" Tee Coupling, Brass.....	11.21	5.04
15917-0037	Copper Tubing	<small>(15917)</small>		
15917-0038	LF	1/4" Outside Diameter Copper Tubing.....	3.64	
15917-0039	LF	3/8" Outside Diameter Copper Tubing.....	4.24	
15917-0040	LF	1/2" Outside Diameter Copper Tubing.....	4.89	
15917-0041	LF	5/8" Outside Diameter Copper Tubing.....	5.44	
15917-0042	LF	3/4" Outside Diameter Copper Tubing.....	7.60	

END OF SECTION 15



MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

16000 Electrical

Note: Termination costs are included with all electrical equipment, panel boards, fixtures and devices. Terminations are not included with patch panels where the number of terminations is not known.

16100 Basic Materials And Methods (16000)

16101 General (16100)

16101-0001 Lock Out/Tag Out Devices (16101)

Note: Includes the installation and removal of identifying markers and securing equipment.

16101-0002	EA	Lock Out/Tag Out Local Disconnect.....	16.37	
16101-0003	EA	Lock Out/Tag Out Breaker Or Motor Starter.....	24.47	
16101-0004	EA	Lock Out/Tag Out Tags.....	2.07	
16101-0005	EA	Existing Circuit Tracing Per Device.....	13.62	

16101-0006 Temporary Light And Power System (16101)

16101-0007 Service Switch And/Or Building Feeder Switch (16101-0006)

Note: Includes fuses.

16101-0008	EA	Temporary 30 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	426.43	148.23
16101-0009	EA	Temporary 60 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	520.74	196.60
16101-0010	EA	Temporary 100 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	824.69	215.16
16101-0011	EA	Temporary 200 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	1,222.98	334.83
16101-0012	EA	Temporary 400 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	2,353.64	555.74
16101-0013	EA	Temporary 600 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	4,197.84	741.02
16101-0014	EA	Temporary 800 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	6,102.83	840.24
16101-0015	EA	Temporary 1200 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	9,964.89	1,280.36
16101-0016	EA	Temporary 2000 A, 240 V, NEMA 3R Service Switch Or Building Feeder Switch With Fuses.....	14,052.10	1,920.61

16101-0017 Panelboard Complete With Branch Fuses 120/208V (16101-0006)

Note: Main lug.

16101-0018	EA	Temporary 100 A Panelboard Complete With Up To 24 Branch Circuits, 120/208 V.....	966.94	145.48
16101-0019	EA	Temporary 200 A Panelboard Complete With Up To 42 Branch Circuits, 120/208 V.....	1,228.77	266.79
16101-0020	EA	Temporary 400 A Panelboard Complete With Up To 42 Branch Circuits, 120/208 V.....	1,955.36	400.13
16101-0021	EA	Temporary 600 A Panelboard Complete With Up To 42 Branch Circuits, 120/208 V.....	2,593.04	666.91

16101-0022 Temporary Devices (16101-0006)

16101-0023	EA	Temporary Exit Light.....	106.93	29.88
16101-0024	EA	Temporary Light Socket With Branch Wiring Connection And Lamp.....	13.97	6.21
16101-0025	EA	Temporary 10 Light String.....	38.60	14.05
16101-0026	EA	Temporary GFI Device With Enclosure.....	114.56	40.06
16101-0027	EA	Temporary Trailer Socket With Branch Wiring.....	43.81	14.51
16101-0028	EA	Temporary Auditorium Drop Light Complete With Branch Wiring.....	55.66	13.07

16101-0029 Cord Grip Plug (16101-0006)

Note: Includes installation, a maximum of 50' of cord and connection to source.

16101-0030	EA	Temporary 2 - Pole Cord Grip Plug With Installation.....	94.90	40.06
16101-0031	EA	Temporary 3 - Pole Cord Grip Plug With Installation.....	139.98	61.63
16101-0032	EA	Temporary 4 - Pole Cord Grip Plug With Installation.....	179.88	80.00
16101-0033	EA	Temporary 3 - Pole (30 A) Cord Grip Plug With Installation.....	136.91	61.63
16101-0034	EA	Temporary 4 - Pole (30 A) Cord Grip Plug With Installation.....	174.98	80.00
16101-0035	EA	Temporary 3 - Pole (50 A) Cord Grip Plug With Installation.....	151.72	61.63

16101-0036 Conduit Markers Pressure-Sensitive (16101)

Note: Stick-on, includes arrow tape.

16101-0037	EA	1/2" Outside Diameter Pressure Sensitive Marker Stick-on.....	7.49	
16101-0038	EA	3/4" Outside Diameter Pressure Sensitive Marker Stick-on.....	7.81	
16101-0039	EA	1" Outside Diameter Pressure Sensitive Marker Stick-on.....	8.47	
16101-0040	EA	1-1/4" Outside Diameter Pressure Sensitive Marker Stick-on.....	8.60	
16101-0041	EA	1-1/2" Outside Diameter Pressure Sensitive Marker Stick-on.....	8.73	
16101-0042	EA	2" Outside Diameter Pressure Sensitive Marker Stick-on.....	8.93	
16101-0043	EA	2-1/2" Outside Diameter Pressure Sensitive Marker Stick-on.....	10.55	
16101-0044	EA	3" Outside Diameter Pressure Sensitive Marker Stick-on.....	10.81	
16101-0045	EA	3-1/2" Outside Diameter Pressure Sensitive Marker Stick-on.....	11.00	
16101-0046	EA	4" Outside Diameter Pressure Sensitive Marker Stick-on.....	11.20	
16101-0047	EA	4-1/2" Outside Diameter Pressure Sensitive Marker Stick-on.....	11.61	
16101-0048	EA	5" Outside Diameter Pressure Sensitive Marker Stick-on.....	12.05	
16101-0049	EA	6" Outside Diameter Pressure Sensitive Marker Stick-on.....	12.43	
16101-0050	EA	7" Outside Diameter Pressure Sensitive Marker Stick-on.....	12.82	
16101-0051	EA	8" Outside Diameter Pressure Sensitive Marker Stick-on.....	14.12	
16101-0052	EA	10" Outside Diameter Pressure Sensitive Marker Stick-on.....	14.84	

16101-0053 Labeling Electrical Wires (16101)

16101-0054	EA	Labeling Wire.....	1.41	
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MINOR
 CSI UOM DESCRIPTION

 TOTAL DIRECT DEMOLITION
 UNIT COST UNIT COST

16102 Cable Installation Methods (16100)

16102-0001	Pull Cord <small>(16102)</small>		
	Note: Left in conduit for others to pull cable. Not to be used when contractor has priced new wire in a conduit. Priced when owner wants a pull cord left in a conduit for owner to pull wire at a later time.		
16102-0002	LF 1/4" Nylon Pull Cord Installed To Remain In Place, In Existing Conduit.....	0.58	
16102-0003	LF 1/4" Nylon Pull Cord Installed To Remain In Place, In New Conduits.....	0.14	
16102-0004	Bore Conduit Into Dirt Or Sand <small>(16102)</small>		
	Note: For installation under roads, driveways or other structures up to 20'.		
16102-0005	LF Bore 1" To 4" Conduit Into Dirt Or Sand.....	2.20	
16102-0006	LF Bore 5" To 8" Conduit Into Dirt Or Sand.....	2.79	
16102-0007	EA Boring Minimum Set-Up Charge.....	307.72	
	Note: For projects where the total boring charge is less than the minimum set-up charge. Use this item exclusively. This item should not be used in conjunction with any other items in this section.		

16120 Wire And Cable (16100)

Note: Pulled in conduit except as noted. Includes pull wires, pulling branch circuit conductors, testing, and splicing (#8 and lighter). All conductors are copper except as otherwise noted. No special set-up is required. Excludes terminations.

16120-0001	Solid Conductor Low Voltage Cable <small>(16120)</small>		
16120-0002	Low Voltage Cable, Pulled In Conduit <small>(16120-0001)</small>		
16120-0003	#12 AWG Low Voltage Cable, Pulled In Conduit <small>(16120-0002)</small>		
16120-0004	MLF 1 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	1,817.91	591.55
	16MOD-0001 For #10 AWG, Add	471.73	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-197.20	
16120-0005	MLF 2 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,556.25	612.47
	16MOD-0001 For #10 AWG, Add	710.82	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-204.21	
16120-0006	MLF 3 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	3,195.14	633.98
	16MOD-0001 For #10 AWG, Add	917.07	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-211.26	
16120-0007	MLF 4 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	3,873.25	655.49
	16MOD-0001 For #10 AWG, Add	1,136.11	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-218.56	
16120-0008	MLF 5 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,550.57	699.70
	16MOD-0001 For #10 AWG, Add	1,350.04	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-233.30	
16120-0009	MLF 6 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	5,158.53	743.32
	16MOD-0001 For #10 AWG, Add	1,541.22	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-247.84	
16120-0010	MLF 8 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	5,513.28	831.75
	16MOD-0001 For #10 AWG, Add	1,639.20	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-277.20	
16120-0011	MLF 12 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	7,330.12	1,096.45
	16MOD-0001 For #10 AWG, Add	2,181.42	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-365.41	
16120-0012	MLF 24 Pair #12 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	10,952.69	1,619.29
	16MOD-0001 For #10 AWG, Add	3,263.63	
	16MOD-0002 For Installation On Exposed Surface, Deduct	-539.62	
16120-0013	#14 AWG Low Voltage Cable, Pulled In Conduit <small>(16120-0002)</small>		
16120-0014	MLF 1 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	1,553.43	517.46
	16MOD-0002 For Installation On Exposed Surface, Deduct	-172.45	
16120-0015	MLF 2 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,168.79	535.98
	16MOD-0002 For Installation On Exposed Surface, Deduct	-178.66	
16120-0016	MLF 3 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,701.39	554.50
	16MOD-0002 For Installation On Exposed Surface, Deduct	-184.87	
16120-0017	MLF 4 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	3,266.15	573.62
	16MOD-0002 For Installation On Exposed Surface, Deduct	-191.21	
16120-0018	MLF 5 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	3,832.19	612.47
	16MOD-0002 For Installation On Exposed Surface, Deduct	-204.11	
16120-0019	MLF 6 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,340.24	650.70
	16MOD-0002 For Installation On Exposed Surface, Deduct	-216.78	
16120-0020	MLF 8 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,642.08	727.78
	16MOD-0002 For Installation On Exposed Surface, Deduct	-242.59	
16120-0021	MLF 12 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	6,170.52	959.02
	16MOD-0002 For Installation On Exposed Surface, Deduct	-319.67	
16120-0022	MLF 24 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	9,219.64	1,416.73
	16MOD-0002 For Installation On Exposed Surface, Deduct	-472.28	
16120-0023	#16 AWG Low Voltage Cable, Pulled In Conduit <small>(16120-0002)</small>		
16120-0024	MLF 1 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	1,378.88	461.88
	16MOD-0002 For Installation On Exposed Surface, Deduct	-154.04	
16120-0025	MLF 2 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,226.49	478.62
	16MOD-0002 For Installation On Exposed Surface, Deduct	-159.54	
16120-0026	MLF 3 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,791.21	495.34
	16MOD-0002 For Installation On Exposed Surface, Deduct	-165.04	
16120-0027	MLF 4 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	3,034.21	512.08
	16MOD-0002 For Installation On Exposed Surface, Deduct	-170.77	
16120-0028	MLF 5 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,126.01	546.73
	16MOD-0002 For Installation On Exposed Surface, Deduct	-182.24	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0029	MLF	6 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,539.97	580.79
	16MOD-0002	For Installation On Exposed Surface, Deduct	-193.60	
16120-0030	MLF	7 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	5,383.18	615.45
	16MOD-0002	For Installation On Exposed Surface, Deduct	-205.07	
16120-0031	MLF	8 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	6,226.98	650.11
	16MOD-0002	For Installation On Exposed Surface, Deduct	-216.66	
16120-0032	MLF	9 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	6,832.92	691.33
	16MOD-0002	For Installation On Exposed Surface, Deduct	-230.40	
16120-0033	MLF	25 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	11,517.17	1,295.43
	16MOD-0002	For Installation On Exposed Surface, Deduct	-431.71	
16120-0034		#18 AWG Low Voltage Cable, Pulled In Conduit (16120-0002)		
16120-0035	MLF	1 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	1,426.28	406.92
	16MOD-0002	For Installation On Exposed Surface, Deduct	-135.52	
16120-0036	MLF	2 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,125.17	421.25
	16MOD-0002	For Installation On Exposed Surface, Deduct	-140.42	
16120-0037	MLF	3 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,692.62	435.59
	16MOD-0002	For Installation On Exposed Surface, Deduct	-145.32	
16120-0038	MLF	4 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,891.43	450.53
	16MOD-0002	For Installation On Exposed Surface, Deduct	-150.22	
16120-0039	MLF	5 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,105.97	481.01
	16MOD-0002	For Installation On Exposed Surface, Deduct	-160.37	
16120-0040	MLF	6 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,744.12	510.88
	16MOD-0002	For Installation On Exposed Surface, Deduct	-170.41	
16120-0041	MLF	8 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	5,325.17	571.83
	16MOD-0002	For Installation On Exposed Surface, Deduct	-190.61	
16120-0042	MLF	12 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	6,896.74	753.48
	16MOD-0002	For Installation On Exposed Surface, Deduct	-251.20	
16120-0043	MLF	24 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	11,142.50	1,113.19
	16MOD-0002	For Installation On Exposed Surface, Deduct	-371.06	
16120-0044		#20 AWG Low Voltage Cable, Pulled In Conduit (16120-0002)		
16120-0045	MLF	1 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	930.39	369.87
	16MOD-0002	For Installation On Exposed Surface, Deduct	-123.21	
16120-0046	MLF	2 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	1,341.12	383.01
	16MOD-0002	For Installation On Exposed Surface, Deduct	-127.63	
16120-0047	MLF	4 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	1,948.89	409.91
	16MOD-0002	For Installation On Exposed Surface, Deduct	-136.59	
16120-0048	MLF	6 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,363.18	464.87
	16MOD-0002	For Installation On Exposed Surface, Deduct	-154.88	
16120-0049	MLF	8 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	2,778.14	519.84
	16MOD-0002	For Installation On Exposed Surface, Deduct	-173.28	
16120-0050	MLF	12 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	4,056.62	685.36
	16MOD-0002	For Installation On Exposed Surface, Deduct	-228.37	
16120-0051	MLF	24 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	6,244.68	1,012.21
	16MOD-0002	For Installation On Exposed Surface, Deduct	-337.36	
16120-0052	MLF	25 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	6,799.07	1,036.11
	16MOD-0002	For Installation On Exposed Surface, Deduct	-345.37	
16120-0053	MLF	36 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	8,225.94	1,206.40
	16MOD-0002	For Installation On Exposed Surface, Deduct	-402.13	
16120-0054	MLF	40 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	8,839.05	1,291.25
	16MOD-0002	For Installation On Exposed Surface, Deduct	-430.45	
16120-0055	MLF	50 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	10,262.07	1,613.91
	16MOD-0002	For Installation On Exposed Surface, Deduct	-537.89	
16120-0056	MLF	100 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Alarm And Communications Cable.....	14,256.88	2,124.79
	16MOD-0002	For Installation On Exposed Surface, Deduct	-708.18	
16120-0057		Triad (16120-0002)		
16120-0058	MLF	1 Triad #16.....	3,082.68	495.34
16120-0059	MLF	4 Triad #20.....	3,856.59	685.36
16120-0060	MLF	8 Triad #20.....	6,258.96	1,012.21
16120-0061	MLF	12 Triad #20.....	8,011.62	1,206.40
16120-0062	MLF	24 Triad #20.....	13,545.10	1,869.05
16120-0063	MLF	36 Triad #20.....	15,685.68	2,124.79
16120-0064		Low Voltage Cable Buried In Trench (16120-0001)		
		Note: Excludes excavation.		
16120-0065	MLF	1 Pair #14 AWG, Solid, Low Voltage, Direct Burial, Alarm And Communications Cable.....	1,111.31	
16120-0066	MLF	2 Pair #14 AWG, Solid, Low Voltage, Direct Burial, Alarm And Communications Cable.....	1,152.74	
16120-0067	MLF	3 Pair #14 AWG, Solid, Low Voltage, Direct Burial, Alarm And Communications Cable.....	1,409.86	
16120-0068	MLF	4 Pair #14 AWG, Solid, Low Voltage, Direct Burial, Alarm And Communications Cable.....	1,523.31	
16120-0069	MLF	5 Pair #14 AWG, Solid, Low Voltage, Direct Burial, Alarm And Communications Cable.....	1,726.30	
16120-0070	MLF	6 Pair #14 AWG, Solid, Low Voltage, Direct Burial, Alarm And Communications Cable.....	1,808.83	
16120-0071		Low Voltage Cable Installed On Poles, Aerially (16120-0001)		
16120-0072	MLF	1 Pair #14 AWG, Solid, Low Voltage, On Poles, Alarm And Communications Cable.....	1,135.95	306.95
16120-0073	MLF	2 Pair #14 AWG, Solid, Low Voltage, On Poles, Alarm And Communications Cable.....	1,206.13	328.85
16120-0074	MLF	3 Pair #14 AWG, Solid, Low Voltage, On Poles, Alarm And Communications Cable.....	1,653.64	415.74
16120-0075	MLF	4 Pair #14 AWG, Solid, Low Voltage, On Poles, Alarm And Communications Cable.....	1,902.47	480.85
16120-0076	MLF	5 Pair #14 AWG, Solid, Low Voltage, On Poles, Alarm And Communications Cable.....	2,218.06	548.06
16120-0077	MLF	6 Pair #14 AWG, Solid, Low Voltage, On Poles, Alarm And Communications Cable.....	2,626.05	700.19

MINOR CSI UOM DESCRIPTION		TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0078	Non-Shielded Low Voltage Cable Pulled In Conduit ⁽¹⁶¹²⁰⁻⁰⁰⁰¹⁾		
16120-0079	MLF 4 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	3,313.56	573.62
	16MOD-0003 For Installation On Exposed Surface, Deduct	-191.21	
16120-0080	MLF 8 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	4,642.08	727.78
	16MOD-0003 For Installation On Exposed Surface, Deduct	-242.59	
16120-0081	MLF 12 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	6,170.52	959.02
	16MOD-0003 For Installation On Exposed Surface, Deduct	-319.67	
16120-0082	MLF 24 Pair #14 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	9,219.64	1,416.73
	16MOD-0003 For Installation On Exposed Surface, Deduct	-472.28	
16120-0083	MLF 1 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,184.56	461.88
	16MOD-0003 For Installation On Exposed Surface, Deduct	-154.04	
16120-0084	MLF 2 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,540.67	478.62
	16MOD-0003 For Installation On Exposed Surface, Deduct	-159.54	
16120-0085	MLF 3 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,739.61	495.34
	16MOD-0003 For Installation On Exposed Surface, Deduct	-165.04	
16120-0086	MLF 4 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	2,025.47	512.08
	16MOD-0003 For Installation On Exposed Surface, Deduct	-170.77	
16120-0087	MLF 5 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	2,310.85	546.14
	16MOD-0003 For Installation On Exposed Surface, Deduct	-182.13	
16120-0088	MLF 6 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	2,596.81	580.79
	16MOD-0003 For Installation On Exposed Surface, Deduct	-193.60	
16120-0089	MLF 7 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	2,997.09	615.45
	16MOD-0003 For Installation On Exposed Surface, Deduct	-205.07	
16120-0090	MLF 8 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	3,312.24	650.11
	16MOD-0003 For Installation On Exposed Surface, Deduct	-216.66	
16120-0091	MLF 9 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	3,752.37	691.33
	16MOD-0003 For Installation On Exposed Surface, Deduct	-230.39	
16120-0092	MLF 25 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	6,966.56	1,264.95
	16MOD-0003 For Installation On Exposed Surface, Deduct	-421.73	
16120-0093	MLF 1 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,029.79	406.31
	16MOD-0003 For Installation On Exposed Surface, Deduct	-135.52	
16120-0094	MLF 2 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,333.62	421.25
	16MOD-0003 For Installation On Exposed Surface, Deduct	-140.42	
16120-0095	MLF 3 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,503.86	436.19
	16MOD-0003 For Installation On Exposed Surface, Deduct	-145.32	
16120-0096	MLF 4 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,746.96	450.53
	16MOD-0003 For Installation On Exposed Surface, Deduct	-150.22	
16120-0097	MLF 5 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,992.06	481.01
	16MOD-0003 For Installation On Exposed Surface, Deduct	-160.37	
16120-0098	MLF 6 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	2,236.58	511.48
	16MOD-0003 For Installation On Exposed Surface, Deduct	-170.41	
16120-0099	MLF 8 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	2,847.64	571.83
	16MOD-0003 For Installation On Exposed Surface, Deduct	-190.61	
16120-0100	MLF 12 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	3,659.23	753.48
	16MOD-0003 For Installation On Exposed Surface, Deduct	-251.20	
16120-0101	MLF 24 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	5,498.74	1,113.19
	16MOD-0003 For Installation On Exposed Surface, Deduct	-371.06	
16120-0102	MLF 1 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	864.66	369.87
	16MOD-0003 For Installation On Exposed Surface, Deduct	-123.21	
16120-0103	MLF 2 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,123.94	383.01
	16MOD-0003 For Installation On Exposed Surface, Deduct	-127.63	
16120-0104	MLF 4 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	1,640.26	409.91
	16MOD-0003 For Installation On Exposed Surface, Deduct	-136.59	
16120-0105	MLF 8 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	2,723.85	519.84
	16MOD-0003 For Installation On Exposed Surface, Deduct	-173.28	
16120-0106	MLF 12 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	3,342.22	685.36
	16MOD-0003 For Installation On Exposed Surface, Deduct	-228.37	
16120-0107	MLF 24 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	5,115.92	1,012.21
	16MOD-0003 For Installation On Exposed Surface, Deduct	-337.36	
16120-0108	MLF 25 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	5,727.47	1,036.11
	16MOD-0003 For Installation On Exposed Surface, Deduct	-345.37	
16120-0109	MLF 36 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	7,582.98	1,206.40
	16MOD-0003 For Installation On Exposed Surface, Deduct	-402.13	
16120-0110	MLF 40 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	7,981.77	1,291.25
	16MOD-0003 For Installation On Exposed Surface, Deduct	-430.45	
16120-0111	MLF 50 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	10,690.71	1,613.91
	16MOD-0003 For Installation On Exposed Surface, Deduct	-537.89	
16120-0112	MLF 100 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Non-Shielded.....	13,828.24	2,124.79
	16MOD-0003 For Installation On Exposed Surface, Deduct	-708.18	
16120-0113	MLF 1 Single #16 TC.....	1,055.97	461.88
	16MOD-0003 For Installation On Exposed Surface, Deduct	-154.04	
16120-0114	MLF 24 Single #16 TC.....	5,002.80	1,264.95
	16MOD-0003 For Installation On Exposed Surface, Deduct	-421.61	
16120-0115	MLF 3 Single #14 TC.....	1,501.60	554.50
	16MOD-0003 For Installation On Exposed Surface, Deduct	-184.87	
16120-0116	MLF 4 Single #14 TC.....	1,664.72	573.62
	16MOD-0003 For Installation On Exposed Surface, Deduct	-191.21	
16120-0117	MLF 6 Single #14 TC.....	2,155.50	650.70
	16MOD-0003 For Installation On Exposed Surface, Deduct	-216.78	
16120-0118	MLF 7 Single #14 TC.....	2,328.63	688.94
	16MOD-0003 For Installation On Exposed Surface, Deduct	-229.69	
16120-0119	MLF 9 Single #14 TC.....	3,276.66	718.58
	16MOD-0003 For Installation On Exposed Surface, Deduct	-359.28	
16120-0120	MLF 12 Single #14 TC.....	3,670.13	959.02
	16MOD-0003 For Installation On Exposed Surface, Deduct	-319.67	
16120-0121	MLF 24 Single #14 TC.....	6,290.61	1,416.73
	16MOD-0003 For Installation On Exposed Surface, Deduct	-472.28	



MINOR CSI UOM DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16120-0122	MLF 37 Single #14 TC 16MOD-0003 For Installation On Exposed Surface, Deduct	9,258.46 -569.20	1,707.72
16120-0123	MLF 3 Single #12 TC 16MOD-0003 For Installation On Exposed Surface, Deduct	1,828.80 -204.59	614.25
16120-0124	MLF 3 Single #10 TC 16MOD-0003 For Installation On Exposed Surface, Deduct	2,316.62 -224.43	673.40

16120-0125 Plenum Rated Low Voltage Cable (16120-0001)

16120-0126	MLF 1 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,469.58	461.88
16120-0127	MLF 2 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,440.81	478.62
16120-0128	MLF 3 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	3,086.11	495.34
16120-0129	MLF 4 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	3,361.26	512.08
16120-0130	MLF 5 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	4,608.23	546.14
16120-0131	MLF 6 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	5,075.77	580.79
16120-0132	MLF 8 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	6,998.53	650.11
16120-0133	MLF 12 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	8,285.26	856.25
16120-0134	MLF 24 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	12,871.07	1,264.95
16120-0135	MLF 1 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,205.72	406.31
16120-0136	MLF 2 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,995.92	421.25
16120-0137	MLF 3 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,628.38	436.19
16120-0138	MLF 4 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,879.59	450.53
16120-0139	MLF 5 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	3,935.84	481.01
16120-0140	MLF 6 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	4,663.83	511.48
16120-0141	MLF 8 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	5,315.24	571.83
16120-0142	MLF 12 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	6,744.25	753.48
16120-0143	MLF 24 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	11,536.97	1,113.19
16120-0144	MLF 1 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	977.54	369.87
16120-0145	MLF 2 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,446.56	383.01
16120-0146	MLF 3 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,897.68	396.16
16120-0147	MLF 4 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,138.77	409.91
16120-0148	MLF 5 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,403.16	437.39
16120-0149	MLF 6 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,732.56	464.87
16120-0150	MLF 8 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	3,064.90	519.84
16120-0151	MLF 12 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	4,493.83	685.36
16120-0152	MLF 24 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	7,071.23	1,012.21
16120-0153	MLF 25 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	7,718.50	1,036.11
16120-0154	MLF 36 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	9,335.79	1,206.40
16120-0155	MLF 40 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	10,051.74	1,291.25
16120-0156	MLF 50 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	11,635.39	1,613.91
16120-0157	MLF 100 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	16,200.28	2,124.79
16120-0158	MLF 250 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	33,244.71	3,913.77
16120-0159	MLF 500 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	55,906.25	5,179.33
16120-0160	MLF 750 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	78,258.80	6,526.75
16120-0161	MLF 1200 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	112,204.04	8,952.68
16120-0162	MLF 1 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	847.29	369.87
16120-0163	MLF 2 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,155.26	383.01
16120-0164	MLF 3 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,451.82	396.16
16120-0165	MLF 4 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,614.21	409.91
16120-0166	MLF 5 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	1,799.92	437.39
16120-0167	MLF 6 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,026.98	464.87
16120-0168	MLF 8 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	2,272.72	519.84
16120-0169	MLF 12 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	3,286.05	685.36
16120-0170	MLF 24 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	5,131.12	1,012.21
16120-0171	MLF 25 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	5,559.57	1,036.11
16120-0172	MLF 36 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	6,707.47	1,206.40
16120-0173	MLF 40 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	7,205.37	1,291.25
16120-0174	MLF 50 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	8,411.94	1,613.91
16120-0175	MLF 100 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	11,638.83	2,124.79
16120-0176	MLF 250 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	23,591.48	3,913.77
16120-0177	MLF 500 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	38,863.31	5,179.33
16120-0178	MLF 750 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	53,965.94	6,526.75
16120-0179	MLF 1200 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated	77,132.86	8,952.68

16120-0180 Non-Shielded Plenum Rated Low Voltage Cable (16120-0001)

16120-0181	MLF 1 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,246.71	461.88
16120-0182	MLF 2 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,652.11	478.62
16120-0183	MLF 3 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,876.78	495.34
16120-0184	MLF 4 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,200.62	512.08
16120-0185	MLF 5 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,521.48	546.14
16120-0186	MLF 6 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,841.13	580.79
16120-0187	MLF 8 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	3,646.57	650.11
16120-0188	MLF 12 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	4,680.85	856.25
16120-0189	MLF 24 Pair #16 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	7,038.00	1,264.95
16120-0190	MLF 1 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,082.63	406.31
16120-0191	MLF 2 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,428.35	421.25
16120-0192	MLF 3 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,620.45	436.19
16120-0193	MLF 4 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,896.36	450.53
16120-0194	MLF 5 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,170.60	481.01
16120-0195	MLF 6 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,444.27	511.48
16120-0196	MLF 8 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	3,131.82	571.83
16120-0197	MLF 12 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	4,021.37	753.48
16120-0198	MLF 24 Pair #18 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	6,045.26	1,113.19
16120-0199	MLF 1 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	901.95	369.87

MINOR
 CSI UOM DESCRIPTION

 TOTAL DIRECT DEMOLITION
 UNIT COST UNIT COST

16120-0200	MLF 2 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,196.81	383.01
16120-0201	MLF 3 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,386.52	396.16
16120-0202	MLF 4 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,775.29	409.91
16120-0203	MLF 5 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,050.05	437.39
16120-0204	MLF 6 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,688.29	464.87
16120-0205	MLF 8 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	3,002.46	519.84
16120-0206	MLF 12 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	3,672.27	685.36
16120-0207	MLF 24 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	5,630.29	1,012.21
16120-0208	MLF 25 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	6,112.74	1,036.11
16120-0209	MLF 36 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	7,385.36	1,206.40
16120-0210	MLF 40 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	7,934.69	1,291.25
16120-0211	MLF 50 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	9,237.86	1,613.91
16120-0212	MLF 100 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	12,807.57	2,124.79
16120-0213	MLF 250 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	26,068.03	3,913.77
16120-0214	MLF 500 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	43,233.89	5,179.33
16120-0215	MLF 750 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	60,197.27	6,526.75
16120-0216	MLF 1200 Pair #20 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	86,127.01	8,952.09
16120-0217	MLF 1 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	798.93	369.87
16120-0218	MLF 2 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	995.52	383.01
16120-0219	MLF 3 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,124.85	396.16
16120-0220	MLF 4 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,381.70	409.91
16120-0221	MLF 5 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,574.04	437.39
16120-0222	MLF 6 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	1,998.69	464.87
16120-0223	MLF 8 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,232.81	519.84
16120-0224	MLF 12 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	2,760.52	685.36
16120-0225	MLF 24 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	4,209.37	1,012.21
16120-0226	MLF 25 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	4,532.40	1,036.11
16120-0227	MLF 36 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	5,448.72	1,206.40
16120-0228	MLF 40 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	5,851.15	1,291.25
16120-0229	MLF 50 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	6,878.31	1,613.91
16120-0230	MLF 100 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	9,468.58	2,124.79
16120-0231	MLF 250 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	19,001.20	3,913.77
16120-0232	MLF 500 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	30,757.92	5,179.33
16120-0233	MLF 750 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	42,415.35	6,526.75
16120-0234	MLF 1200 Pair #22 AWG, Solid, Low Voltage, Placed In Conduit, Plenum Rated, Non-Shielded	60,456.07	8,952.68

16120-0235 Telecommunications Cable (16120)
16120-0236 Indoor Telecommunications Cable (16120-0235)

Note: Telecommunications cable installed in conduit includes pull wires and installation in conduit, innerduct, wiremold, etc. Telecommunications cable installed exposed includes installation on exposed surfaces, uncovered wireways, cable trays, etc. Shielded twisted pair cables (STP) include a metallic foil wrap. Un-shielded twisted pair cables (UTP) exclude any shielding.

16120-0237 Category 3, Indoor Telecommunications Cable (16120-0236)

Note: Un-shielded twisted pair cables (UTP).

16120-0238 Category 3, Indoor Telecommunications Riser Cable (16120-0237)
16120-0239 24 AWG, Category 3, Indoor Telecommunications Riser Cable (16120-0238)
16120-0240 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit (16120-0239)

16120-0241	MLF 2-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	537.79	274.50
16120-0242	MLF 3-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	571.95	274.50
16120-0243	MLF 4-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	583.90	274.50
16120-0244	MLF 6-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	717.58	313.72
16120-0245	MLF 12-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	968.65	313.72
16120-0246	MLF 25-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	1,368.33	313.72
16120-0247	MLF 50-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	2,253.99	392.14
16120-0248	MLF 100-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	4,128.70	627.44
16120-0249	MLF 150-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	5,687.31	705.86
16120-0250	MLF 200-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	7,660.97	784.30
16120-0251	MLF 300-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	11,237.77	1,098.02
16120-0252	MLF 400-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	14,784.55	1,356.83
16120-0253	MLF 600-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	23,170.48	1,882.30
16120-0254	MLF 900-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	37,196.27	3,764.61
16120-0255	MLF 1200-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	50,239.93	5,646.92

16120-0256 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed

Exposed (16120-0239)

16120-0257	MLF 2-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	995.29	549.01
16120-0258	MLF 3-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	1,029.45	549.01
16120-0259	MLF 4-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	1,041.40	549.01
16120-0260	MLF 6-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	1,109.73	549.01
16120-0261	MLF 12-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	1,360.80	549.01
16120-0262	MLF 25-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	1,891.20	627.44
16120-0263	MLF 50-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	2,907.58	784.30
16120-0264	MLF 100-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	4,651.56	941.15
16120-0265	MLF 150-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	6,275.53	1,058.79
16120-0266	MLF 200-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	8,314.54	1,176.44
16120-0267	MLF 300-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	12,152.78	1,647.01
16120-0268	MLF 400-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	15,921.77	2,039.17
16120-0269	MLF 600-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	24,739.06	2,823.46
16120-0270	MLF 900-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed	40,333.45	5,646.92



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0271	MLF	1200-Pair 24 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	54,945.69	8,470.38
16120-0272		22 AWG, Category 3, Indoor Telecommunications Riser Cable <small>(16120-0238)</small>		
16120-0273		22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit <small>(16120-0272)</small>		
16120-0274	MLF	25-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit	2,322.59	313.72
16120-0275	MLF	50-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit	3,510.57	392.14
16120-0276	MLF	100-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	6,471.41	627.44
16120-0277	MLF	200-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	11,718.53	784.30
16120-0278	MLF	300-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	17,366.12	1,098.02
16120-0279	MLF	400-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	22,669.72	1,356.83
16120-0280	MLF	600-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed In Conduit.....	33,521.57	1,882.30
16120-0281		22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed <small>(16120-0272)</small>		
16120-0282	MLF	25-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	2,845.46	627.44
16120-0283	MLF	50-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	4,164.16	784.30
16120-0284	MLF	100-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	6,994.27	941.15
16120-0285	MLF	200-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	12,372.10	1,176.44
16120-0286	MLF	300-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	18,281.13	1,647.01
16120-0287	MLF	400-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	23,806.94	2,039.17
16120-0288	MLF	600-Pair 22 AWG, Category 3, Indoor Telecommunications Riser Cable, Installed Exposed.....	35,090.15	2,823.46
16120-0289		Category 3, Indoor Telecommunications Plenum Cable <small>(16120-0237)</small>		
16120-0290		24 AWG, Category 3, Indoor Telecommunications Plenum Cable <small>(16120-0289)</small>		
16120-0291		24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit <small>(16120-0290)</small>		
16120-0292	MLF	2-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	560.00	274.50
16120-0293	MLF	3-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	594.15	274.50
16120-0294	MLF	4-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	618.06	274.50
16120-0295	MLF	6-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	753.45	313.72
16120-0296	MLF	12-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	1,014.77	313.72
16120-0297	MLF	25-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	1,727.00	313.72
16120-0298	MLF	50-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	2,973.06	392.14
16120-0299	MLF	100-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	5,686.41	627.44
16120-0300	MLF	200-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	10,035.12	784.30
16120-0301	MLF	300-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	15,089.34	1,098.02
16120-0302		24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed <small>(16120-0290)</small>		
16120-0303	MLF	2-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,017.50	549.01
16120-0304	MLF	3-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,051.65	549.01
16120-0305	MLF	4-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,075.56	549.01
16120-0306	MLF	6-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,145.60	549.01
16120-0307	MLF	12-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,406.92	549.01
16120-0308	MLF	25-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	2,249.87	627.44
16120-0309	MLF	50-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	3,626.65	784.30
16120-0310	MLF	100-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	6,209.27	941.15
16120-0311	MLF	200-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	10,688.69	1,176.44
16120-0312	MLF	300-Pair 24 AWG, Category 3, Indoor Telecommunications Plenum Cable, Installed Exposed.....	16,004.35	1,647.01
16120-0313		Category 5E, Indoor Telecommunications Cable <small>(16120-0236)</small>		
16120-0314		Category 5E, Indoor Telecommunications Riser Cable <small>(16120-0313)</small>		
16120-0315		Category 5E, Indoor Telecommunications Riser Cable, Installed In Conduit <small>(16120-0314)</small>		
16120-0316	MLF	4-Pair Solid UTP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed In Conduit.....	645.39	274.50
16120-0317	MLF	4-Pair Stranded UTP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed In Conduit.....	689.52	274.50
16120-0318	MLF	4-Pair Solid STP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed In Conduit.....	755.73	313.72
16120-0319	MLF	4-Pair Stranded STP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed In Conduit.....	800.12	313.72
16120-0320		Category 5E, Indoor Telecommunications Riser Cable, Installed Exposed <small>(16120-0314)</small>		
16120-0321	MLF	4-Pair Solid UTP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed Exposed.....	1,102.89	549.01
16120-0322	MLF	4-Pair Stranded UTP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed Exposed.....	1,147.02	549.01
16120-0323	MLF	4-Pair Solid STP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed Exposed.....	1,278.60	627.44
16120-0324	MLF	4-Pair Stranded STP, 24 AWG, Category 5E, Indoor Telecommunications Riser Cable, Installed Exposed.....	1,322.99	627.44
16120-0325		Category 5E, Indoor Telecommunications Plenum Cable <small>(16120-0313)</small>		
16120-0326		Category 5E, Indoor Telecommunications Plenum Cable, Installed In Conduit <small>(16120-0325)</small>		
16120-0327	MLF	4-Pair Solid UTP, 24 AWG, Category 5E, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	792.28	274.50
16120-0328	MLF	4-Pair Solid STP, 24 AWG, Category 5E, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	1,186.57	313.72

16000 Electrical**16100 Basic Materials And Methods****16120 Wire And Cable**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0329		Category 5E, Indoor Telecommunications Plenum Cable, Installed Exposed ⁽¹⁶¹²⁰⁻⁰³²⁹⁾		
16120-0330	MLF	4-Pair Solid UTP, 24 AWG, Category 5E, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,249.78	549.01
16120-0331	MLF	4-Pair Solid STP, 24 AWG, Category 5E, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,709.44	627.44
16120-0332		Category 6, Indoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰²³⁶⁾		
16120-0333		Category 6, Indoor Telecommunications Riser Cable ⁽¹⁶¹²⁰⁻⁰³³²⁾		
16120-0334		Category 6, Indoor Telecommunications Riser Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰³³³⁾		
16120-0335	MLF	4-Pair Solid UTP, 23 AWG, Category 6, Indoor Telecommunications Riser Cable, Installed In Conduit.....	754.70	274.50
16120-0336	MLF	4-Pair Stranded UTP, 23 AWG, Category 6, Indoor Telecommunications Riser Cable, Installed In Conduit.....	787.93	274.50
16120-0337		Category 6, Indoor Telecommunications Riser Cable, Installed Exposed ⁽¹⁶¹²⁰⁻⁰³³³⁾		
16120-0338	MLF	4-Pair Solid UTP, 23 AWG, Category 6, Indoor Telecommunications Riser Cable, Installed Exposed.....	1,212.20	549.01
16120-0339	MLF	4-Pair Stranded UTP, 23 AWG, Category 6, Indoor Telecommunications Riser Cable, Installed Exposed.....	1,245.43	549.01
16120-0340		Category 6, Indoor Telecommunications Plenum Cable ⁽¹⁶¹²⁰⁻⁰³³²⁾		
16120-0341		Category 6, Indoor Telecommunications Plenum Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰³⁴⁰⁾		
16120-0342	MLF	4-Pair Solid UTP, 23 AWG, Category 6, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	1,062.15	274.50
16120-0343		Category 6, Indoor Telecommunications Plenum Cable, Installed Exposed ⁽¹⁶¹²⁰⁻⁰³⁴⁰⁾		
16120-0344	MLF	4-Pair Solid UTP, 23 AWG, Category 6, Indoor Telecommunications Plenum Cable, Installed Exposed.....	1,519.65	549.01
16120-0345		Category 7, Indoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰²³⁶⁾		
16120-0346		Category 7, Indoor Telecommunications Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰³⁴⁵⁾		
16120-0347	MLF	4-Pair Solid STP, 22 AWG, Category 7, Indoor Telecommunications Riser Cable, Installed In Conduit.....	1,873.22	313.72
16120-0348	MLF	4-Pair Solid STP, 22 AWG, Category 7, Indoor Telecommunications Plenum Cable, Installed In Conduit.....	3,819.18	313.72
16120-0349		Category 7, Indoor Telecommunications Cable, Installed Exposed ⁽¹⁶¹²⁰⁻⁰³⁴⁵⁾		
16120-0350	MLF	4-Pair Solid STP, 22 AWG, Category 7, Indoor Telecommunications Riser Cable, Installed Exposed.....	2,396.09	627.44
16120-0351	MLF	4-Pair Solid STP, 22 AWG, Category 7, Indoor Telecommunications Plenum Cable, Installed Exposed.....	4,342.05	627.44
16120-0352		Coaxial, Indoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰²³⁶⁾		
16120-0353		Coaxial, Indoor Telecommunications Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰³⁵²⁾		
16120-0354	MLF	RG 59/U Coaxial, Indoor Telecommunications Cable, Installed In Conduit (Belden 9108).....	872.27	274.50
16120-0355	MLF	RG 59/U Plenum Coaxial, Indoor Telecommunications Cable, Installed In Conduit (Belden 82108).....	2,055.29	274.50
16120-0356	MLF	RG 6/U Coaxial, Indoor Telecommunications Cable, Installed In Conduit (Belden 9114).....	722.58	313.72
16120-0357	MLF	RG 6/U Plenum Coaxial, Indoor Telecommunications Cable, Installed In Conduit (Belden 82120).....	2,586.65	313.72
16120-0358		Coaxial, Indoor Telecommunications Cable, Installed Exposed ⁽¹⁶¹²⁰⁻⁰³⁵²⁾		
16120-0359	MLF	RG 59/U Coaxial, Indoor Telecommunications Cable, Installed Exposed (Belden 9108).....	1,329.77	549.01
16120-0360	MLF	RG 59/U Plenum Coaxial, Indoor Telecommunications Cable, Installed Exposed (Belden 82108).....	2,512.79	549.01
16120-0361	MLF	RG 6/U Coaxial, Indoor Telecommunications Cable, Installed Exposed (Belden 9114).....	1,245.45	627.44
16120-0362	MLF	RG 6/U Plenum Coaxial, Indoor Telecommunications Cable, Installed Exposed (Belden 82120).....	3,109.52	627.44
16120-0363		Outdoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰²³⁵⁾		
Note: Telecommunications cable installed in conduit includes pull wires and installation in conduit, innerduct, etc. Telecommunications cable buried in trench excludes excavation.				
16120-0364		PE-89 Outdoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰³⁶³⁾		
Note: Includes foam-skin polyolefin insulated conductors.				
16120-0365		24 AWG, PE-89 Outdoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰³⁶⁴⁾		
16120-0366		24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰³⁶⁵⁾		
16120-0367	MLF	6-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	1,233.06	549.01
16120-0368	MLF	12-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	1,367.58	549.01
16120-0369	MLF	25-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	1,657.37	549.01
16120-0370	MLF	50-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	2,209.44	549.01
16120-0371	MLF	75-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	2,758.17	549.01
16120-0372	MLF	100-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	3,308.17	549.01
16120-0373	MLF	200-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	5,717.62	705.86
16120-0374	MLF	300-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	8,396.00	1,019.58
16120-0375	MLF	400-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	11,116.19	1,333.30
16120-0376	MLF	600-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	15,093.41	1,803.88
16120-0377	MLF	900-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	24,218.65	3,607.76
16120-0378	MLF	1200-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	33,305.18	5,333.21
16120-0379		24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench ⁽¹⁶¹²⁰⁻⁰³⁶⁵⁾		
16120-0380	MLF	6-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	1,036.99	
16120-0381	MLF	12-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	1,171.51	
16120-0382	MLF	25-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	1,461.30	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0383	MLF	50-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	2,013.37	
16120-0384	MLF	75-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	2,562.10	
16120-0385	MLF	100-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	3,112.10	
16120-0386	MLF	200-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	5,586.91	
16120-0387	MLF	300-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	8,003.86	
16120-0388	MLF	400-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	10,299.22	
16120-0389	MLF	600-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	13,655.54	
16120-0390	MLF	900-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	20,297.19	
16120-0391	MLF	1200-Pair 24 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	27,553.68	
16120-0392		22 AWG, PE-89 Outdoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰³⁶⁴⁾		
16120-0393		22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰³⁹²⁾		
16120-0394	MLF	6-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	1,318.58	549.01
16120-0395	MLF	12-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	1,527.36	549.01
16120-0396	MLF	25-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	1,984.43	549.01
16120-0397	MLF	50-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	2,791.57	549.01
16120-0398	MLF	75-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	3,667.87	549.01
16120-0399	MLF	100-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	4,544.88	549.01
16120-0400	MLF	200-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	8,103.41	705.86
16120-0401	MLF	300-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	11,798.61	1,019.58
16120-0402	MLF	400-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	15,703.21	1,333.30
16120-0403	MLF	600-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	23,103.79	1,803.88
16120-0404	MLF	900-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	34,335.10	3,607.76
16120-0405	MLF	1200-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	48,440.32	5,333.21
16120-0406		22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench ⁽¹⁶¹²⁰⁻⁰³⁹²⁾		
16120-0407	MLF	6-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	1,122.51	
16120-0408	MLF	12-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	1,331.29	
16120-0409	MLF	25-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	1,788.36	
16120-0410	MLF	50-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	2,595.50	
16120-0411	MLF	75-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	3,471.80	
16120-0412	MLF	100-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	4,348.81	
16120-0413	MLF	200-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	7,972.70	
16120-0414	MLF	300-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	11,406.47	
16120-0415	MLF	400-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	14,886.24	
16120-0416	MLF	600-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	21,665.92	
16120-0417	MLF	900-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	30,413.64	
16120-0418	MLF	1200-Pair 22 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	42,688.82	
16120-0419		19 AWG, PE-89 Outdoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰³⁶⁴⁾		
16120-0420		19 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰⁴¹⁹⁾		
16120-0421	MLF	25-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	2,992.68	549.01
16120-0422	MLF	50-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	4,762.37	549.01
16120-0423	MLF	75-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	7,173.56	549.01
16120-0424	MLF	100-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Installed In Conduit.....	8,448.47	549.01
16120-0425		19 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench ⁽¹⁶¹²⁰⁻⁰⁴¹⁹⁾		
16120-0426	MLF	25-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	2,796.61	
16120-0427	MLF	50-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	4,566.30	
16120-0428	MLF	75-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	6,977.49	
16120-0429	MLF	100-Pair 19 AWG, PE-89 Outdoor Telecommunications Cable, Buried In Trench.....	8,252.40	
16120-0430		PE-39 Outdoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰³⁶³⁾		
		Note: Includes solid polyolefin insulated conductors.		
16120-0431		24 AWG, PE-39 Outdoor Telecommunications Cable ⁽¹⁶¹²⁰⁻⁰⁴³⁰⁾		
16120-0432		24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit ⁽¹⁶¹²⁰⁻⁰⁴³¹⁾		
16120-0433	MLF	6-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	1,245.08	549.01
16120-0434	MLF	12-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	1,409.66	549.01
16120-0435	MLF	25-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	1,741.69	549.01
16120-0436	MLF	50-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	2,339.60	549.01
16120-0437	MLF	100-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	3,552.26	549.01
16120-0438	MLF	200-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	6,275.85	705.86
16120-0439	MLF	300-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	9,157.45	1,019.58
16120-0440	MLF	400-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	12,044.02	1,333.30
16120-0441	MLF	600-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	16,448.11	1,803.88
16120-0442	MLF	900-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	25,970.61	3,607.76
16120-0443	MLF	1200-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	37,849.06	5,333.21
16120-0444		24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench ⁽¹⁶¹²⁰⁻⁰⁴³¹⁾		
16120-0445	MLF	6-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	1,049.01	
16120-0446	MLF	12-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	1,213.59	
16120-0447	MLF	25-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	1,545.62	
16120-0448	MLF	50-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	2,143.53	
16120-0449	MLF	100-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	3,356.19	
16120-0450	MLF	200-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	6,145.14	
16120-0451	MLF	300-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	8,765.31	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0452	MLF	400-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	11,227.05	
16120-0453	MLF	600-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	15,010.24	
16120-0454	MLF	900-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	22,049.15	
16120-0455	MLF	1200-Pair 24 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	32,097.56	
16120-0456		22 AWG, PE-39 Outdoor Telecommunications Cable (16120-0439)		
16120-0457		22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit (16120-0456)		
16120-0458	MLF	6-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	1,340.23	549.01
16120-0459	MLF	12-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	1,582.07	549.01
16120-0460	MLF	25-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	2,096.71	549.01
16120-0461	MLF	50-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	3,043.48	549.01
16120-0462	MLF	100-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	5,019.25	549.01
16120-0463	MLF	200-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	9,099.03	705.86
16120-0464	MLF	300-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	13,324.81	1,019.58
16120-0465	MLF	400-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	17,084.36	1,333.30
16120-0466	MLF	600-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	23,833.37	1,803.88
16120-0467	MLF	900-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	37,929.06	3,607.76
16120-0468		22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench (16120-0456)		
16120-0469	MLF	6-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	1,144.16	
16120-0470	MLF	12-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	1,386.00	
16120-0471	MLF	25-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	1,900.64	
16120-0472	MLF	50-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	2,847.41	
16120-0473	MLF	100-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	4,823.18	
16120-0474	MLF	200-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	8,968.32	
16120-0475	MLF	300-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	12,932.67	
16120-0476	MLF	400-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	16,267.39	
16120-0477	MLF	600-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	22,395.50	
16120-0478	MLF	900-Pair 22 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	34,007.60	
16120-0479		19 AWG, PE-39 Outdoor Telecommunications Cable (16120-0439)		
16120-0480		19 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit (16120-0479)		
16120-0481	MLF	25-Pair 19 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	3,236.77	549.01
16120-0482	MLF	50-Pair 19 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	5,156.93	549.01
16120-0483	MLF	100-Pair 19 AWG, PE-39 Outdoor Telecommunications Cable, Installed In Conduit.....	9,138.67	549.01
16120-0484		19 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench (16120-0479)		
16120-0485	MLF	25-Pair 19 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	3,040.70	
16120-0486	MLF	50-Pair 19 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	4,960.86	
16120-0487	MLF	100-Pair 19 AWG, PE-39 Outdoor Telecommunications Cable, Buried In Trench.....	8,942.60	
16120-0488		(Aerial) Outdoor Telecommunications Cable (16120-0363)		
		Note: Includes support wire.		
16120-0489		24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles (16120-0488)		
16120-0490	MLF	6-Pair 24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	3,427.58	1,052.33
16120-0491	MLF	12-Pair 24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	3,564.51	1,052.33
16120-0492	MLF	25-Pair 24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	3,904.50	1,052.33
16120-0493	MLF	50-Pair 24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	4,533.97	1,052.33
16120-0494	MLF	100-Pair 24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	5,749.80	1,052.33
16120-0495	MLF	200-Pair 24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	8,406.18	1,157.55
16120-0496	MLF	300-Pair 24 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	11,077.62	1,262.79
16120-0497		22 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles (16120-0488)		
16120-0498	MLF	6-Pair 22 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	3,591.41	1,052.33
16120-0499	MLF	12-Pair 22 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	3,793.72	1,052.33
16120-0500	MLF	25-Pair 22 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	4,281.02	1,052.33
16120-0501	MLF	50-Pair 22 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	5,243.71	1,052.33
16120-0502	MLF	100-Pair 22 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	7,196.64	1,052.33
16120-0503	MLF	200-Pair 22 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	11,139.64	1,157.55
16120-0504		19 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles (16120-0488)		
16120-0505	MLF	6-Pair 19 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	3,808.00	1,052.33
16120-0506	MLF	12-Pair 19 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	4,265.53	1,052.33
16120-0507	MLF	25-Pair 19 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	5,165.10	1,052.33
16120-0508	MLF	50-Pair 19 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	6,964.26	1,052.33
16120-0509	MLF	100-Pair 19 AWG, (Aerial) Outdoor Telecommunications Cable, Installed On Poles.....	10,413.62	1,052.33
16120-0510		Building Entrance Terminals (16120-0239)		
16120-0511	EA	25 Pair Gas Protective Unit Assembly Complete With Gas Protector.....	1,298.90	143.41
16120-0512	EA	50 Pair Gas Protective Unit Assembly Complete With Gas Protector.....	1,740.57	239.01
16120-0513	EA	100 Pair Gas Protective Unit Assembly Complete With Gas Protector.....	2,471.39	382.72
16120-0514		ACSR (Aluminum Conductor Steel Reinforced) (16120)		



MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

Note: Concentric lay stranded Class A galvanizing installed on poles, aerially.

MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0515			ACSR Cable (16120-0514)		
16120-0516	MLF		#4 AWG ACSR Cable Swan 6/1 Installed On Poles, Aluminum Cable	1,105.85	284.65
16120-0517	MLF		#4 AWG ACSR Cable Swanate 7/1 Installed On Poles, Aluminum Cable	1,212.83	295.57
16120-0518	MLF		#2 AWG ACSR Cable Sparrow 6/1 Installed On Poles, Aluminum Cable	1,379.36	306.95
16120-0519	MLF		#2 AWG ACSR Cable Sparate 7/1 Installed On Poles, Aluminum Cable	1,486.16	318.06
16120-0520	MLF		#1/0 AWG ACSR Cable Raven 6/1 Installed On Poles, Aluminum Cable	1,797.45	328.85
16120-0521	MLF		#2/0 AWG ACSR Cable Quail 6/1 Installed On Poles, Aluminum Cable	2,152.10	372.78
16120-0522	MLF		#3/0 AWG ACSR Cable Pigeon 6/1 Installed On Poles, Aluminum Cable	2,575.28	415.74
16120-0523	MLF		#4/0 AWG ACSR Cable Penguin 6/1 Installed On Poles, Aluminum Cable	3,067.15	459.27
16120-0524	MLF		Bare Aluminum Wire #1	1,824.32	412.53
16120-0525	MLF		336 AWG ACSR Cable Merlin 18/1 Installed On Pole, Aluminum Cable	3,301.54	590.23
16120-0526	MLF		477 AWG ACSR Cable Hawk 26/1 Installed On Pole, Aluminum Cable	3,723.87	677.04
16120-0527			All Aluminum Conductors (16120-0514)		
16120-0528	MLF		795.0 ACSR Conductor Aluminum	23,498.48	5,486.06
16120-0529			Single Copper Conductor Installed On Poles (16120)		
16120-0530			Bare Stranded Conductor (16120-0529)		
16120-0531	MLF		#12 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	745.34	241.18
16120-0532	MLF		#10 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	909.07	262.89
16120-0533	MLF		#8 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	1,073.46	284.85
16120-0534	MLF		#6 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	1,391.43	306.95
16120-0535	MLF		#4 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	1,771.80	329.12
16120-0536	MLF		#2 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	2,676.76	394.76
16120-0537	MLF		#1 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	3,103.55	438.49
16120-0538	MLF		#1/0 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	3,575.99	481.43
16120-0539	MLF		#2/0 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	4,931.35	571.01
16120-0540	MLF		#3/0 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	6,050.26	656.52
16120-0541	MLF		#4/0 AWG 1/c Bare Stranded Copper Cable, Installed On Poles	6,422.39	744.06
16120-0542	MLF		250 MCM 1/c Bare Stranded Copper Cable, Installed On Poles	8,247.32	876.92
16120-0543	MLF		300 MCM 1/c Bare Stranded Copper Cable, Installed On Poles	8,389.17	923.08
16120-0544	MLF		350 MCM 1/c Bare Stranded Copper Cable, Installed On Poles	10,811.23	966.69
16120-0545	MLF		400 MCM 1/c Bare Stranded Copper Cable, Installed On Poles	12,059.97	1,006.35
16120-0546	MLF		500 MCM 1/c Bare Stranded Copper Cable, Installed On Poles	14,284.35	1,049.30
16120-0547			Insulated Stranded Conductor (16120-0529)		
16120-0548	MLF		#12 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	841.40	241.18
16120-0549	MLF		#10 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	1,033.02	262.89
16120-0550	MLF		#8 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	1,318.14	284.85
16120-0551	MLF		#6 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	1,437.75	306.95
16120-0552	MLF		#4 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	1,842.46	329.12
16120-0553	MLF		#2 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	2,574.71	394.76
16120-0554	MLF		#1 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	3,093.36	438.49
16120-0555	MLF		#1/0 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	3,718.08	481.43
16120-0556	MLF		#2/0 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	4,495.02	571.01
16120-0557	MLF		#3/0 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	5,442.06	656.52
16120-0558	MLF		#4/0 AWG 1/c Insulated Stranded Copper Cable, Installed On Poles	6,469.84	744.06
16120-0559	MLF		250 MCM 1/c Insulated Stranded Copper Cable, Installed On Poles	7,957.01	876.92
16120-0560	MLF		300 MCM 1/c Insulated Stranded Copper Cable, Installed On Poles	9,157.59	923.08
16120-0561	MLF		350 MCM 1/c Insulated Stranded Copper Cable, Installed On Poles	10,125.77	966.69
16120-0562	MLF		400 MCM 1/c Insulated Stranded Copper Cable, Installed On Poles	11,491.63	1,006.35
16120-0563	MLF		500 MCM 1/c Insulated Stranded Copper Cable, Installed On Poles	13,075.51	1,049.30
16120-0564			Bare Solid Conductor (16120-0529)		
16120-0565	MLF		#12 AWG 1/c Bare Solid Copper Cable, Installed On Poles	745.34	241.18
16120-0566	MLF		#8 AWG 1/c Bare Solid Copper Cable, Installed On Poles	1,073.46	284.85
16120-0567	MLF		#6 AWG 1/c Bare Solid Copper Cable, Installed On Poles	1,391.43	306.95
16120-0568	MLF		#4 AWG 1/c Bare Solid Copper Cable, Installed On Poles	1,742.60	329.12
16120-0569			Sundry Cable (16120)		
16120-0570			Cable For Sound System (16120-0569)		
16120-0571			Shielded Conductors (16120-0570)		
Note: One pair, stranded or solid, copper, PVC jacketed, sizes as indicated on tasks.					
16120-0572	MLF		1 Pair #20 AWG Sound System, Placed In Conduit, Shielded	616.98	239.01
16120-0573	MLF		1 Pair #14 AWG Sound System, Placed In Conduit, Shielded	1,027.14	239.01
16120-0574	LF		3 Conductor #16 AWG Sound System, Placed In Conduit, Shielded	0.84	0.14
16120-0575	MLF		18/6 AWG Sound System, Placed In Conduit, Shielded	892.54	144.84
16120-0576			Coaxial Cables "Television" Copper Covered Aluminum Center Core (16120-0570)		
Note: Corrugated steel armor jacket.					
16120-0577	MLF		TV Coaxial Trunk Cable 3/4" Diameter, Direct Burial	3,883.61	894.62
16120-0578	MLF		TV Coaxial Distribution Cable 1/2" Diameter, Direct Burial	2,418.05	629.25
16120-0579	MLF		TV Coaxial Distribution Cable 3/8" Diameter, Direct Burial	2,118.03	371.24
16120-0580	MLF		TV Coaxial Cable Drop 1/4" Diameter, Direct Burial	1,080.41	371.24
16120-0581	MLF		TV Coaxial Cable Drop 1/4" Diameter, Placed In Conduit	1,602.50	580.08

16000 Electrical**16100 Basic Materials And Methods****16120 Wire And Cable**

MINOR

CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

MINOR	CSI UOM DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16120-0582	Coaxial Distribution Cable <small>(16120-0570)</small> Note: Cables shall be as Belden, Times Fiber, West Penn or approved equal		
16120-0583	MLF RG-6/U Coaxial Distribution Cable, In Conduit.....	1,435.02	191.20
16120-0584	MLF RG-6A/U Coaxial Distribution Cable, In Conduit.....	5,414.55	191.20
16120-0585	MLF RG-8/U Coaxial Distribution Cable, In Conduit.....	2,832.12	201.96
16120-0586	MLF RG-8A/U Coaxial Distribution Cable, In Conduit.....	3,579.64	201.96
16120-0587	MLF RG-11/U Coaxial Distribution Cable, In Conduit.....	3,171.61	239.01
16120-0588	MLF RG-11A/U Coaxial Distribution Cable, In Conduit.....	4,617.27	239.01
16120-0589	MLF RG-11/U Coaxial Distribution Cable, In Plenum.....	10,383.25	478.02
16120-0590	MLF RG-58/U Coaxial Distribution Cable, In Conduit.....	1,052.94	167.31
16120-0591	MLF RG-58A/U Coaxial Distribution Cable, In Conduit.....	1,201.07	167.31
16120-0592	MLF RG-58C/U Coaxial Distribution Cable, In Conduit.....	1,462.01	167.31
16120-0593	MLF RG-58/U Coaxial Distribution Cable, In Plenum.....	3,584.68	334.61
16120-0594	MLF RG-59/U Coaxial Distribution Cable, In Conduit.....	1,744.98	167.31
16120-0595	MLF RG-59/U Coaxial Distribution Cable, In Plenum.....	4,361.07	334.61
16120-0596	MLF 1/2" Hard Line Coaxial, In Conduit.....	1,680.08	334.61
16120-0597	Sound System Cables <small>(16120-0570)</small> Note: Cables shall be type CL2 or CM and as manufactured by West Penn Wire, Belden or approved equal.		
16120-0598	MLF 2/c #18 AWG, Stranded Copper Conductor, Speakers.....	819.25	76.25
16120-0599	MLF 2/c #16 AWG, Stranded Copper Conductor, Speakers.....	923.10	80.07
16120-0600	MLF 2/c #22 AWG, Shielded, Stranded Copper Conductor, Microphone.....	594.66	60.95
16120-0601	MLF 4/c #22 AWG, 2 Shielded, 2 Unshielded, Stranded Copper Conductor, Microphone.....	659.09	64.06
16120-0602	MLF 2/c #20 AWG, Shielded, Stranded Copper Conductors, Microphone.....	749.93	72.42
16120-0603	MLF 4/c #20 AWG, 2 Shielded, 2 Unshielded, Stranded Copper Conductor, Microphone.....	853.81	79.83
16120-0604	Cable For HVAC System Controls <small>(16120-0569)</small>		
16120-0605	Low Voltage Cable To 300 Volts <small>(16120-0604)</small> Note: For surface or conduit installation. Thermostat wiring.		
16120-0606	MLF 2/c #18 300 V Thermostat Cable, Low Volt Cable For HVAC System Controls.....	819.03	76.19
16120-0607	MLF 3/c #18 300 V Thermostat Cable, Low Volt Cable For HVAC System Controls.....	1,077.93	80.25
16120-0608	MLF 4/c #18 300 V Thermostat Cable, Low Volt Cable For HVAC System Controls.....	1,429.41	84.85
16120-0609	MLF 6/c #18 300 V Twisted Shielded Cable, In Conduit.....	1,207.30	114.48
16120-0610	MLF 8/c #18 300 V Twisted Shielded Cable, In Conduit.....	1,647.58	100.33
16120-0611	Cable For Fire Alarm System <small>(16120-0569)</small>		
16120-0612	CLF Red Teflon 1-Pair #18 Gauge, Twisted Shielded Solid CU.....	152.10	26.30
16120-0613	CLF Red Teflon 2-Pair #18 Gauge, Twisted Shielded Solid CU.....	177.15	29.40
16120-0614	CLF Red Teflon 4-Pair #18 Gauge, Twisted Shielded Solid CU.....	237.39	39.68
16120-0615	CLF Red Teflon 6-Pair #18 Gauge, Twisted Shielded Solid CU.....	292.28	47.81
16120-0616	CLF Red Teflon 8-Pair #18 Gauge, Twisted Shielded Solid CU.....	344.15	54.73
16120-0617	CLF Red Teflon 10-Pair #18 Gauge, Twisted Shielded Solid CU.....	401.42	63.82
16120-0618	CLF Red Teflon 1-Pair #14 Gauge, Twisted Shielded Solid CU.....	239.14	33.46
16120-0619	CLF Red Teflon 2-Pair #14 Gauge, Twisted Shielded Solid CU.....	315.47	43.26
16120-0620	CLF Red Teflon 2-Pair #16 Gauge, Twisted Shielded Solid CU.....	310.50	43.74
16120-0621	Low Voltage Control Cables <small>(16120-0569)</small> Note: Type "TC" multi-conductor (individually numbered conductors) control cables installed in conduit.		
16120-0622	MLF 4/c #18 AWG "TC" Copper Conductor Cable.....	1,788.32	129.30
16120-0623	MLF 6/c #18 AWG "TC" Copper Conductor Cable.....	2,442.23	144.84
16120-0624	MLF 8/c #18 AWG "TC" Copper Conductor Cable.....	2,998.29	173.76
16120-0625	MLF 10/c #18 AWG "TC" Copper Conductor Cable.....	3,748.37	208.42
16120-0626	MLF 12/c #18 AWG "TC" Copper Conductor Cable.....	4,239.53	233.51
16120-0627	MLF 37/c #18 AWG "TC" Copper Conductor Cable.....	10,623.15	301.81
16120-0628	Security System Cable <small>(16120-0569)</small>		
16120-0629	CLF 2/c #18 AWG, "Red", Twisted Shielded Solid Copper, In Conduit.....	205.65	35.62
16120-0630	CLF 2/c #16 AWG, "Red", Twisted Shielded Solid Copper, In Conduit.....	310.50	43.74
16120-0631	CLF 2/c #18 AWG, "Red", Twisted Shielded Solid Copper, Plenum.....	215.67	37.28
16120-0632	CLF 2/c #16 AWG, "Red", Twisted Shielded Solid Copper, Plenum.....	325.95	45.89
16120-0633	CLF 4/c #18 AWG Stranded Copper Cable, In Conduit.....	237.40	39.68
16120-0634	CLF 6/c #18 AWG Stranded Copper Cable, In Conduit.....	292.28	47.81
16120-0635	CLF 2/c #22 AWG, Type CL2R/MPR Bare Copper Conductor.....	193.05	35.62
16120-0636	CLF 4/c #22 AWG, Type CL2R/MPR Bare Copper Conductor.....	288.75	43.74
16120-0637	CLF 6/c #22 AWG, Type CL2R/MPR Bare Copper Conductor.....	303.12	45.89
16120-0638	Service Drop Cable And Weatherheads <small>(16120)</small>		
16120-0639	600 Volt Insulated Stranded Conductors <small>(16120-0638)</small>		
16120-0640	Aluminum Duplex ACSR Neutral <small>(16120-0639)</small>		
16120-0641	LF #6 AWG Aluminum Duplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V.....	4.93	1.63
16120-0642	LF #4 AWG Aluminum Duplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V.....	6.13	1.93
16120-0643	LF #2 AWG Aluminum Duplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V.....	7.71	2.17
16120-0644	LF #1/0 AWG Aluminum Duplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V.....	11.05	2.74



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16120-0645 Aluminum Triplex ACSR Neutral <small>(16120-0639)</small>					
16120-0646	LF	#6	AWG Aluminum Triplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	6.33	1.93
16120-0647	LF	#4	AWG Aluminum Triplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	7.45	2.17
16120-0648	LF	#2	AWG Aluminum Triplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	9.56	2.74
16120-0649	LF	#1/0	AWG Aluminum Triplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	12.47	3.35
16120-0650	LF	#2/0	AWG Aluminum Triplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	15.96	4.43
16120-0651	LF	#4/0	AWG Aluminum Triplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	21.14	5.49
16120-0652	LF	336	MCM Aluminum Triplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	32.14	6.53

16120-0653 Aluminum Quadruplex ACSR Neutral <small>(16120-0639)</small>					
16120-0654	LF	#6	AWG Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	7.50	2.17
16120-0655	LF	#4	AWG Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	9.55	2.74
16120-0656	LF	#2	AWG Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	12.46	3.52
16120-0657	LF	#1/0	AWG Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	17.14	4.43
16120-0658	LF	#2/0	AWG Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	19.22	4.89
16120-0659	LF	#3/0	AWG Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	23.09	5.49
16120-0660	LF	#4/0	AWG Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	26.79	6.53
16120-0661	LF	336	MCM Aluminum Quadruplex ACSR With Neutral Cable Service Drop, Stranded Cable, 600 V	38.08	7.22

16120-0662 Aluminum Triplex For Underground Service, Direct Burial <small>(16120-0639)</small>					
Note: Excludes excavation and backfill.					
16120-0663	MLF	#6	AWG Aluminum Triplex URD With Neutral Cable, Stranded Cable, 600 V, Direct Burial	3,310.87	609.57
16120-0664	MLF	#4	AWG Aluminum Triplex URD With Neutral Cable, Stranded Cable, 600 V, Direct Burial	3,988.65	645.44
16120-0665	MLF	#2	AWG Aluminum Triplex URD With Neutral Cable, Stranded Cable, 600 V, Direct Burial	5,007.93	685.76
16120-0666	MLF	#1/0	AWG Aluminum Triplex URD With Neutral Cable, Stranded Cable, 600 V, Direct Burial	6,419.26	685.76
16120-0667	MLF	#2/0	AWG Aluminum Triplex URD With Neutral Cable, Stranded Cable, 600 V, Direct Burial	7,266.76	731.49
16120-0668	MLF	#3/0	AWG Aluminum Triplex URD With Neutral Cable, Stranded Cable, 600 V, Direct Burial	8,728.64	844.03
16120-0669	MLF	#4/0	AWG Aluminum Triplex URD With Neutral Cable, Stranded Cable, 600 V, Direct Burial	10,461.00	1,097.22

16120-0670 Weather Proof Conduit Hubs <small>(16120-0639)</small>					
16120-0671	EA	1/2"	Weatherproof Conduit Hubs	31.05	11.50
16120-0672	EA	3/4"	Weatherproof Conduit Hubs	35.48	13.07
16120-0673	EA	1"	Weatherproof Conduit Hubs	41.87	14.64
16120-0674	EA	1-1/4"	Weatherproof Conduit Hubs	59.38	19.61
16120-0675	EA	1-1/2"	Weatherproof Conduit Hubs	65.76	21.18
16120-0676	EA	2"	Weatherproof Conduit Hubs	88.34	24.57
16120-0677	EA	2-1/2"	Weatherproof Conduit Hubs	121.54	27.71
16120-0678	EA	3"	Weatherproof Conduit Hubs	160.70	32.68
16120-0679	EA	4"	Weatherproof Conduit Hubs	275.59	65.36

16120-0680 Service Entrance Cap, Threaded Weatherhead, Galvanized <small>(16120-0639)</small>					
16120-0681	EA	1/2"	Galvanized Weatherhead For #14 Thru #10 AWG Cable Service Entrance Threaded Weatherhead	34.76	11.50
16120-0682	EA	3/4"	Galvanized Weatherhead For #12 Thru #8 AWG Cable Service Entrance Threaded Weatherhead	39.92	13.07
16120-0683	EA	1"	Galvanized Weatherhead For #6 AWG Cable Service Entrance Threaded Weatherhead	47.64	15.36
16120-0684	EA	1-1/4"	Galvanized Weatherhead For #4 Thru #2 AWG Cable Service Entrance Threaded Weatherhead	61.63	19.61
16120-0685	EA	1-1/2"	Galvanized Weatherhead For #4 Thru #2 AWG Cable Service Entrance Threaded Weatherhead	72.71	22.22
16120-0686	EA	2"	Galvanized Weatherhead For #1/0 Thru #2/0 AWG Cable Service Entrance Threaded Weatherhead	96.54	25.79
16120-0687	EA	2-1/2"	Galvanized Weatherhead For #3/0 Thru #4/0 Cable Service Entrance Threaded Weatherhead	166.58	29.08
16120-0688	EA	3"	Galvanized Weatherhead For 250 Thru 500 MCM Cable Service Entrance Threaded Weatherhead	185.26	32.68
16120-0689	EA	4"	Galvanized Weatherhead For 750 MCM Cable Service Entrance Threaded Weatherhead	299.61	65.36

16120-0690 Service Entrance Cap, Threaded Weatherhead, PVC <small>(16120-0639)</small>					
16120-0691	EA	1/2"	PVC Weatherhead For #14 Thru #10 AWG Cable Service Entrance Threaded Weatherhead	31.54	11.50
16120-0692	EA	3/4"	PVC Weatherhead For #12 Thru #8 AWG Cable Service Entrance Threaded Weatherhead	35.46	13.07
16120-0693	EA	1"	PVC Weatherhead For #6 AWG Cable Service Entrance Threaded Weatherhead	41.36	15.29
16120-0694	EA	1-1/4"	PVC Weatherhead For #4 Thru #2 AWG Cable Service Entrance Threaded Weatherhead	54.00	19.61
16120-0695	EA	1-1/2"	PVC Weatherhead For #4 Thru #2 AWG Cable Service Entrance Threaded Weatherhead	61.39	22.22
16120-0696	EA	2"	PVC Weatherhead For #1/0 Thru #2/0 AWG Cable Service Entrance Threaded Weatherhead	74.06	25.79
16120-0697	EA	2-1/2"	PVC Weatherhead For #3/0 Thru #4/0 Cable Service Entrance Threaded Weatherhead	120.06	29.08
16120-0698	EA	3"	PVC Weatherhead For 250 Thru 350 MCM Cable Service Entrance Threaded Weatherhead	130.30	32.68
16120-0699	EA	3-1/2"	PVC Weatherhead For 500 MCM Cable Service Entrance Threaded Weatherhead	211.59	45.75
16120-0700	EA	4"	PVC Weatherhead For 750 MCM Cable Service Entrance Threaded Weatherhead	290.78	65.36

16130 Raceways (16100)

16130-0001 Wireway With Screw Cover <small>(16130)</small>					
Note: Also known as wire trough. Galvanized steel construction. Mounted exposed on flat wall surface. Labor units include material unloading, unpacking at job site, layout of job, assembly and installation.					
16130-0002 2-1/2" x 2-1/2", Wireway With Screw Cover <small>(16130-0001)</small>					
16130-0003	LF	2-1/2" x 2-1/2"	NEMA 1, Surface Mounted Wireway With Screw Cover	11.04	2.99
			16MOD-0094 For Combination Hinged Screw Cover, Add	0.25	
			16MOD-0095 For Concrete Or Masonry Surface, Add	0.30	
16130-0004	EA	2-1/2" x 2-1/2"	End Plate For Surface Mounted Wireway With Screw Cover	10.80	4.48
			16MOD-0094 For Combination Hinged Screw Cover, Add	0.09	
16130-0005	EA	2-1/2" x 2-1/2"	Coupling For Surface Mounted Wireway With Screw Cover	13.02	5.59
			16MOD-0094 For Combination Hinged Screw Cover, Add	0.09	
16130-0006	EA	2-1/2" x 2-1/2"	Panel Adapter For Surface Mounted Wireway With Screw Cover	26.31	10.45
			16MOD-0094 For Combination Hinged Screw Cover, Add	0.27	

16000 Electrical**16100 Basic Materials And Methods****16130 Raceways**

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16130-0007	EA 2-1/2" x 2-1/2", Elbow For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	37.03 0.81	10.45
16130-0008	EA 2-1/2" x 2-1/2", Tee For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	54.31 1.23	14.88
16130-0009	EA 2-1/2" x 2-1/2", Cross For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	60.78 1.40	16.43
16130-0010	4" x 4", Wireway With Screw Cover <small>(16130-0001)</small>		
16130-0011	LF 4" x 4", NEMA 1, Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	13.58 0.31 0.37	3.76
16130-0012	LF 4" x 4", NEMA 3R, Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	21.90 0.72 0.37	3.76
16130-0013	EA 4" x 4", End Plate For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	8.49 0.10	3.29
16130-0014	EA 4" x 4", Coupling For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	14.47 0.10	6.27
16130-0015	EA 4" x 4", Panel Adapter For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	31.44 0.29	12.79
16130-0016	EA 4" x 4", Elbow For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	43.23 0.88	12.79
16130-0017	EA 4" x 4", Tee For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	59.97 1.34	16.61
16130-0018	EA 4" x 4", Cross For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	69.45 1.53	19.42
16130-0019	6" x 6", Wireway With Screw Cover <small>(16130-0001)</small>		
16130-0020	LF 6" x 6", NEMA 1, Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	19.39 0.52 0.45	4.48
16130-0021	LF 6" x 6", NEMA 3R, Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	33.98 1.25 0.45	4.48
16130-0022	EA 6" x 6", End Plate For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	10.25 0.15	3.58
16130-0023	EA 6" x 6", Coupling For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	18.02 0.15	7.46
16130-0024	EA 6" x 6", Panel Adapter For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	41.68 0.60	14.88
16130-0025	EA 6" x 6", Elbow For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	54.14 1.22	14.88
16130-0026	EA 6" x 6", Tee For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	81.05 2.20	18.58
16130-0027	EA 6" x 6", Cross For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	89.01 2.30	21.51
16130-0028	8" x 8", Wireway With Screw Cover <small>(16130-0001)</small>		
16130-0029	LF 8" x 8", NEMA 1, Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	29.29 0.98 0.49	4.90
16130-0030	LF 8" x 8", NEMA 3R, Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	50.07 2.02 0.49	4.90
16130-0031	EA 8" x 8", End Plate For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	11.24 0.17	3.88
16130-0032	EA 8" x 8", Coupling For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	19.60 0.17	8.07
16130-0033	EA 8" x 8", Panel Adapter For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	46.35 0.68	16.37
16130-0034	EA 8" x 8", Elbow For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	66.58 1.69	16.37
16130-0035	EA 8" x 8", Tee For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	95.65 2.76	20.20
16130-0036	EA 8" x 8", Cross For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	130.43 4.07	24.50
16130-0037	10" x 10", Wireway With Screw Cover <small>(16130-0001)</small>		
16130-0038	LF 10" x 10", NEMA 1, Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	41.34 1.50 0.57	5.68
16130-0039	LF 10" x 10", NEMA 3R, Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i> <i>16MOD-0095 For Concrete Or Masonry Surface, Add</i>	69.46 2.90 0.57	5.68
16130-0040	EA 10" x 10", End Plate For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	14.92 0.30	4.48
16130-0041	EA 10" x 10", Coupling For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	23.89 0.30	8.96
16130-0042	EA 10" x 10", Panel Adapter For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	58.42 1.14	17.81
16130-0043	EA 10" x 10", Elbow For Surface Mounted Wireway With Screw Cover <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	98.55 3.15	17.81
16130-0044	EA 10" x 10", Tee For Surface Mounted Wireway With Screw Cover..... <i>16MOD-0094 For Combination Hinged Screw Cover, Add</i>	145.24 5.02	22.46



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16130-0045	EA	10" x 10", Cross For Surface Mounted Wireway With Screw Cover.....	201.58	25.39
	16MOD-0094	For Combination Hinged Screw Cover, Add	7.54	
16130-0046		12" x 12", Wireway With Screw Cover (16130-0001)		
16130-0047	LF	12" x 12", NEMA 1, Surface Mounted Wireway With Screw Cover	48.71	6.87
	16MOD-0094	For Combination Hinged Screw Cover, Add	1.75	
	16MOD-0095	For Concrete Or Masonry Surface, Add	0.69	
16130-0048	LF	12" x 12", NEMA 3R, Surface Mounted Wireway With Screw Cover	76.97	6.87
	16MOD-0094	For Combination Hinged Screw Cover, Add	3.16	
	16MOD-0095	For Concrete Or Masonry Surface, Add	0.69	
16130-0049	EA	12" x 12", End Plate For Surface Mounted Wireway With Screw Cover	18.67	4.78
	16MOD-0094	For Combination Hinged Screw Cover, Add	0.46	
16130-0050	EA	12" x 12", Coupling For Surface Mounted Wireway With Screw Cover.....	28.23	9.56
	16MOD-0094	For Combination Hinged Screw Cover, Add	0.46	
16130-0051	EA	12" x 12", Panel Adapter For Surface Mounted Wireway With Screw Cover	73.29	19.42
	16MOD-0094	For Combination Hinged Screw Cover, Add	1.72	
16130-0052	EA	12" x 12", Elbow For Surface Mounted Wireway With Screw Cover	126.43	19.42
	16MOD-0094	For Combination Hinged Screw Cover, Add	4.38	
16130-0053	EA	12" x 12", Tee For Surface Mounted Wireway With Screw Cover.....	162.08	23.90
	16MOD-0094	For Combination Hinged Screw Cover, Add	5.71	
16130-0054	EA	12" x 12", Cross For Surface Mounted Wireway With Screw Cover.....	253.85	26.89
	16MOD-0094	For Combination Hinged Screw Cover, Add	10.00	
16130-0055		Surface Metal Raceways (16130)		
		Note: Exposed on flat wall surface. Labor units include material unloading, unpacking at job site, layout of job, assembly and installation.		
16130-0056		One Piece Surface Metal Raceways (16130-0055)		
		Note: Exposed installations on masonry, concrete masonry unit (CMU) or drywall walls or ceilings. Labor units to include material handling, unloading at job site, layout of job, measuring, cutting and assembly (Wiremold or approved equal).		
16130-0057		#500, 3/4" x 17/32" (16130-0056)		
		Note: Available in ivory.		
16130-0058	LF	#500 Raceway	2.84	0.89
	16MOD-0095	For Concrete Or Masonry Surface, Add	0.09	
16130-0059	EA	#502 Bushing	2.63	1.19
16130-0060	EA	#504 One Or Two Hole Strap.....	2.67	1.19
16130-0061	EA	#506 Connection Cover.....	2.78	1.19
16130-0062	EA	#511 Flat 90 Degree Elbow.....	4.38	1.43
16130-0063	EA	#512 Flat 45 Degree Elbow.....	7.67	1.49
16130-0064	EA	#517 Adjustable Internal Elbow.....	5.45	1.80
16130-0065	EA	#518 Adjustable External Elbow.....	5.31	1.80
16130-0066		#700, 3/4" x 21/32" (16130-0056)		
		Note: Available in ivory.		
16130-0067	LF	#700 Raceway	3.58	1.19
	16MOD-0095	For Concrete Or Masonry Surface, Add	0.12	
16130-0068	EA	#702 Bushing	2.72	1.19
16130-0069	EA	#704 One Or Two Hole Strap.....	2.83	1.19
16130-0070	EA	#706 Connection Cover.....	2.83	1.19
16130-0071	EA	#711 Flat 90 Degree Elbow.....	6.37	2.39
16130-0072	EA	#712 Flat 45 Degree Elbow.....	10.61	2.39
16130-0073	EA	#717 Adjustable Internal Elbow.....	6.96	2.39
16130-0074	EA	#718 Adjustable External Elbow.....	6.68	2.39
16130-0075		#500 And 700 Fittings (16130-0056)		
		Note: Available in ivory.		
16130-0076	EA	#5700F 18" Flex Fitting, For #500 Or 700	21.68	1.80
16130-0077	EA	#5701 Galvanized Coupling, For #500 Or 700	2.79	1.19
16130-0078	EA	#5703 Supporting Clip, For #500 Or 700	2.81	1.19
16130-0079	EA	#5709 Ground Clamp	8.60	1.80
16130-0080	EA	#5711 Twisted Internal Ell (Right Or Left)	8.51	2.39
16130-0081	EA	#5715 Tee	9.59	2.99
16130-0082	EA	#5719 Corner Box, 2-1/2" x 2-3/8" x 2-1/2"	18.49	2.39
16130-0083	EA	#57242 Utility Box For #200, #500 Or #700	12.94	2.39
16130-0084	EA	#5731 Blank Cover, 2-3/8" Diameter	6.79	1.49
16130-0085	EA	#5733 Outlet Box, 3" Diameter	15.91	2.39
16130-0086	EA	#5735 Distribution Box, 4-3/4" Square x 1-3/8" Deep.....	16.29	2.39
16130-0087	EA	#5736 Blank Cover, 4-3/8"	7.25	1.49
16130-0088	EA	#5737 Extension Box/Open Base, 4-3/4" Diameter.....	15.18	2.39
16130-0089	EA	#5737A Extension Box/Open Base, 5-1/2" Diameter	15.42	2.39
16130-0090	EA	#5739A Extension Box/Open Base, 6-3/8" Diameter	17.44	2.39
16130-0091	EA	#5738 Fixture Box/Solid Base, 4-3/4" Diameter	14.47	2.39
16130-0092	EA	#5738A Fixture Box/Solid Base, 5-1/2" Diameter	14.64	2.39
16130-0093	EA	#5739 Fixture Box/Solid Base, 6-3/8"	16.41	2.39
16130-0094	EA	#57240 Standard Switch Box For #200, #500, Or #700.....	19.98	3.88
16130-0095	EA	#57243G Duplex Receptacle And Box, Ground, For #200, #500 Or #700.....	29.35	7.46
16130-0096	EA	#5741 Switch And Receptacle Box For Shallow Type Switches, 2-13/16" x 4-5/8" x 1-3/8"	14.62	3.88
16130-0097	EA	#5744 Extra Deep Switch And Receptacle Box, 1 Gang, 4-5/8" x 2-7/8" x 2-3/4"	23.25	3.88
16130-0098	EA	#5744-2 Extra Deep Switch And Receptacle Box, 2 Gang, 4-3/4" x 4-3/4" x 2-3/4"	27.24	3.88
16130-0099	EA	#5744-3 Extra Deep Switch And Receptacle Box, 3 Gang, 4-5/8" x 6-1/2" x 2-3/4"	40.34	3.88
16130-0100	EA	#5744S Signal Box 1 Gang.....	21.19	3.29
16130-0101	EA	#5744S2 Signal Box 2 Gang.....	23.81	3.29

16000 Electrical**16100 Basic Materials And Methods****16130 Raceways**MINOR
CSI UOM DESCRIPTIONTOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

16130-0102	EA	#5744S3 Signal Box 3 Gang	37.82	3.29
16130-0103	EA	#5745 Combination Switch And Receptacle Box With 1/2" KO's, 4-5/8" x 2-7/8" x 1-3/4"	14.38	3.88
16130-0104	EA	#5747 Shallow Switch And Receptacle Box For Standard Shallow Devices, 1 Gang, 4-5/8" x 2-7/8" x 1-3/8"	13.15	3.88
16130-0105	EA	#5747-2 Shallow Switch And Receptacle Box For Standard Shallow Devices, 2 Gang, 4-3/4" x 4-3/4" x 1-3/8"	18.22	3.88
16130-0106	EA	#5747-3 Shallow Switch And Receptacle Box For Standard Shallow Devices, 3 Gang, 4-5/8" x 6-1/2" x 2-3/4"	37.48	3.88
16130-0107	EA	#5748 Switch And Receptacle Box For Deep Devices, 1 Gang, 4-5/8" x 2-7/8" x 1-3/4"	14.28	3.88
16130-0108	EA	#5748-2 Switch And Receptacle Box For Deep Devices, 2 Gang, 4-3/4" x 4-3/4" x 1-3/4"	19.49	3.88
16130-0109	EA	#5748-3 Switch And Receptacle Box For Deep Devices, 3 Gang, 4-5/8" x 6-1/2" x 1-3/4"	36.86	3.88
16130-0110	EA	#5748-4 Switch And Receptacle Box For Deep Devices, 4 Gang, 4-5/8" x 8-11/32" x 1-3/4"	55.14	3.88
16130-0111	EA	#5748-S Shallow Switch And Receptacle Box For Shallow Duplex Devices, 4-3/8" x 2-7/8" x 15/16"	13.38	3.88
16130-0112	EA	#5751 Flush-Type Extension Adapter, 1 Gang, 4-5/8" x 2-7/8" x 15/16"	13.58	3.88
16130-0113	EA	#5751-2 Flush-Type Extension Adapter, 2 Gang, 4-3/4" x 4-3/4" x 15/16"	19.13	3.88
16130-0114	EA	#5751-3 Flush-Type Extension Adapter, 3 Gang, 4-5/8" x 6-1/2" x 15/16"	37.07	3.88
16130-0115	EA	#5760 Blank Ext. Box	9.67	1.49
16130-0116	EA	#5780 Special Nipple, 1/2"	9.06	1.49
16130-0117	EA	#5781 1/2" Box Connector	5.78	1.49
16130-0118	EA	#5781A 3/4" Box Connector	11.48	1.80
16130-0119	EA	#5784 1/2" Elbow Conduit Connector	12.96	1.80
16130-0120	EA	#5785 Combination Connector, To Any 3-1/4" Or 4" Outlet Box	6.81	1.80
16130-0121	EA	#5782 1/2" Conduit Connector	5.89	1.49
16130-0122	EA	#5782A 3/4" Conduit Connector	14.40	1.80
16130-0123	EA	#5786 Offset Connector	12.42	1.80
16130-0124	EA	#5790B Armor Cable Connector	5.97	1.49

16130-0125 #1500, 1-9/16" x 11/32" (16130-0056)

Note: Galvanized finish.

16130-0126	LF	#1500-10 Raceway	5.10	1.49
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.75	
16130-0127	EA	#1500WC Wire Clip	2.93	1.19
16130-0128	EA	#1502 Bushing	3.64	1.49
16130-0129	EA	#1504 2-Hole Strap	4.13	1.80
16130-0130	EA	#1511 Flat Elbow	16.70	5.68
16130-0131	EA	#1517 Internal Elbow	16.70	5.68
16130-0132	EA	#1518 External Elbow	18.19	5.68
16130-0133	EA	#1528 Utility Box	17.65	3.88
16130-0134	EA	#1542D Junction Box	17.26	3.88
16130-0135	EA	#1543GL Duplex Receptacle	33.48	7.46
16130-0136	EA	#1546A Single Receptacle Box	19.09	3.88
16130-0137	EA	#1546B Duplex Receptacle Box	21.59	3.88
16130-0138	EA	#1546T Telephone Box	21.38	3.88
16130-0139	EA	#1585 Combination Connection	10.27	1.80

16130-0140 #2600, 2-7/32" x 28/32" (16130-0056)

Note: Galvanized finish.

16130-0141	LF	#2600-10 Raceway	8.69	2.69
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.27	
16130-0142	EA	#2600WC Wire Clip	3.04	1.19
16130-0143	EA	#2602 Fiber Bushing	3.44	1.19
16130-0144	EA	#2611 2-5/8 90 Degree Flat Elbow	12.65	2.09
16130-0145	EA	#2642D Junction Box, 5" Diameter	18.92	2.99
16130-0146	EA	#2686 Service Fitting	19.12	3.58

16130-0147 Two Piece Surface Metal Raceways (16130-0055)

Note: Exposed installations on masonry, concrete masonry unit (CMU) or drywall walls or ceilings. Labor units to include material handling, unloading at job site, layout of job, measuring, cutting and assembly (Wiremold or approved equal).

16130-0148 #2000, 3/4" x 1-9/32" (16130-0147)

16130-0149	LF	#2000BC Raceway Base And Cover	5.00	1.49
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.75	
16130-0150	EA	#2000WC Wire Clip	2.24	1.19
16130-0151	EA	#2001 Coupling	5.93	1.49
16130-0152	EA	#2003 Supporting Clip	2.96	0.89
16130-0153	EA	#2006 Cover Clip	2.71	0.89
16130-0154	EA	#2009 Ground Clamp	7.22	1.49
16130-0155	EA	#2010A2 Entrance End Fitting	13.95	4.48
16130-0156	EA	#2010A3 Entrance End Fitting	24.00	5.98
16130-0157	EA	#2010B Blank End Fitting	3.67	1.49
16130-0158	EA	#2011 Flat 90 Degree Elbow	12.00	3.88
16130-0159	EA	#2015 Tee	22.34	5.62
16130-0160	EA	#2017TC Internal Corner Coupling	7.63	2.99
16130-0161	EA	#2048 Single Gang device Box	18.32	5.32
16130-0162	EA	#2048-2 2-Gang device Box	29.36	5.92
16130-0163	EA	#2051H Flush Plate Adapter	19.73	5.92
16130-0164	EA	#2089 Side Reducing Connector	17.10	2.99
16130-0165	EA	#2089E End Reducing Connector	6.85	1.49

16130-0166 #2100, 1-1/4" x 7/8" (16130-0147)

Note: Available in buff, gray enamel or ivory.

16130-0167	LF	#2100B Raceway Base	4.74	1.49
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.75	
16130-0168	LF	#2100CA Raceway Cover	1.61	0.30
16130-0169	EA	#2100WC Wire Clip	2.27	1.19



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16130-0170	EA	#2101 Coupling	6.11	1.49
16130-0171	EA	#2101A Rigid Coupling	5.42	1.49
16130-0172	EA	#2106 Cover Clip	2.62	0.89
16130-0173	EA	#2109 Grounding Adapter	10.15	2.99
16130-0174	EA	#2110A 2-5/16" Entrance End Fitting	14.28	4.48
16130-0175	EA	#2110B Blank End Fitting.....	5.34	1.49
16130-0176	EA	#2110C1 3-1/2" Entrance End Fitting.....	29.02	4.48
16130-0177	EA	#2111 Flat 90 Degree Elbow.....	15.04	4.48
16130-0178	EA	#2115 Tee.....	17.21	4.42
16130-0179	EA	#2117TC Internal Coupling	13.72	4.42
16130-0180	EA	#2118A External Coupling.....	18.42	4.42
16130-0181	EA	#2135 Distribution Box	43.84	8.96
16130-0182	EA	#2141 Switch And Receptacle Box For Shallow Devices, 1 Gang, 4-5/8" x 2-7/8" x 1-3/8"	17.51	3.88
16130-0183	EA	#2141-2 Switch And Receptacle Box For Shallow Devices, 2 Gang, 4-3/4" x 4-3/4" x 1-3/8"	38.74	3.88
16130-0184	EA	#2144 Extra Deep Switch And Receptacle, 1 Gang, 4-5/8" x 2-7/8" x 2-3/4"	23.43	3.88
16130-0185	EA	#2144-2 Extra Deep Switch And Receptacle Box, 2 Gang, 4-3/4" x 4-3/4" x 2-3/4"	44.77	3.88
16130-0186	EA	#2151 Flush Type Extension Adapter, 1 Gang, 4-5/8" x 2-7/8" x 1-3/8"	15.41	2.39
16130-0187	EA	#2151-2 Flush Type Extension Adapter, 2 Gang, 4-3/4" x 4-3/4" x 1-3/8"	42.57	2.39
16130-0188		#2400, 1-7/8" x 7/8" <small>(16130-0147)</small>		
16130-0189	LF	#2400B Raceway Base	4.17	1.49
		16MOD-0004 For Aluminum 24XX Series, Add	1.18	
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.15	
16130-0190	LF	#2400C Raceway Cover	1.67	0.30
		16MOD-0004 For Aluminum 24XX Series, Add	1.07	
16130-0191	EA	#2400WC Wire Clip.....	2.23	1.19
		16MOD-0005 For Aluminum 24XX Series, Add	0.32	
16130-0192	EA	#2401 Coupling	5.88	1.49
		16MOD-0005 For Aluminum 24XX Series, Add	0.38	
16130-0193	EA	#2401D Raceway Coupling.....	4.94	1.49
		16MOD-0005 For Aluminum 24XX Series, Add	1.46	
16130-0194	EA	#2406 Cover Clip	2.81	0.89
		16MOD-0005 For Aluminum 24XX Series, Add	0.76	
16130-0195	EA	#2410A End Fitting.....	13.75	4.48
		16MOD-0005 For Aluminum 24XX Series, Add	3.62	
16130-0196	EA	#2410C Entrance End Fitting	21.01	4.48
		16MOD-0005 For Aluminum 24XX Series, Add	9.06	
16130-0197	EA	#2410B Blank End	3.69	1.49
		16MOD-0005 For Aluminum 24XX Series, Add	0.53	
16130-0198	EA	#2411M Flat 90 Degree Elbow.....	14.61	4.48
		16MOD-0005 For Aluminum 24XX Series, Add	4.24	
16130-0199	EA	#2415M Tee.....	17.53	4.42
		16MOD-0005 For Aluminum 24XX Series, Add	6.47	
16130-0200	EA	#2417M Internal Coupling.....	13.83	4.42
		16MOD-0005 For Aluminum 24XX Series, Add	3.70	
16130-0201	EA	#2418M External Coupling.....	17.21	4.42
		16MOD-0005 For Aluminum 24XX Series, Add	6.23	
16130-0202	EA	#2489 Side Reducing Connector	15.65	2.39
16130-0203		#3000, 2-3/4" x 1-17/32" <small>(16130-0147)</small>		
		Note: Available in both gray enamel and ivory.		
16130-0204	LF	#3000B Raceway Base	8.12	2.69
		16MOD-0006 For Aluminum 33XX Series, Add	4.38	
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.27	
16130-0205	LF	#3000CE Raceway Cover.....	2.03	0.30
		16MOD-0006 For Aluminum 33XX Series, Add	2.29	
16130-0206	EA	#3000WC Wire Clips For Conductors	3.12	1.19
		16MOD-0007 For Aluminum 33XX Series, Add	0.92	
16130-0207	EA	#3001 Couplings	7.99	1.19
		16MOD-0007 For Aluminum 33XX Series, Add	1.83	
16130-0208	EA	#3001A Rigid Inside Coupling.....	8.17	1.49
		16MOD-0007 For Aluminum 33XX Series, Add	3.63	
16130-0209	EA	#3003 Supporting Clip.....	5.93	1.49
		16MOD-0007 For Aluminum 33XX Series, Add	2.06	
16130-0210	EA	#3006E Clip Cover.....	3.31	1.19
		16MOD-0007 For Aluminum 33XX Series, Add	0.64	
16130-0211	EA	#3007C Device Brackets.....	8.83	2.39
		16MOD-0007 For Aluminum 33XX Series, Add	2.84	
16130-0212	EA	#3008C C-Hanger.....	9.97	1.80
		16MOD-0007 For Aluminum 33XX Series, Add	4.47	
16130-0213	EA	#3010AE Entrance End Fitting For Connecting To 1/2" Conduit Or Armored Connectors.....	20.10	5.68
		16MOD-0007 For Aluminum 33XX Series, Add	6.12	
16130-0214	EA	#3010B Blank End Fittings	7.36	2.39
		16MOD-0007 For Aluminum 33XX Series, Add	1.81	
16130-0215	EA	#3010C Entrance End Fitting For Connecting To Rigid Or Flexible Conduit.....	22.43	5.68
		16MOD-0007 For Aluminum 33XX Series, Add	7.75	
16130-0216	EA	#3011E Flat 90 Degree Elbow	33.74	7.41
		16MOD-0007 For Aluminum 33XX Series, Add	13.26	
16130-0217	EA	#3014C Wall Box Connector	24.20	7.46
		16MOD-0007 For Aluminum 33XX Series, Add	6.52	
16130-0218	EA	#3015E Tee Fitting.....	47.52	9.26
		16MOD-0007 For Aluminum 33XX Series, Add	20.29	
16130-0219	EA	#3017TCE Internal Corner Coupling.....	21.98	5.68
		16MOD-0007 For Aluminum 33XX Series, Add	7.43	
16130-0220	EA	#3018AE External Corner	27.55	5.68
		16MOD-0007 For Aluminum 33XX Series, Add	11.33	

16000 Electrical**16100 Basic Materials And Methods****16130 Raceways**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16130-0221	EA	#3027AE Single Receptacle Cover, With Face Diameters Of 1.38"-1.4".....	19.11	5.68
		16MOD-0007 For Aluminum 33XX Series, Add	5.43	
16130-0222	EA	#3028 Utility Box.....	34.85	5.68
		16MOD-0007 For Aluminum 33XX Series, Add	16.44	
16130-0223	EA	#3033JE Single Receptacle Cover, With Face Diameters Of 1.56"-1.57".....	10.74	1.49
		16MOD-0007 For Aluminum 33XX Series, Add	5.43	
16130-0224	EA	#3036HE Blank Cover.....	12.52	1.49
		16MOD-0007 For Aluminum 33XX Series, Add	6.67	
16130-0225	EA	#3040CE Switch Cover.....	10.94	1.49
		16MOD-0007 For Aluminum 33XX Series, Add	5.57	
16130-0226	EA	#3044-2 Extra Deep Switch And Receptacle Box, 2 Gang.....	35.45	5.68
		16MOD-0007 For Aluminum 33XX Series, Add	16.85	
16130-0227	EA	#3046BE Duplex Receptacle Cover.....	11.08	1.80
		16MOD-0007 For Aluminum 33XX Series, Add	5.25	
16130-0228		#4000, 4-3/4" x 1-3/4" (16130-0147)		
		Note: Available in gray enamel or ivory.		
16130-0229	LF	#4000B-10 Raceway Base.....	10.10	2.69
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.29	
16130-0230	LF	#4000C Raceway Cover.....	3.67	0.30
16130-0231	LF	#4000D Divider.....	1.74	0.30
16130-0232	EA	#4000WC Wire Clips For Conductors.....	3.93	1.49
16130-0233	EA	#4001A Couplings.....	10.06	1.80
16130-0234	EA	#4001D Divider Clip.....	4.59	1.80
16130-0235	EA	#4007C-1 Device Plate, 1 Gang.....	10.83	3.88
16130-0236	EA	#4007C-1R Single Device Fitting.....	14.09	3.88
16130-0237	EA	#4007C-2 Device Plate, 2 Gang.....	11.58	3.88
16130-0238	EA	#4010B Blank End Fittings.....	10.91	2.39
16130-0239	EA	#4010D Entrance End Fitting.....	41.52	9.20
16130-0240	EA	#4011 Flat 90 Degree Elbow.....	38.61	7.46
16130-0241	EA	#4012TX Internal Or External 45 Degree Elbow.....	44.56	9.26
16130-0242	EA	#4014A Wall Box Connector.....	61.02	9.26
16130-0243	EA	#4015 Tee Fitting.....	63.48	9.26
16130-0244	EA	#4015D Divided Tee Fitting.....	68.07	9.26
16130-0245	EA	#4017 Internal Elbow.....	34.03	9.26
16130-0246	EA	#4017N Inverted Internal Elbow.....	37.51	9.26
16130-0247	EA	#4017TC Internal Corner Coupling.....	31.73	9.26
16130-0248	EA	#4018 External Elbow.....	51.20	9.26
16130-0249	EA	#4046A Or B Combination Single Or Double Receptacle And Telephone Outlet Cover.....	16.61	3.88
16130-0250	EA	#4046H Tap-Off Fitting.....	14.62	3.88
16130-0251	EA	#4046J Combination Single Receptacle And Phone Outlet Center.....	13.41	1.80
16130-0252	EA	#4046T Telephone Outlet Cover.....	12.57	1.49
16130-0253	EA	#4074A Take-off Connector, #4000 To #3000.....	86.01	9.26
16130-0254	EA	#4086A Panel Connector.....	55.97	17.63
16130-0255		#6000, 4-3/4" x 3-9/16" (16130-0147)		
		Note: Available in gray enamel or ivory.		
16130-0256	LF	#6000B-10 Raceway Base.....	15.04	3.29
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.33	
16130-0257	LF	#6000C Raceway Cover.....	4.39	0.89
16130-0258	LF	#6000D Divider.....	4.57	0.89
16130-0259	EA	#6000WC Wire Clips For Conductors.....	4.49	1.49
16130-0260	EA	#6001A Couplings.....	12.26	2.99
16130-0261	EA	#6001D Divider Clip.....	5.44	1.49
16130-0262	EA	#6001TX Converter Coupling.....	15.72	3.88
16130-0263	EA	#6006 Connection Cover.....	15.34	3.88
16130-0264	EA	#6007C-1 Single Gang Device Plate.....	15.95	3.88
16130-0265	EA	#6007C-2 Two Gang Device Plate.....	17.39	3.88
16130-0266	EA	#6008A C-Hanger.....	24.71	5.68
16130-0267	EA	#6010B Blank End Fittings.....	26.61	8.96
16130-0268	EA	#6011TX Combination Flat Elbow.....	52.57	8.96
16130-0269	EA	#6012TX Internal - External 45 Degree Elbow.....	52.27	8.61
16130-0270	EA	#6014A Connector Fitting.....	77.21	9.26
16130-0271	EA	#6017TX Combination Internal-External Elbow.....	54.22	10.15
16130-0272	EA	#6046KD Circuit Breaker Housing.....	93.67	10.15
16130-0273	EA	#6074 Take-off Connector, #6000 To #6000.....	99.29	8.96
16130-0274	EA	#6074A Take-off Connector, #6000 To #4000.....	99.29	8.96
16130-0275	EA	#6086 Panel Connector.....	56.50	20.80
16130-0276		Surface Metal Raceway With Outlets (16130-0059)		
		Note: Exposed installations on masonry, concrete masonry unit (CMU) or drywall walls or ceilings. Labor units to include material handling, unloading at job site, layout of job, measuring, cutting and assembly (Wiremold or approved equal).		
16130-0277	LF	Plugmold #2000, 3' With Outlets 6" On Center, Single Circuit.....	20.82	4.77
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.48	
16130-0278	LF	Plugmold #2000, 6' With Outlets 6" On Center, Single Circuit.....	16.56	3.40
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.34	
16130-0279	LF	Plugmold #2000, 6' With Outlets 9" On Center, Single Circuit.....	15.04	3.59
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.36	
16130-0280	LF	Plugmold #2000, 6' With Outlets 12" On Center, Single Circuit.....	14.14	3.40
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.34	
16130-0281	LF	Plugmold #2000, 6' With Outlets 18" On Center, Single Circuit.....	13.04	3.46
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.34	
16130-0282	LF	Plugmold #2000, 6' With Outlets 9" On Center, Two Circuits.....	20.15	3.40
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.34	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16130-0283	LF	Plugmold #2000, 6' With Outlets 12" On Center, Two Circuits.....	17.14	3.40
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.34	
16130-0284	LF	Plugmold #2000, 6' With Outlets 18" On Center, Two Circuits.....	15.98	3.40
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.34	
16130-0285		Surface Non-Metallic Raceways (16130)		
		Note: Exposed on flat wall surface. Labor units include material unloading, unpacking at job site, layout of job, assembly and installation.		
16130-0286		Wiremold Non-Metallic Raceways (16130-0285)		
		Note: Exposed on flat wall surface. Labor units include material unloading, unpacking at job site, layout of job, assembly and installation.		
16130-0287		#400, 7/16" x 7/8" (16130-0286)		
16130-0288	LF	#400BC Raceway Base And Cover	4.18	1.19
		16MOD-0008 For Adhesive Back, Add	0.06	
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.12	
16130-0289	EA	#400WC Wire Clip.....	2.68	1.19
16130-0290	EA	#406 Cover Clip	2.86	1.19
16130-0291	EA	#410B Blank End Clip	5.45	2.39
16130-0292	EA	#411 Flat 90 Degree Elbow.....	6.57	2.39
16130-0293	EA	#415 Tee.....	8.32	2.99
16130-0294	EA	#417 Internal Elbow	6.44	2.39
16130-0295	EA	#418 External Elbow	6.44	2.39
16130-0296		#800, 7/16" x 1-5/16" (16130-0286)		
16130-0297	LF	#800BC Raceway Base And Cover	4.47	1.19
		16MOD-0009 For Adhesive Back, Add	0.10	
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.12	
16130-0298	EA	#800WC Wire Clip.....	2.74	1.19
16130-0299	EA	#806 Cover Clip	2.81	1.19
16130-0300	EA	#810A2 Entrance End Fitting	10.42	2.39
16130-0301	EA	#810B Blank End Fitting.....	5.53	2.39
16130-0302	EA	#811 Flat 90 Degree Elbow.....	6.64	2.39
16130-0303	EA	#815 Tee.....	8.39	2.99
16130-0304	EA	#817 Internal Elbow	6.50	2.39
16130-0305	EA	#818 External Elbow	6.50	2.39
16130-0306	EA	#889A End Reducer, #800 To #400.....	7.51	2.39
16130-0307		#2300, 11/16" x 2-1/4" (16130-0286)		
16130-0308	LF	#2300BC Raceway Base And Cover	5.27	1.19
		16MOD-0010 For Adhesive Back, Add	0.22	
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.12	
16130-0309	EA	#2300WC Wire Clip.....	2.79	1.19
16130-0310	EA	#2306 Cover Clip	3.11	1.19
16130-0311	EA	#2310A Entrance End Fitting	10.31	2.39
16130-0312	EA	#2310B Blank End Fitting.....	5.92	2.39
16130-0313	EA	#2311 Flat 90 Degree Elbow.....	6.79	2.39
16130-0314	EA	#2315 Tee.....	8.42	2.99
16130-0315	EA	#2317 Internal Elbow	6.79	2.39
16130-0316	EA	#2318 External Elbow	6.79	2.39
16130-0317	EA	#2389A End Reducer, #2300 To #800.....	8.13	2.39
16130-0318	EA	#2389 End Reducer, #2300 To #400.....	7.77	2.39
16130-0319		#400, #800 Or #2300 Fittings (16130-0286)		
16130-0320	EA	#2336 Blank Cover, 4-1/2" Diameter.....	9.02	2.09
16130-0321	EA	#2337A Extension Box, 5-1/2" Diameter	15.52	2.39
16130-0322	EA	#2338-A Fixture Box, 5-1/2" Diameter.....	15.52	2.39
16130-0323	EA	#2344 Extra Deep Device Box, 1 Gang, 2-3/4" Deep x 4-3/4" Long x 3" Wide	13.77	2.39
16130-0324	EA	#2344-2 Extra Deep Device Box, 2 Gang, 2-3/4" Deep x 4-3/4" Long x 4-7/8" Wide	15.99	2.39
16130-0325	EA	#2347 1-Gang Standard Device Box, 1-3/8" Deep x 4-3/4" Long x 3" Wide	12.52	3.88
16130-0326	EA	#2347-2 2-Gang Standard Device Box, 1-3/8" Deep x 4-3/4" Long x 4-7/8" Wide	14.82	3.88
16130-0327	EA	#2348 1-Gang Deep Device Box, 1-3/4" Deep x 4-3/4" Long x 3" Wide	13.16	3.88
16130-0328	EA	#2348-2 2-Gang Deep Device Box, 1-3/4" Deep x 4-3/4" Long x 4-7/8" Wide	16.51	3.88
16130-0329	EA	#2348-3 3-Gang Deep Device Box, 1-3/4" Deep x 5" Long x 7" Wide	21.10	3.88
16130-0330	EA	#2348S/51 Shallow Device And Extension Box, 7/8" Deep x 4-3/4" Long x 3" Wide	12.34	3.88
16130-0331		#2700, 3/4" x 3/8" (16130-0286)		
16130-0332	LF	#2700 Raceway	3.58	1.19
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.12	
16130-0333	EA	#2700WC 3/4" Wire Clip	1.44	0.60
16130-0334	EA	#2706 Cover Clip	2.38	0.60
16130-0335	EA	#2710B Blank End	3.58	1.19
16130-0336	EA	#2711 Flat 90 Degree Elbow.....	4.18	1.49
16130-0337	EA	#2715 Tee	6.57	2.69
16130-0338	EA	#2717 Internal Elbow	4.77	1.80
16130-0339	EA	#2718 External Elbow	4.77	1.80
16130-0340	EA	#2786 Drop Ceiling Connector.....	5.68	2.09
16130-0341		#2800, 1" x 1/2" (16130-0286)		

16000 Electrical**16100 Basic Materials And Methods****16130 Raceways**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16130-0342	LF	#2800 Raceway.....	4.51	1.49
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.15	
16130-0343	EA	#2800WC 1" Wire Clip.....	2.15	0.89
16130-0344	EA	#2806 Cover Clip.....	3.09	0.89
16130-0345	EA	#2810B Blank End.....	4.28	1.49
16130-0346	EA	#2811 Flat 90 Degree Elbow.....	5.47	2.09
16130-0347	EA	#2815 Tee.....	7.86	3.29
16130-0348	EA	#2817 Internal Elbow.....	6.07	2.39
16130-0349	EA	#2818 External Elbow.....	6.07	2.39
16130-0350	EA	#2886 Drop Ceiling Connector.....	6.88	2.69
16130-0351	EA	#2889 2800-2700 Reducer.....	6.28	2.39
16130-0352		#2900, 1-1/2" x 3/4" (16130-0286)		
16130-0353	LF	#2900 Raceway.....	5.51	1.80
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.18	
16130-0354	EA	#2900WC 1-1/2" Wire Clip.....	2.83	1.19
16130-0355	EA	#2906 Cover Clip.....	3.75	1.19
16130-0356	EA	#2910B Blank End.....	4.94	1.80
16130-0357	EA	#2911 Flat 90 Degree Elbow.....	6.14	2.39
16130-0358	EA	#2915 Tee.....	8.53	3.58
16130-0359	EA	#2917 Internal Elbow.....	6.74	2.69
16130-0360	EA	#2918 External Elbow.....	6.74	2.69
16130-0361	EA	#2986 Drop Ceiling Connector.....	6.88	2.69
16130-0362	EA	#2989A 2900-2800 Reducer.....	7.66	2.99
16130-0363	EA	#2989A 2900-2700 Reducer.....	7.46	2.99
16130-0364		#5000, 5" (16130-0286)		
16130-0365	LF	#5000B Base.....	8.76	2.69
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.27	
16130-0366	LF	#5000C Cover, Black, Gray Or White.....	8.19	2.69
16130-0367	LF	#5000C Cover, Vinyl, Black Or Gray.....	8.19	2.69
16130-0368	LF	#5000C Cover, Oak Veneer.....	14.80	2.69
16130-0369	LF	#5000C Cover, Wood.....	12.06	2.69
16130-0370	LF	#5000T Quarter Round Trim, Black, Gray Or White.....	1.25	0.30
16130-0371	LF	#5000T Quarter Round Trim, Vinyl, Black Or Gray.....	1.25	0.30
16130-0372	LF	#5000T Quarter Round Trim, Oak Veneer.....	4.67	0.30
16130-0373	LF	#5000T Quarter Round Trim, Wood Veneer.....	2.89	0.30
16130-0374	EA	#5001 Base Coupling.....	7.77	2.99
16130-0375	EA	#5004 Blank/Coax Adapter.....	4.71	1.49
16130-0376	EA	#5005 Low Voltage Blank Plate.....	6.39	1.80
16130-0377	EA	#5006 Cover Clip.....	8.72	2.99
16130-0378	EA	#5006A Internal Wire Guard.....	7.82	2.99
16130-0379	EA	#5007C Device Bracket.....	9.29	2.99
16130-0380	EA	#5007C-1 Device Plate.....	16.77	5.98
16130-0381	EA	#5007C-2 Deep Device Plate.....	17.01	5.98
16130-0382	EA	#5010 End Cap, Right Or Left.....	14.05	5.68
16130-0383	EA	#5010A Entrance End Feed.....	28.86	9.26
16130-0384	EA	#5017B Internal Base Elbow.....	18.97	7.46
16130-0385	EA	#5017C Internal Cover Elbow.....	17.88	5.98
16130-0386	EA	#5017WG Internal Elbow Wire Guard.....	11.93	4.48
16130-0387	EA	#5018B External Base Elbow.....	19.03	7.46
16130-0388	EA	#5018C External Cover Elbow.....	18.45	5.98
16130-0389	EA	#5018WG External Elbow Wire Guard.....	7.93	2.99
16130-0390		#5400, 5-1/4" x 1-11/16" (16130-0286)		
16130-0391	LF	#5400B Two Compartment Base.....	9.48	2.69
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.27	
16130-0392	LF	#5400TC Cover.....	2.22	0.30
16130-0393	EA	#5400TWC Wire Clips.....	3.42	1.49
16130-0394	EA	#5406 Cover Clip.....	5.01	1.80
16130-0395	EA	#5450 5-5/32" x 6" Device Bracket.....	14.71	2.99
16130-0396	EA	#5450A3 7-19/32" x 7-1/2" Device Bracket.....	20.03	2.99
16130-0397	EA	#5410 End Cap.....	16.64	5.68
16130-0398	EA	#5410D Entrance End Fitting.....	33.84	9.26
16130-0399	EA	#5411 Flat 90 Degree Elbow.....	31.25	7.46
16130-0400	EA	#5415 Tee Fitting.....	35.83	9.26
16130-0401	EA	#5417 Internal Elbow.....	28.87	9.26
16130-0402	EA	#5418 External Elbow.....	29.37	9.26
16130-0403	EA	#5474 Transition Fitting.....	30.73	9.26
16130-0404		#5500, 6-11/16" x 1-11/16" (16130-0286)		
16130-0405	LF	#5500BD Three Compartment Divided Base.....	12.28	2.69
		16MOD-0095 For Concrete Or Masonry Surface, Add	0.27	
16130-0406	LF	#5500C Cover.....	4.81	0.30
16130-0407	LF	#5500D Divider.....	2.07	0.30
16130-0408	EA	#5500WC Wire Clips.....	4.14	1.49
16130-0409	EA	#5506 Cover Clip.....	7.09	1.80
16130-0410	EA	#5550 6-5/8" x 6" Device Bracket.....	17.79	2.99
16130-0411	EA	#5550A4 9-5/8" x 7-1/2" Device Bracket.....	25.49	2.99
16130-0412	EA	#5510 End Cap.....	18.48	5.68
16130-0413	EA	#5510D Entrance End Fitting.....	39.27	9.26



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16130-0414	EA		#5511 Flat 90 Degree Elbow.....	36.90	7.46
16130-0415	EA		#5514A Backfeed Connector.....	27.92	7.46
16130-0416	EA		#5515 Tee Fitting.....	41.87	9.26
16130-0417	EA		#5517 Internal Elbow.....	32.49	9.26
16130-0418	EA		#5518 External Elbow.....	33.60	9.26
16130-0419	EA		#5574 Transition Fitting.....	35.44	9.26
16130-0420	EA		#5574A Transition Fitting.....	45.04	9.26

16130-0421 Under Carpet Power System (16130)

Note: Includes laying out, floor prep, taping, testing, drill floor, folds.

16130-0422	LF		Cable Flat 3 Conductor #12 With Attached Bottom Shield.....	2.57	0.30
16130-0423	LF		Top Shield, Steel.....	6.34	0.30
16130-0424	EA		Splice, 3-Conductor.....	16.50	5.08
16130-0425	EA		Splice Top Shield For 3 Conductor.....	5.30	2.39
16130-0426	EA		Tap 3-Conductor.....	20.38	5.98
16130-0427	EA		Insulating Patch, Splice Tap And End.....	29.31	5.08
16130-0428	EA		Transition Block Assembly 3-conductor.....	18.94	2.99
16130-0429	EA		Receptacles, Direct Connected Single, With Box.....	57.44	9.56
16130-0430	EA		Receptacles, Direct Connected Dual, With Box.....	95.16	14.94
16130-0431	EA		Box, Floor Mounted With Cover.....	93.12	11.95
16130-0432	LF		5-Conductor #12 With Attached Bottom Shield.....	3.98	0.30
16130-0433	LF		Shield, Top, Steel For 5 Conductor.....	3.95	0.30
16130-0434	EA		Splice, 5 Conductor.....	16.68	5.08
16130-0435	EA		Insulating Patch Splice Tap And End.....	24.50	2.99
16130-0436	EA		Transition Block Assembly 5 Conductor.....	24.50	2.99
16130-0437	EA		Box, Wall, Flush With Cover.....	45.62	11.95
16130-0438	EA		Telephone Transition Fitting Wall Box.....	31.21	9.86
16130-0439	EA		Telephone Fitting With Duplex Jack And Cover RJ-45.....	40.13	11.36
16130-0440	EA		Telephone Miniature With Duplex RJ-45.....	17.04	4.48
16130-0441	LF		Telephone 4-Pair Level 5 Under Carpet Wire.....	1.01	0.30
16130-0442	EA		BNC Coax Connector Plug.....	14.98	5.98
16130-0443	EA		TNC Connector Coax Plug.....	14.98	5.98
16130-0444	CLF		Flat RG A/U 59, 75 Ohm, RG A/U 62, 93 Ohm, RG A/U 58, 50 Ohm.....	77.90	29.88

16131 Conduit (16100)

Note: Includes warning tape for underground conduits. Where 4-1/2" conduit is required, use tasks for 5" conduit. Add couplings as required at each fitting.

16131-0001 Conduit Installed Above Grade (16131)

16131-0002 RGS Conduit (16131-0001)

Note: Exposed installation, conditions branch and feeder conduit. Excludes supporting strap, hanger and fastening.

16131-0003 RGS Conduit With Threaded Coupling (16131-0002)

Note: Includes field bending for conduit up to 1".

16131-0004	LF		1/2" RGS Conduit With Coupling, Mounted Exposed On Flat Wall.....	4.51	1.01
16MOD-0016			For > 250 To 500, Deduct	-0.06	
16MOD-0017			For > 500 To 1000, Deduct	-0.26	
16MOD-0018			For > 1000, Deduct	-0.37	
16MOD-0019			For Installation In Metal Stud Wall, Add	0.33	
16MOD-0020			For Installation In Wood Stud Wall (Includes Drilling), Add	0.82	
16MOD-0021			For Installation In Concrete (Excludes Concrete), Add	0.49	
16MOD-0029			For Work In Restricted Working Space, Add	0.99	
16MOD-0030			For Installation Above 14', Add	0.49	
16131-0005	LF		3/4" RGS Conduit With Coupling, Mounted Exposed On Flat Wall.....	5.08	1.25
16MOD-0016			For > 250 To 500, Deduct	-0.08	
16MOD-0017			For > 500 To 1000, Deduct	-0.29	
16MOD-0018			For > 1000, Deduct	-0.42	
16MOD-0019			For Installation In Metal Stud Wall, Add	0.36	
16MOD-0020			For Installation In Wood Stud Wall (Includes Drilling), Add	0.90	
16MOD-0021			For Installation In Concrete (Excludes Concrete), Add	0.54	
16MOD-0029			For Work In Restricted Working Space, Add	1.07	
16MOD-0030			For Installation Above 14', Add	0.54	
16131-0006	LF		1" RGS Conduit With Coupling, Mounted Exposed On Flat Wall.....	6.51	1.37
16MOD-0016			For > 250 To 500, Deduct	-0.12	
16MOD-0017			For > 500 To 1000, Deduct	-0.38	
16MOD-0018			For > 1000, Deduct	-0.55	
16MOD-0019			For Installation In Metal Stud Wall, Add	0.42	
16MOD-0020			For Installation In Wood Stud Wall (Includes Drilling), Add	1.05	
16MOD-0021			For Installation In Concrete (Excludes Concrete), Add	0.63	
16MOD-0029			For Work In Restricted Working Space, Add	1.25	
16MOD-0030			For Installation Above 14', Add	0.63	
16131-0007	LF		1-1/4" RGS Conduit With Coupling, Mounted Exposed On Flat Wall.....	7.88	1.86
16MOD-0016			For > 250 To 500, Deduct	-0.16	
16MOD-0017			For > 500 To 1000, Deduct	-0.47	
16MOD-0018			For > 1000, Deduct	-0.67	
16MOD-0019			For Installation In Metal Stud Wall, Add	0.48	
16MOD-0020			For Installation In Wood Stud Wall (Includes Drilling), Add	1.20	
16MOD-0021			For Installation In Concrete (Excludes Concrete), Add	0.72	
16MOD-0029			For Work In Restricted Working Space, Add	1.43	
16MOD-0030			For Installation Above 14', Add	0.72	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0008	LF	1-1/2" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	9.18	2.09
	16MOD-0016	For > 250 To 500, Deduct	-0.19	
	16MOD-0017	For > 500 To 1000, Deduct	-0.55	
	16MOD-0018	For > 1000, Deduct	-0.78	
	16MOD-0019	For Installation In Metal Stud Wall, Add	0.54	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	1.35	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	0.81	
	16MOD-0029	For Work In Restricted Working Space, Add	1.61	
	16MOD-0030	For Installation Above 14', Add	0.81	
16131-0009	LF	2" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	11.65	2.33
	16MOD-0016	For > 250 To 500, Deduct	-0.25	
	16MOD-0017	For > 500 To 1000, Deduct	-0.71	
	16MOD-0018	For > 1000, Deduct	-1.00	
	16MOD-0019	For Installation In Metal Stud Wall, Add	0.66	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	1.64	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	0.99	
	16MOD-0029	For Work In Restricted Working Space, Add	1.97	
	16MOD-0030	For Installation Above 14', Add	0.99	
16131-0010	LF	2-1/2" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	17.38	3.40
	16MOD-0016	For > 250 To 500, Deduct	-0.42	
	16MOD-0017	For > 500 To 1000, Deduct	-1.08	
	16MOD-0018	For > 1000, Deduct	-1.51	
	16MOD-0019	For Installation In Metal Stud Wall, Add	0.90	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	2.24	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	1.34	
	16MOD-0029	For Work In Restricted Working Space, Add	2.69	
	16MOD-0030	For Installation Above 14', Add	1.34	
16131-0011	LF	3" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	22.66	4.30
	16MOD-0016	For > 250 To 500, Deduct	-0.54	
	16MOD-0017	For > 500 To 1000, Deduct	-1.40	
	16MOD-0018	For > 1000, Deduct	-1.97	
	16MOD-0019	For Installation In Metal Stud Wall, Add	1.20	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	2.99	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	1.79	
	16MOD-0029	For Work In Restricted Working Space, Add	3.59	
	16MOD-0030	For Installation Above 14', Add	1.79	
16131-0012	LF	3-1/2" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	28.01	4.54
	16MOD-0016	For > 250 To 500, Deduct	-0.65	
	16MOD-0017	For > 500 To 1000, Deduct	-1.73	
	16MOD-0018	For > 1000, Deduct	-2.43	
	16MOD-0019	For Installation In Metal Stud Wall, Add	1.49	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	3.74	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	2.24	
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0013	LF	4" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	33.14	5.02
	16MOD-0016	For > 250 To 500, Deduct	-0.76	
	16MOD-0017	For > 500 To 1000, Deduct	-2.04	
	16MOD-0018	For > 1000, Deduct	-2.87	
	16MOD-0019	For Installation In Metal Stud Wall, Add	1.79	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	4.48	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	2.69	
	16MOD-0029	For Work In Restricted Working Space, Add	5.38	
	16MOD-0030	For Installation Above 14', Add	2.69	
16131-0014	LF	5" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	53.53	6.93
	16MOD-0016	For > 250 To 500, Deduct	-1.54	
	16MOD-0017	For > 500 To 1000, Deduct	-3.45	
	16MOD-0018	For > 1000, Deduct	-4.79	
	16MOD-0019	For Installation In Metal Stud Wall, Add	2.27	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	5.68	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	3.41	
	16MOD-0029	For Work In Restricted Working Space, Add	6.81	
	16MOD-0030	For Installation Above 14', Add	3.41	
16131-0015	LF	6" RGS Conduit With Coupling, Mounted Exposed On Flat Wall	72.01	9.08
	16MOD-0016	For > 250 To 500, Deduct	-2.17	
	16MOD-0017	For > 500 To 1000, Deduct	-4.68	
	16MOD-0018	For > 1000, Deduct	-6.48	
	16MOD-0019	For Installation In Metal Stud Wall, Add	2.87	
	16MOD-0020	For Installation In Wood Stud Wall (Includes Drilling), Add	7.17	
	16MOD-0021	For Installation In Concrete (Excludes Concrete), Add	4.30	
	16MOD-0029	For Work In Restricted Working Space, Add	8.60	
	16MOD-0030	For Installation Above 14', Add	4.30	
16131-0016		90 Degree Elbow <small>(16131-0002)</small>		
		See CSI section 16131-1572 for conduit field bending.		
16131-0017	EA	1/2" RGS 90 Degree Elbow	18.26	5.92
	16MOD-0029	For Work In Restricted Working Space, Add	4.45	
	16MOD-0030	For Installation Above 14', Add	2.23	
16131-0018	EA	3/4" RGS 90 Degree Elbow	22.14	7.35
	16MOD-0029	For Work In Restricted Working Space, Add	5.53	
	16MOD-0030	For Installation Above 14', Add	2.77	
16131-0019	EA	1" RGS 90 Degree Elbow	28.09	9.02
	16MOD-0029	For Work In Restricted Working Space, Add	6.75	
	16MOD-0030	For Installation Above 14', Add	3.37	
16131-0020	EA	1-1/4" RGS 90 Degree Elbow	34.20	10.45
	16MOD-0029	For Work In Restricted Working Space, Add	7.84	
	16MOD-0030	For Installation Above 14', Add	3.92	
16131-0021	EA	1-1/2" RGS 90 Degree Elbow	40.71	12.01
	16MOD-0029	For Work In Restricted Working Space, Add	8.99	
	16MOD-0030	For Installation Above 14', Add	4.50	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0022	EA	2" RGS 90 Degree Elbow.....	48.17	13.20
	16MOD-0029	For Work In Restricted Working Space, Add	9.89	
	16MOD-0030	For Installation Above 14', Add	4.95	
16131-0023	EA	2-1/2" RGS 90 Degree Elbow.....	70.28	16.49
	16MOD-0029	For Work In Restricted Working Space, Add	12.37	
	16MOD-0030	For Installation Above 14', Add	6.18	
16131-0024	EA	3" RGS 90 Degree Elbow.....	99.84	22.46
	16MOD-0029	For Work In Restricted Working Space, Add	16.85	
	16MOD-0030	For Installation Above 14', Add	8.42	
16131-0025	EA	3-1/2" RGS 90 Degree Elbow.....	132.67	25.33
	16MOD-0029	For Work In Restricted Working Space, Add	19.01	
	16MOD-0030	For Installation Above 14', Add	9.50	
16131-0026	EA	4" RGS 90 Degree Elbow.....	166.00	32.99
	16MOD-0029	For Work In Restricted Working Space, Add	24.73	
	16MOD-0030	For Installation Above 14', Add	12.37	
16131-0027	EA	5" RGS 90 Degree Elbow.....	261.69	53.78
	16MOD-0029	For Work In Restricted Working Space, Add	40.34	
	16MOD-0030	For Installation Above 14', Add	20.17	
16131-0028	EA	6" RGS 90 Degree Elbow.....	410.85	80.78
	16MOD-0029	For Work In Restricted Working Space, Add	60.59	
	16MOD-0030	For Installation Above 14', Add	30.29	
16131-0029		Plastic Bushing Set With Locknut <small>(16131-0002)</small>		
16131-0030	EA	1/2" RGS Plastic Bushing Set With Locknuts.....	8.12	3.11
	16MOD-0029	For Work In Restricted Working Space, Add	2.33	
	16MOD-0030	For Installation Above 14', Add	1.17	
16131-0031	EA	3/4" RGS Plastic Bushing Set With Locknuts.....	9.52	3.58
	16MOD-0029	For Work In Restricted Working Space, Add	2.69	
	16MOD-0030	For Installation Above 14', Add	1.34	
16131-0032	EA	1" RGS Plastic Bushing Set With Locknuts.....	12.27	4.54
	16MOD-0029	For Work In Restricted Working Space, Add	3.41	
	16MOD-0030	For Installation Above 14', Add	1.70	
16131-0033	EA	1-1/4" RGS Plastic Bushing Set With Locknuts.....	15.02	5.50
	16MOD-0029	For Work In Restricted Working Space, Add	4.12	
	16MOD-0030	For Installation Above 14', Add	2.06	
16131-0034	EA	1-1/2" RGS Plastic Bushing Set With Locknuts.....	16.81	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0035	EA	2" RGS Plastic Bushing Set With Locknuts.....	21.52	7.41
	16MOD-0029	For Work In Restricted Working Space, Add	5.66	
	16MOD-0030	For Installation Above 14', Add	2.78	
16131-0036	EA	2-1/2" RGS Plastic Bushing Set With Locknuts.....	37.17	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0037	EA	3" RGS Plastic Bushing Set With Locknuts.....	49.56	16.49
	16MOD-0029	For Work In Restricted Working Space, Add	12.37	
	16MOD-0030	For Installation Above 14', Add	6.18	
16131-0038	EA	3-1/2" RGS Plastic Bushing Set With Locknuts.....	60.98	19.36
	16MOD-0029	For Work In Restricted Working Space, Add	14.52	
	16MOD-0030	For Installation Above 14', Add	7.26	
16131-0039	EA	4" RGS Plastic Bushing Set With Locknuts.....	71.72	22.46
	16MOD-0029	For Work In Restricted Working Space, Add	16.85	
	16MOD-0030	For Installation Above 14', Add	8.42	
16131-0040	EA	5" RGS Plastic Bushing Set With Locknuts.....	104.95	28.44
	16MOD-0029	For Work In Restricted Working Space, Add	21.33	
	16MOD-0030	For Installation Above 14', Add	10.67	
16131-0041	EA	6" RGS Plastic Bushing Set With Locknuts.....	152.16	37.28
	16MOD-0029	For Work In Restricted Working Space, Add	27.96	
	16MOD-0030	For Installation Above 14', Add	13.98	
16131-0042		Steel Bushing Set With Locknut <small>(16131-0002)</small>		
16131-0043	EA	1/2" RGS Steel Bushing Set With Locknuts.....	8.24	3.11
	16MOD-0029	For Work In Restricted Working Space, Add	2.33	
	16MOD-0030	For Installation Above 14', Add	1.17	
16131-0044	EA	3/4" RGS Steel Bushing Set With Locknuts.....	9.68	3.58
	16MOD-0029	For Work In Restricted Working Space, Add	2.69	
	16MOD-0030	For Installation Above 14', Add	1.34	
16131-0045	EA	1" RGS Steel Bushing Set With Locknuts.....	12.48	4.54
	16MOD-0029	For Work In Restricted Working Space, Add	3.41	
	16MOD-0030	For Installation Above 14', Add	1.70	
16131-0046	EA	1-1/4" RGS Steel Insulated Bushing Set With Locknuts.....	17.92	5.50
	16MOD-0029	For Work In Restricted Working Space, Add	4.12	
	16MOD-0030	For Installation Above 14', Add	2.06	
16131-0047	EA	1-1/2" RGS Steel Insulated Bushing Set With Locknuts.....	20.35	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0048	EA	2" RGS Steel Insulated Bushing Set With Locknuts.....	26.22	7.41
	16MOD-0029	For Work In Restricted Working Space, Add	5.66	
	16MOD-0030	For Installation Above 14', Add	2.78	
16131-0049	EA	2-1/2" RGS Steel Insulated Bushing Set With Locknuts.....	45.19	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0050	EA	3" RGS Steel Insulated Bushing Set With Locknuts.....	61.09	16.25
	16MOD-0029	For Work In Restricted Working Space, Add	12.19	
	16MOD-0030	For Installation Above 14', Add	6.09	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0051	EA	3-1/2" RGS Steel Insulated Bushing Set With Locknuts.....	76.62	19.36
	16MOD-0029	For Work In Restricted Working Space, Add	14.52	
	16MOD-0030	For Installation Above 14', Add	7.26	
16131-0052	EA	4" RGS Steel Insulated Bushing Set With Locknuts.....	92.15	22.46
	16MOD-0029	For Work In Restricted Working Space, Add	16.85	
	16MOD-0030	For Installation Above 14', Add	8.42	
16131-0053	EA	5" RGS Steel Insulated Bushing Set With Locknuts.....	148.77	28.44
	16MOD-0029	For Work In Restricted Working Space, Add	21.33	
	16MOD-0030	For Installation Above 14', Add	10.67	
16131-0054	EA	6" RGS Steel Insulated Bushing Set With Locknuts.....	215.73	37.28
	16MOD-0029	For Work In Restricted Working Space, Add	27.96	
	16MOD-0030	For Installation Above 14', Add	13.98	
16131-0055		Steel Insulated Grounding Bushing Set With Locknut (16131-0002)		
16131-0056	EA	1/2" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	15.30	4.54
	16MOD-0029	For Work In Restricted Working Space, Add	3.41	
	16MOD-0030	For Installation Above 14', Add	1.70	
16131-0057	EA	3/4" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	18.76	5.50
	16MOD-0029	For Work In Restricted Working Space, Add	4.12	
	16MOD-0030	For Installation Above 14', Add	2.06	
16131-0058	EA	1" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	20.75	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0059	EA	1-1/4" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	26.02	7.41
	16MOD-0029	For Work In Restricted Working Space, Add	5.56	
	16MOD-0030	For Installation Above 14', Add	2.78	
16131-0060	EA	1-1/2" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	31.21	9.08
	16MOD-0029	For Work In Restricted Working Space, Add	6.81	
	16MOD-0030	For Installation Above 14', Add	3.41	
16131-0061	EA	2" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	37.52	10.51
	16MOD-0029	For Work In Restricted Working Space, Add	7.89	
	16MOD-0030	For Installation Above 14', Add	3.94	
16131-0062	EA	2-1/2" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	61.10	16.49
	16MOD-0029	For Work In Restricted Working Space, Add	12.37	
	16MOD-0030	For Installation Above 14', Add	6.18	
16131-0063	EA	3" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	73.80	19.36
	16MOD-0029	For Work In Restricted Working Space, Add	14.52	
	16MOD-0030	For Installation Above 14', Add	7.26	
16131-0064	EA	3-1/2" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	88.74	22.46
	16MOD-0029	For Work In Restricted Working Space, Add	16.85	
	16MOD-0030	For Installation Above 14', Add	8.43	
16131-0065	EA	4" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	105.76	25.33
	16MOD-0029	For Work In Restricted Working Space, Add	19.00	
	16MOD-0030	For Installation Above 14', Add	9.50	
16131-0066	EA	5" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	177.08	37.28
	16MOD-0029	For Work In Restricted Working Space, Add	27.96	
	16MOD-0030	For Installation Above 14', Add	13.98	
16131-0067	EA	6" RGS Steel Insulated Grounding Bushing Set With Locknuts.....	233.41	41.83
	16MOD-0029	For Work In Restricted Working Space, Add	31.37	
	16MOD-0030	For Installation Above 14', Add	15.69	
16131-0068		Box Connector With Set Screw (16131-0002)		
16131-0069	EA	1/2" RGS Box Connector With Set Screw.....	8.78	2.75
	16MOD-0029	For Work In Restricted Working Space, Add	2.05	
	16MOD-0030	For Installation Above 14', Add	1.02	
16131-0070	EA	3/4" RGS Box Connector With Set Screw.....	10.62	3.17
	16MOD-0029	For Work In Restricted Working Space, Add	2.37	
	16MOD-0030	For Installation Above 14', Add	1.19	
16131-0071	EA	1" RGS Box Connector With Set Screw.....	13.85	3.82
	16MOD-0029	For Work In Restricted Working Space, Add	2.86	
	16MOD-0030	For Installation Above 14', Add	1.43	
16131-0072	EA	1-1/4" RGS Box Connector, Insulated With Set Screw.....	20.33	4.73
	16MOD-0029	For Work In Restricted Working Space, Add	3.55	
	16MOD-0030	For Installation Above 14', Add	1.78	
16131-0073	EA	1-1/2" RGS Box Connector, Insulated With Set Screw.....	27.51	6.33
	16MOD-0029	For Work In Restricted Working Space, Add	4.76	
	16MOD-0030	For Installation Above 14', Add	2.38	
16131-0074	EA	2" RGS Box Connector, Insulated With Set Screw.....	46.60	9.50
	16MOD-0029	For Work In Restricted Working Space, Add	7.12	
	16MOD-0030	For Installation Above 14', Add	3.56	
16131-0075	EA	2-1/2" RGS Box Connector, Insulated With Set Screw.....	82.88	10.51
	16MOD-0029	For Work In Restricted Working Space, Add	7.89	
	16MOD-0030	For Installation Above 14', Add	3.95	
16131-0076	EA	3" RGS Box Connector, Insulated With Set Screw.....	98.81	12.73
	16MOD-0029	For Work In Restricted Working Space, Add	9.55	
	16MOD-0030	For Installation Above 14', Add	4.78	
16131-0077	EA	3-1/2" RGS Box Connector, Insulated With Set Screw.....	133.39	15.95
	16MOD-0029	For Work In Restricted Working Space, Add	11.96	
	16MOD-0030	For Installation Above 14', Add	5.98	
16131-0078	EA	4" RGS Box Connector, Insulated With Set Screw.....	156.35	19.12
	16MOD-0029	For Work In Restricted Working Space, Add	14.34	
	16MOD-0030	For Installation Above 14', Add	7.17	
16131-0079	EA	5" RGS Box Connector, Insulated With Set Screw.....	272.51	21.27
	16MOD-0029	For Work In Restricted Working Space, Add	15.94	
	16MOD-0030	For Installation Above 14', Add	7.97	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0080	EA		6" RGS Box Connector, Insulated With Set Screw.....	325.30	23.90
	16MOD-0029		For Work In Restricted Working Space, Add	17.92	
	16MOD-0030		For Installation Above 14', Add	8.96	
16131-0081			LB, LL Or LR 2 Hub Conduit Body With Cover <small>(16131-0002)</small>		
16131-0082	EA		1/2" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	39.44	11.48
	16MOD-0022		For Mogul LB, Add	6.64	
	16MOD-0029		For Work In Restricted Working Space, Add	8.60	
	16MOD-0030		For Installation Above 14', Add	4.30	
16131-0083	EA		3/4" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	45.78	13.14
	16MOD-0022		For Mogul LB, Add	8.04	
	16MOD-0029		For Work In Restricted Working Space, Add	9.86	
	16MOD-0030		For Installation Above 14', Add	4.93	
16131-0084	EA		1" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	57.36	15.30
	16MOD-0022		For Mogul LB, Add	12.43	
	16MOD-0029		For Work In Restricted Working Space, Add	11.47	
	16MOD-0030		For Installation Above 14', Add	5.74	
16131-0085	EA		1-1/4" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	72.11	17.45
	16MOD-0022		For Mogul LB, Add	19.19	
	16MOD-0029		For Work In Restricted Working Space, Add	13.09	
	16MOD-0030		For Installation Above 14', Add	6.54	
16131-0086	EA		1-1/2" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	76.30	19.12
	16MOD-0022		For Mogul LB, Add	18.98	
	16MOD-0029		For Work In Restricted Working Space, Add	14.34	
	16MOD-0030		For Installation Above 14', Add	7.17	
16131-0087	EA		2" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	116.88	22.94
	16MOD-0022		For Mogul LB, Add	41.76	
	16MOD-0029		For Work In Restricted Working Space, Add	17.21	
	16MOD-0030		For Installation Above 14', Add	8.61	
16131-0088	EA		2-1/2" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	200.31	32.27
	16MOD-0022		For Mogul LB, Add	85.70	
	16MOD-0029		For Work In Restricted Working Space, Add	24.20	
	16MOD-0030		For Installation Above 14', Add	12.10	
16131-0089	EA		3" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	262.02	43.02
	16MOD-0022		For Mogul LB, Add	110.47	
	16MOD-0029		For Work In Restricted Working Space, Add	32.27	
	16MOD-0030		For Installation Above 14', Add	16.13	
16131-0090	EA		3-1/2" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	398.11	53.78
	16MOD-0022		For Mogul LB, Add	191.02	
	16MOD-0029		For Work In Restricted Working Space, Add	40.34	
	16MOD-0030		For Installation Above 14', Add	20.17	
16131-0091	EA		4" RGS Type LB, LL Or LR 2 Hub Conduit Body With Cover.....	488.47	65.49
	16MOD-0022		For Mogul LB, Add	235.38	
	16MOD-0029		For Work In Restricted Working Space, Add	49.12	
	16MOD-0030		For Installation Above 14', Add	24.56	
16131-0092			Type T 3 Hub Conduit Body With Cover <small>(16131-0002)</small>		
16131-0093	EA		1/2" RGS Type T 3 Hub Conduit Body With Cover.....	45.91	13.14
	16MOD-0029		For Work In Restricted Working Space, Add	9.86	
	16MOD-0030		For Installation Above 14', Add	4.93	
16131-0094	EA		3/4" RGS Type T 3 Hub Conduit Body With Cover.....	53.75	15.30
	16MOD-0029		For Work In Restricted Working Space, Add	11.47	
	16MOD-0030		For Installation Above 14', Add	5.74	
16131-0095	EA		1" RGS Type T 3 Hub Conduit Body With Cover.....	64.87	16.73
	16MOD-0029		For Work In Restricted Working Space, Add	12.55	
	16MOD-0030		For Installation Above 14', Add	6.27	
16131-0096	EA		1-1/4" RGS Type T 3 Hub Conduit Body With Cover.....	80.09	19.12
	16MOD-0029		For Work In Restricted Working Space, Add	14.34	
	16MOD-0030		For Installation Above 14', Add	7.17	
16131-0097	EA		1-1/2" RGS Type T 3 Hub Conduit Body With Cover.....	94.36	21.03
	16MOD-0029		For Work In Restricted Working Space, Add	15.77	
	16MOD-0030		For Installation Above 14', Add	7.89	
16131-0098	EA		2" RGS Type T 3 Hub Conduit Body With Cover.....	126.74	24.62
	16MOD-0029		For Work In Restricted Working Space, Add	18.46	
	16MOD-0030		For Installation Above 14', Add	9.23	
16131-0099	EA		2-1/2" RGS Type T 3 Hub Conduit Body With Cover.....	213.71	35.85
	16MOD-0029		For Work In Restricted Working Space, Add	26.89	
	16MOD-0030		For Installation Above 14', Add	13.44	
16131-0100	EA		3" RGS Type T 3 Hub Conduit Body With Cover.....	292.50	46.60
	16MOD-0029		For Work In Restricted Working Space, Add	34.95	
	16MOD-0030		For Installation Above 14', Add	17.48	
16131-0101	EA		3-1/2" RGS Type T 3 Hub Conduit Body With Cover.....	437.14	57.37
	16MOD-0029		For Work In Restricted Working Space, Add	43.02	
	16MOD-0030		For Installation Above 14', Add	21.51	
16131-0102	EA		4" RGS Type T 3 Hub Conduit Body With Cover.....	521.65	69.08
	16MOD-0029		For Work In Restricted Working Space, Add	51.81	
	16MOD-0030		For Installation Above 14', Add	25.90	
16131-0103			Type C Conduit Body With Cover <small>(16131-0002)</small>		
16131-0104	EA		1/2" RGS Type C Conduit Body With Cover.....	35.48	11.48
	16MOD-0029		For Work In Restricted Working Space, Add	8.60	
	16MOD-0030		For Installation Above 14', Add	4.30	
16131-0105	EA		3/4" RGS Type C Conduit Body With Cover.....	42.63	13.14
	16MOD-0029		For Work In Restricted Working Space, Add	9.86	
	16MOD-0030		For Installation Above 14', Add	4.93	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0106	EA	1" RGS Type C Conduit Body With Cover.....	51.82	15.06
	16MOD-0029	For Work In Restricted Working Space, Add	11.29	
	16MOD-0030	For Installation Above 14', Add	5.65	
16131-0107	EA	1-1/4" RGS Type C Conduit Body With Cover.....	64.34	17.45
	16MOD-0029	For Work In Restricted Working Space, Add	13.09	
	16MOD-0030	For Installation Above 14', Add	6.54	
16131-0108	EA	1-1/2" RGS Type C Conduit Body With Cover.....	70.39	19.12
	16MOD-0029	For Work In Restricted Working Space, Add	14.34	
	16MOD-0030	For Installation Above 14', Add	7.17	
16131-0109	EA	2" RGS Type C Conduit Body With Cover.....	94.98	22.94
	16MOD-0029	For Work In Restricted Working Space, Add	17.21	
	16MOD-0030	For Installation Above 14', Add	8.61	
16131-0110	EA	2-1/2" RGS Type C Conduit Body With Cover.....	136.07	32.27
	16MOD-0029	For Work In Restricted Working Space, Add	24.20	
	16MOD-0030	For Installation Above 14', Add	12.10	
16131-0111	EA	3" RGS Type C Conduit Body With Cover.....	179.60	43.02
	16MOD-0029	For Work In Restricted Working Space, Add	32.27	
	16MOD-0030	For Installation Above 14', Add	16.13	
16131-0112	EA	3-1/2" RGS Type C Conduit Body With Cover.....	239.68	53.78
	16MOD-0029	For Work In Restricted Working Space, Add	40.34	
	16MOD-0030	For Installation Above 14', Add	20.17	
16131-0113	EA	4" RGS Type C Conduit Body With Cover.....	302.25	65.49
	16MOD-0029	For Work In Restricted Working Space, Add	49.11	
	16MOD-0030	For Installation Above 14', Add	24.56	
16131-0114		Type X 4 Hub Conduit Body With Cover (16131-0002)		
16131-0115	EA	1/2" RGS Type X 4 Hub Conduit Body With Cover.....	46.36	15.06
	16MOD-0029	For Work In Restricted Working Space, Add	11.29	
	16MOD-0030	For Installation Above 14', Add	5.65	
16131-0116	EA	3/4" RGS Type X 4 Hub Conduit Body With Cover.....	52.30	16.73
	16MOD-0029	For Work In Restricted Working Space, Add	12.55	
	16MOD-0030	For Installation Above 14', Add	6.27	
16131-0117	EA	1" RGS Type X 4 Hub Conduit Body With Cover.....	61.72	18.40
	16MOD-0029	For Work In Restricted Working Space, Add	13.80	
	16MOD-0030	For Installation Above 14', Add	6.90	
16131-0118	EA	1-1/4" RGS Type X 4 Hub Conduit Body With Cover.....	75.60	21.03
	16MOD-0029	For Work In Restricted Working Space, Add	15.77	
	16MOD-0030	For Installation Above 14', Add	7.89	
16131-0119	EA	1-1/2" RGS Type X 4 Hub Conduit Body With Cover.....	88.07	22.94
	16MOD-0029	For Work In Restricted Working Space, Add	17.21	
	16MOD-0030	For Installation Above 14', Add	8.61	
16131-0120	EA	2" RGS Type X 4 Hub Conduit Body With Cover.....	117.96	28.20
	16MOD-0029	For Work In Restricted Working Space, Add	21.15	
	16MOD-0030	For Installation Above 14', Add	10.58	
16131-0121	EA	2-1/2" RGS Type X 4 Hub Conduit Body With Cover.....	185.56	41.34
	16MOD-0029	For Work In Restricted Working Space, Add	31.01	
	16MOD-0030	For Installation Above 14', Add	15.51	
16131-0122	EA	3" RGS Type X 4 Hub Conduit Body With Cover.....	242.55	53.78
	16MOD-0029	For Work In Restricted Working Space, Add	40.34	
	16MOD-0030	For Installation Above 14', Add	20.17	
16131-0123	EA	3-1/2" RGS Type X 4 Hub Conduit Body With Cover.....	366.95	66.45
	16MOD-0029	For Work In Restricted Working Space, Add	49.83	
	16MOD-0030	For Installation Above 14', Add	24.92	
16131-0124	EA	4" RGS Type X 4 Hub Conduit Body With Cover.....	424.29	79.83
	16MOD-0029	For Work In Restricted Working Space, Add	59.87	
	16MOD-0030	For Installation Above 14', Add	29.94	
16131-0125		Off-Set Nipple (16131-0002)		
16131-0126	EA	1/2" RGS Off-Set Nipple.....	8.87	3.11
	16MOD-0029	For Work In Restricted Working Space, Add	2.35	
	16MOD-0030	For Installation Above 14', Add	1.17	
16131-0127	EA	3/4" RGS Off-Set Nipple.....	10.51	3.58
	16MOD-0029	For Work In Restricted Working Space, Add	2.67	
	16MOD-0030	For Installation Above 14', Add	1.34	
16131-0128	EA	1" RGS Off-Set Nipple.....	13.22	4.54
	16MOD-0029	For Work In Restricted Working Space, Add	3.42	
	16MOD-0030	For Installation Above 14', Add	1.71	
16131-0129	EA	1-1/4" RGS Off-Set Nipple, Insulated.....	16.60	5.44
	16MOD-0029	For Work In Restricted Working Space, Add	4.10	
	16MOD-0030	For Installation Above 14', Add	2.05	
16131-0130	EA	1-1/2" RGS Off-Set Nipple, Insulated.....	18.18	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.49	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0131	EA	2" RGS Off-Set Nipple, Insulated.....	23.54	7.35
	16MOD-0029	For Work In Restricted Working Space, Add	5.52	
	16MOD-0030	For Installation Above 14', Add	2.76	
16131-0132	EA	2-1/2" RGS Off-Set Nipple, Insulated.....	38.43	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0133	EA	3" RGS Off-Set Nipple, Insulated.....	60.63	16.49
	16MOD-0029	For Work In Restricted Working Space, Add	12.37	
	16MOD-0030	For Installation Above 14', Add	6.18	
16131-0134	EA	3-1/2" RGS Off-Set Nipple, Insulated.....	37.00	4.30
	16MOD-0029	For Work In Restricted Working Space, Add	3.24	
	16MOD-0030	For Installation Above 14', Add	1.62	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0135	EA	4" RGS Off-Set Nipple, Insulated	89.14	22.46
	16MOD-0029	For Work In Restricted Working Space, Add	16.85	
	16MOD-0030	For Installation Above 14', Add	8.43	
16131-0136		Erickson Fitting <small>(16131-0002)</small>		
		Note: 3-Piece coupling.		
16131-0137	EA	1/2" RGS Erickson Fitting.....	26.15	9.56
	16MOD-0029	For Work In Restricted Working Space, Add	7.18	
	16MOD-0030	For Installation Above 14', Add	3.59	
16131-0138	EA	3/4" RGS Erickson Fitting.....	29.50	10.69
	16MOD-0029	For Work In Restricted Working Space, Add	8.01	
	16MOD-0030	For Installation Above 14', Add	4.01	
16131-0139	EA	1" RGS Erickson Fitting.....	34.31	11.89
	16MOD-0029	For Work In Restricted Working Space, Add	8.93	
	16MOD-0030	For Installation Above 14', Add	4.46	
16131-0140	EA	1-1/4" RGS Erickson Fitting	41.75	13.02
	16MOD-0029	For Work In Restricted Working Space, Add	9.77	
	16MOD-0030	For Installation Above 14', Add	4.88	
16131-0141	EA	1-1/2" RGS Erickson Fitting	48.89	14.22
	16MOD-0029	For Work In Restricted Working Space, Add	10.69	
	16MOD-0030	For Installation Above 14', Add	5.34	
16131-0142	EA	2" RGS Erickson Fitting.....	59.89	15.42
	16MOD-0029	For Work In Restricted Working Space, Add	11.57	
	16MOD-0030	For Installation Above 14', Add	5.79	
16131-0143	EA	2-1/2" RGS Erickson Fitting	95.86	19.12
	16MOD-0029	For Work In Restricted Working Space, Add	14.34	
	16MOD-0030	For Installation Above 14', Add	7.17	
16131-0144	EA	3" RGS Erickson Fitting.....	131.82	23.90
	16MOD-0029	For Work In Restricted Working Space, Add	17.93	
	16MOD-0030	For Installation Above 14', Add	8.96	
16131-0145	EA	3-1/2" RGS Erickson Fitting	182.44	28.68
	16MOD-0029	For Work In Restricted Working Space, Add	21.52	
	16MOD-0030	For Installation Above 14', Add	10.76	
16131-0146	EA	4" RGS Erickson Fitting.....	209.28	31.07
	16MOD-0029	For Work In Restricted Working Space, Add	23.30	
	16MOD-0030	For Installation Above 14', Add	11.65	
16131-0147	EA	5" RGS Erickson Fitting.....	358.81	38.24
	16MOD-0029	For Work In Restricted Working Space, Add	28.68	
	16MOD-0030	For Installation Above 14', Add	14.34	
16131-0148	EA	6" RGS Erickson Fitting.....	462.82	44.21
	16MOD-0029	For Work In Restricted Working Space, Add	33.16	
	16MOD-0030	For Installation Above 14', Add	16.58	
16131-0149		Rigid To EMT Connector <small>(16131-0002)</small>		
16131-0150	EA	1/2" Rigid To EMT Connector.....	14.75	4.78
	16MOD-0029	For Work In Restricted Working Space, Add	3.59	
	16MOD-0030	For Installation Above 14', Add	1.79	
16131-0151	EA	3/4" Rigid To EMT Connector.....	16.45	5.26
	16MOD-0029	For Work In Restricted Working Space, Add	3.94	
	16MOD-0030	For Installation Above 14', Add	1.97	
16131-0152	EA	1" Rigid To EMT Connector	18.88	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0153	EA	1-1/4" Rigid To EMT Connector	21.33	6.45
	16MOD-0029	For Work In Restricted Working Space, Add	4.84	
	16MOD-0030	For Installation Above 14', Add	2.42	
16131-0154	EA	1-1/2" Rigid To EMT Connector	25.18	7.17
	16MOD-0029	For Work In Restricted Working Space, Add	5.38	
	16MOD-0030	For Installation Above 14', Add	2.69	
16131-0155	EA	2" Rigid To EMT Connector	30.44	7.89
	16MOD-0029	For Work In Restricted Working Space, Add	5.92	
	16MOD-0030	For Installation Above 14', Add	2.96	
16131-0156	EA	2-1/2" Rigid To EMT Connector	41.09	9.56
	16MOD-0029	For Work In Restricted Working Space, Add	7.17	
	16MOD-0030	For Installation Above 14', Add	3.59	
16131-0157	EA	3" Rigid To EMT Connector	50.85	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0158	EA	3-1/2" Rigid To EMT Connector	61.08	14.34
	16MOD-0029	For Work In Restricted Working Space, Add	10.76	
	16MOD-0030	For Installation Above 14', Add	5.38	
16131-0159	EA	4" Rigid To EMT Connector	68.80	15.53
	16MOD-0029	For Work In Restricted Working Space, Add	11.65	
	16MOD-0030	For Installation Above 14', Add	5.83	
16131-0160		Rain Tight Threaded Hub <small>(16131-0002)</small>		
16131-0161	EA	1/2" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	13.12	4.78
	16MOD-0029	For Work In Restricted Working Space, Add	3.59	
	16MOD-0030	For Installation Above 14', Add	1.79	
16131-0162	EA	3/4" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	16.69	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0163	EA	1" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	20.52	7.17
	16MOD-0029	For Work In Restricted Working Space, Add	5.38	
	16MOD-0030	For Installation Above 14', Add	2.69	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0164	EA	1-1/4" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	24.58	8.37
	16MOD-0029	For Work In Restricted Working Space, Add	6.28	
	16MOD-0030	For Installation Above 14', Add	3.14	
16131-0165	EA	1-1/2" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	28.62	9.56
	16MOD-0029	For Work In Restricted Working Space, Add	7.17	
	16MOD-0030	For Installation Above 14', Add	3.59	
16131-0166	EA	2" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	33.70	10.76
	16MOD-0029	For Work In Restricted Working Space, Add	8.07	
	16MOD-0030	For Installation Above 14', Add	4.03	
16131-0167	EA	2-1/2" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	41.30	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0168	EA	3" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	48.25	13.14
	16MOD-0029	For Work In Restricted Working Space, Add	9.86	
	16MOD-0030	For Installation Above 14', Add	4.93	
16131-0169	EA	3-1/2" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	58.77	15.53
	16MOD-0029	For Work In Restricted Working Space, Add	11.65	
	16MOD-0030	For Installation Above 14', Add	5.83	
16131-0170	EA	4" RGS Threaded Hubs, Rain Tight, Die Cast Zinc.....	66.97	16.73
	16MOD-0029	For Work In Restricted Working Space, Add	12.55	
	16MOD-0030	For Installation Above 14', Add	6.27	
16131-0171		Expansion Fitting <small>(16131-0002)</small>		
16131-0172	EA	1/2" RGS Expansion Coupling	74.37	9.56
	16MOD-0029	For Work In Restricted Working Space, Add	7.17	
	16MOD-0030	For Installation Above 14', Add	3.59	
16131-0173	EA	3/4" RGS Expansion Coupling	82.40	10.76
	16MOD-0029	For Work In Restricted Working Space, Add	8.07	
	16MOD-0030	For Installation Above 14', Add	4.03	
16131-0174	EA	1" RGS Expansion Coupling	91.57	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0175	EA	1-1/4" RGS Expansion Coupling	109.83	13.14
	16MOD-0029	For Work In Restricted Working Space, Add	9.86	
	16MOD-0030	For Installation Above 14', Add	4.93	
16131-0176	EA	1-1/2" RGS Expansion Coupling	133.47	14.34
	16MOD-0029	For Work In Restricted Working Space, Add	10.76	
	16MOD-0030	For Installation Above 14', Add	5.38	
16131-0177	EA	2" RGS Expansion Coupling	173.45	15.53
	16MOD-0029	For Work In Restricted Working Space, Add	11.65	
	16MOD-0030	For Installation Above 14', Add	5.83	
16131-0178	EA	2-1/2" RGS Expansion Coupling	259.25	19.12
	16MOD-0029	For Work In Restricted Working Space, Add	14.34	
	16MOD-0030	For Installation Above 14', Add	7.17	
16131-0179	EA	3" RGS Expansion Coupling	312.32	23.90
	16MOD-0029	For Work In Restricted Working Space, Add	17.93	
	16MOD-0030	For Installation Above 14', Add	8.96	
16131-0180	EA	3-1/2" RGS Expansion Coupling	432.40	28.68
	16MOD-0029	For Work In Restricted Working Space, Add	21.51	
	16MOD-0030	For Installation Above 14', Add	10.76	
16131-0181	EA	4" RGS Expansion Coupling	498.79	31.07
	16MOD-0029	For Work In Restricted Working Space, Add	23.30	
	16MOD-0030	For Installation Above 14', Add	11.65	
16131-0182	EA	5" RGS Expansion Coupling	685.09	38.24
	16MOD-0029	For Work In Restricted Working Space, Add	28.68	
	16MOD-0030	For Installation Above 14', Add	14.34	
16131-0183	EA	6" RGS Expansion Coupling	1,097.46	42.43
	16MOD-0029	For Work In Restricted Working Space, Add	31.84	
	16MOD-0030	For Installation Above 14', Add	15.92	
16131-0184		Sealing Fitting Vertical/Horizontal <small>(16131-0002)</small>		
16131-0185	EA	1/2" RGS Conduit Sealing Fitting Vertical/Horizontal	49.30	14.94
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0186	EA	3/4" RGS Conduit Sealing Fitting Vertical/Horizontal	58.66	17.93
	16MOD-0029	For Work In Restricted Working Space, Add	10.76	
	16MOD-0030	For Installation Above 14', Add	5.38	
16131-0187	EA	1" RGS Conduit Sealing Fitting Vertical/Horizontal	71.14	20.92
	16MOD-0029	For Work In Restricted Working Space, Add	12.55	
	16MOD-0030	For Installation Above 14', Add	6.27	
16131-0188	EA	1-1/4" RGS Conduit Sealing Fitting Vertical/Horizontal	83.40	23.90
	16MOD-0029	For Work In Restricted Working Space, Add	14.34	
	16MOD-0030	For Installation Above 14', Add	7.17	
16131-0189	EA	1-1/2" RGS Conduit Sealing Fitting Vertical/Horizontal	107.37	26.89
	16MOD-0029	For Work In Restricted Working Space, Add	16.13	
	16MOD-0030	For Installation Above 14', Add	8.07	
16131-0190	EA	2" RGS Conduit Sealing Fitting Vertical/Horizontal	129.18	29.88
	16MOD-0029	For Work In Restricted Working Space, Add	17.93	
	16MOD-0030	For Installation Above 14', Add	8.96	
16131-0191	EA	2-1/2" RGS Conduit Sealing Fitting Vertical/Horizontal	179.57	35.85
	16MOD-0029	For Work In Restricted Working Space, Add	21.51	
	16MOD-0030	For Installation Above 14', Add	10.76	
16131-0192	EA	3" RGS Conduit Sealing Fitting Vertical/Horizontal	215.42	41.83
	16MOD-0029	For Work In Restricted Working Space, Add	25.10	
	16MOD-0030	For Installation Above 14', Add	12.55	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0193	EA	3-1/2" RGS Conduit Sealing Fitting Vertical/Horizontal	475.63	47.81
	16MOD-0029	For Work In Restricted Working Space, Add	28.68	
	16MOD-0030	For Installation Above 14', Add	14.34	
16131-0194	EA	4" RGS Conduit Sealing Fitting Vertical/Horizontal	547.37	53.78
	16MOD-0029	For Work In Restricted Working Space, Add	32.27	
	16MOD-0030	For Installation Above 14', Add	16.13	
16131-0195		Threaded Steel Couplings (16131-0002)		
16131-0196	EA	1/2" RGS Coupling.....	3.65	1.19
	16MOD-0029	For Work In Restricted Working Space, Add	0.90	
	16MOD-0030	For Installation Above 14', Add	0.45	
16131-0197	EA	3/4" RGS Coupling.....	4.38	1.43
	16MOD-0029	For Work In Restricted Working Space, Add	1.07	
	16MOD-0030	For Installation Above 14', Add	0.54	
16131-0198	EA	1" RGS Coupling.....	5.99	1.92
	16MOD-0029	For Work In Restricted Working Space, Add	1.44	
	16MOD-0030	For Installation Above 14', Add	0.72	
16131-0199	EA	1-1/4" RGS Coupling.....	7.48	2.39
	16MOD-0029	For Work In Restricted Working Space, Add	1.79	
	16MOD-0030	For Installation Above 14', Add	0.90	
16131-0200	EA	1-1/2" RGS Coupling.....	9.66	3.11
	16MOD-0029	For Work In Restricted Working Space, Add	2.33	
	16MOD-0030	For Installation Above 14', Add	1.17	
16131-0201	EA	2" RGS Coupling.....	11.45	3.58
	16MOD-0029	For Work In Restricted Working Space, Add	2.69	
	16MOD-0030	For Installation Above 14', Add	1.34	
16131-0202	EA	2-1/2" RGS Coupling.....	16.88	4.54
	16MOD-0029	For Work In Restricted Working Space, Add	3.41	
	16MOD-0030	For Installation Above 14', Add	1.70	
16131-0203	EA	3" RGS Coupling.....	22.48	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0204	EA	3-1/2" RGS Coupling.....	27.41	6.93
	16MOD-0029	For Work In Restricted Working Space, Add	5.20	
	16MOD-0030	For Installation Above 14', Add	2.60	
16131-0205	EA	4" RGS Coupling.....	28.68	7.41
	16MOD-0029	For Work In Restricted Working Space, Add	5.56	
	16MOD-0030	For Installation Above 14', Add	2.78	
16131-0206		Reducing Bushing (16131-0002)		
16131-0207	EA	1/2" To 3/4" RGS Reducing Bushing.....	3.73	1.19
	16MOD-0029	For Work In Restricted Working Space, Add	0.90	
	16MOD-0030	For Installation Above 14', Add	0.45	
16131-0208	EA	3/4" To 1" RGS Reducing Bushing.....	4.16	1.19
	16MOD-0029	For Work In Restricted Working Space, Add	0.90	
	16MOD-0030	For Installation Above 14', Add	0.45	
16131-0209	EA	1" To 1-1/4" RGS Reducing Bushing.....	7.39	1.92
	16MOD-0029	For Work In Restricted Working Space, Add	1.43	
	16MOD-0030	For Installation Above 14', Add	0.72	
16131-0210	EA	1-1/4" To 1-1/2" RGS Reducing Bushing.....	9.22	2.39
	16MOD-0029	For Work In Restricted Working Space, Add	1.79	
	16MOD-0030	For Installation Above 14', Add	0.90	
16131-0211	EA	1-1/2" To 2" RGS Reducing Bushing.....	15.37	3.11
	16MOD-0029	For Work In Restricted Working Space, Add	2.33	
	16MOD-0030	For Installation Above 14', Add	1.17	
16131-0212	EA	2" To 2-1/2" RGS Reducing Bushing.....	20.11	3.58
	16MOD-0029	For Work In Restricted Working Space, Add	2.69	
	16MOD-0030	For Installation Above 14', Add	1.35	
16131-0213	EA	2-1/2" To 3" RGS Reducing Bushing.....	24.40	4.54
	16MOD-0029	For Work In Restricted Working Space, Add	3.41	
	16MOD-0030	For Installation Above 14', Add	1.70	
16131-0214		Sealing Locknuts (16131-0002)		
16131-0215	EA	1/2" Sealing Locknut In Lieu Of Locknut, Add	0.50	
16131-0216	EA	3/4" Sealing Locknut In Lieu Of Locknut, Add	0.56	
16131-0217	EA	1" Sealing Locknut In Lieu Of Locknut, Add	0.83	
16131-0218	EA	1-1/4" Sealing Locknut In Lieu Of Locknut, Add.....	1.21	
16131-0219	EA	1-1/2" Sealing Locknut In Lieu Of Locknut, Add.....	1.52	
16131-0220	EA	2" Sealing Locknut In Lieu Of Locknut, Add.....	1.81	
16131-0221		Two Hub Conduit Body (16131-0002)		
16131-0222	EA	2-1/2" Two Hub RGS Conduit Body	195.09	41.83
	16MOD-0029	For Work In Restricted Working Space, Add	31.37	
	16MOD-0030	For Installation Above 14', Add	15.69	
16131-0223	EA	3" Two Hub RGS Conduit Body	247.78	52.29
	16MOD-0029	For Work In Restricted Working Space, Add	39.21	
	16MOD-0030	For Installation Above 14', Add	19.61	
16131-0224	EA	3-1/2" Two Hub RGS Conduit Body	371.96	73.59
	16MOD-0029	For Work In Restricted Working Space, Add	55.20	
	16MOD-0030	For Installation Above 14', Add	27.60	
16131-0225	EA	4" Two Hub RGS Conduit Body	455.73	94.97
	16MOD-0029	For Work In Restricted Working Space, Add	71.25	
	16MOD-0030	For Installation Above 14', Add	35.62	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0226	EA	5" Two Hub RGS Conduit Body	1,063.88	168.43
	16MOD-0029	For Work In Restricted Working Space, Add	126.34	
	16MOD-0030	For Installation Above 14', Add	63.17	
16131-0227	EA	6" Two Hub RGS Conduit Body	1,536.11	201.11
	16MOD-0029	For Work In Restricted Working Space, Add	150.83	
	16MOD-0030	For Installation Above 14', Add	75.41	
16131-0228		Expansion Joint With Bonding Jumper ⁽¹⁶¹³¹⁻⁰⁰⁰²⁾		
16131-0229	EA	2-1/2" RGS Expansion Joint With Bonding Jumper	365.85	52.10
	16MOD-0029	For Work In Restricted Working Space, Add	39.07	
	16MOD-0030	For Installation Above 14', Add	19.53	
16131-0230	EA	3" RGS Expansion Joint With Bonding Jumper	436.46	61.01
	16MOD-0029	For Work In Restricted Working Space, Add	45.77	
	16MOD-0030	For Installation Above 14', Add	22.89	
16131-0231	EA	3-1/2" RGS Expansion Joint With Bonding Jumper	581.29	70.15
	16MOD-0029	For Work In Restricted Working Space, Add	52.60	
	16MOD-0030	For Installation Above 14', Add	26.30	
16131-0232	EA	4" RGS Expansion Joint With Bonding Jumper	669.48	78.15
	16MOD-0029	For Work In Restricted Working Space, Add	58.62	
	16MOD-0030	For Installation Above 14', Add	29.31	
16131-0233	EA	5" RGS Expansion Joint With Bonding Jumper	1,132.14	90.71
	16MOD-0029	For Work In Restricted Working Space, Add	68.03	
	16MOD-0030	For Installation Above 14', Add	34.01	
16131-0234	EA	6" RGS Expansion Joint With Bonding Jumper	1,762.44	105.04
	16MOD-0029	For Work In Restricted Working Space, Add	78.81	
	16MOD-0030	For Installation Above 14', Add	39.40	
16131-0235		Fire Stop Fitting ⁽¹⁶¹³¹⁻⁰⁰⁰²⁾		
16131-0236	EA	1/2" RGS Fire Stop Fitting	97.28	7.95
	16MOD-0029	For Work In Restricted Working Space, Add	5.98	
	16MOD-0030	For Installation Above 14', Add	2.99	
16131-0237	EA	3/4" RGS Fire Stop Fitting	97.23	7.95
	16MOD-0029	For Work In Restricted Working Space, Add	5.96	
	16MOD-0030	For Installation Above 14', Add	2.98	
16131-0238	EA	1" RGS Fire Stop Fitting	116.45	8.73
	16MOD-0029	For Work In Restricted Working Space, Add	6.53	
	16MOD-0030	For Installation Above 14', Add	3.27	
16131-0239	EA	1-1/4" RGS Fire Stop Fitting	127.84	9.56
	16MOD-0029	For Work In Restricted Working Space, Add	7.18	
	16MOD-0030	For Installation Above 14', Add	3.59	
16131-0240	EA	1-1/2" RGS Fire Stop Fitting	142.84	9.56
	16MOD-0029	For Work In Restricted Working Space, Add	7.17	
	16MOD-0030	For Installation Above 14', Add	3.59	
16131-0241	EA	2" RGS Fire Stop Fitting	214.64	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.97	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0242	EA	2-1/2" RGS Fire Stop Fitting	247.70	15.95
	16MOD-0029	For Work In Restricted Working Space, Add	11.96	
	16MOD-0030	For Installation Above 14', Add	5.98	
16131-0243	EA	3" RGS Fire Stop Fitting	270.78	15.95
	16MOD-0029	For Work In Restricted Working Space, Add	11.96	
	16MOD-0030	For Installation Above 14', Add	5.98	
16131-0244	EA	3-1/2" RGS Fire Stop Fitting	319.16	19.12
	16MOD-0029	For Work In Restricted Working Space, Add	14.34	
	16MOD-0030	For Installation Above 14', Add	7.17	
16131-0245	EA	4" RGS Fire Stop Fitting	353.80	19.12
	16MOD-0029	For Work In Restricted Working Space, Add	14.34	
	16MOD-0030	For Installation Above 14', Add	7.17	
16131-0246	EA	5" RGS Fire Stop Fitting	481.20	23.90
	16MOD-0029	For Work In Restricted Working Space, Add	17.93	
	16MOD-0030	For Installation Above 14', Add	8.96	
16131-0247	EA	6" RGS Fire Stop Fitting	590.91	23.90
	16MOD-0029	For Work In Restricted Working Space, Add	17.93	
	16MOD-0030	For Installation Above 14', Add	8.96	
16131-0248		EMT Thinwall Conduit ⁽¹⁶¹³¹⁻⁰⁰⁰¹⁾		
		Note: Exposed installation, conditions branch and feeder conduit. Includes field bend conduit up to 1". Excludes supporting strap, hanger and fastening.		
16131-0249		EMT Thinwall Conduit ⁽¹⁶¹³¹⁻⁰²⁴⁸⁾		
		Note: Includes field bending conduit up to 1".		
16131-0250	LF	1/2" EMT Conduit, Mounted Exposed On Flat Wall	2.97	0.71
	16MOD-0023	For > 250 To 500, Deduct	-0.01	
	16MOD-0024	For > 500 To 1000, Deduct	-0.16	
	16MOD-0025	For > 1000, Deduct	-0.23	
	16MOD-0026	For Installation In Metal Stud Wall, Add	0.27	
	16MOD-0027	For Installation In Wood Stud Wall (Includes Drilling), Add	0.67	
	16MOD-0028	For Installation In Concrete (Excludes Concrete), Add	0.40	
	16MOD-0029	For Work In Restricted Working Space, Add	0.81	
	16MOD-0030	For Installation Above 14', Add	0.40	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0251	LF		3/4" EMT Conduit, Mounted Exposed On Flat Wall.....	3.49	0.95
	16MOD-0023		For > 250 To 500, Deduct	-0.03	
	16MOD-0024		For > 500 To 1000, Deduct	-0.19	
	16MOD-0025		For > 1000, Deduct	-0.27	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.30	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	0.75	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	0.45	
	16MOD-0029		For Work In Restricted Working Space, Add	0.90	
	16MOD-0030		For Installation Above 14', Add	0.45	
16131-0252	LF		1" EMT Conduit, Mounted Exposed On Flat Wall.....	4.18	1.19
	16MOD-0023		For > 250 To 500, Deduct	-0.04	
	16MOD-0024		For > 500 To 1000, Deduct	-0.23	
	16MOD-0025		For > 1000, Deduct	-0.34	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.33	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	0.82	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	0.49	
	16MOD-0029		For Work In Restricted Working Space, Add	0.99	
	16MOD-0030		For Installation Above 14', Add	0.49	
16131-0253	LF		1-1/4" EMT Conduit, Mounted Exposed On Flat Wall	4.95	1.43
	16MOD-0023		For > 250 To 500, Deduct	-0.06	
	16MOD-0024		For > 500 To 1000, Deduct	-0.28	
	16MOD-0025		For > 1000, Deduct	-0.40	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.37	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	0.93	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	0.56	
	16MOD-0029		For Work In Restricted Working Space, Add	1.11	
	16MOD-0030		For Installation Above 14', Add	0.56	
16131-0254	LF		1-1/2" EMT Conduit, Mounted Exposed On Flat Wall	5.71	1.92
	16MOD-0023		For > 250 To 500, Deduct	-0.08	
	16MOD-0024		For > 500 To 1000, Deduct	-0.32	
	16MOD-0025		For > 1000, Deduct	-0.47	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.42	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	1.05	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	0.63	
	16MOD-0029		For Work In Restricted Working Space, Add	1.25	
	16MOD-0030		For Installation Above 14', Add	0.63	
16131-0255	LF		2" EMT Conduit, Mounted Exposed On Flat Wall.....	6.67	2.15
	16MOD-0023		For > 250 To 500, Deduct	-0.09	
	16MOD-0024		For > 500 To 1000, Deduct	-0.38	
	16MOD-0025		For > 1000, Deduct	-0.55	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.48	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	1.20	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	0.72	
	16MOD-0029		For Work In Restricted Working Space, Add	1.43	
	16MOD-0030		For Installation Above 14', Add	0.72	
16131-0256	LF		2-1/2" EMT Conduit, Mounted Exposed On Flat Wall	8.53	2.39
	16MOD-0023		For > 250 To 500, Deduct	-0.14	
	16MOD-0024		For > 500 To 1000, Deduct	-0.50	
	16MOD-0025		For > 1000, Deduct	-0.71	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.57	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	1.42	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	0.85	
	16MOD-0029		For Work In Restricted Working Space, Add	1.70	
	16MOD-0030		For Installation Above 14', Add	0.85	
16131-0257	LF		3" EMT Conduit, Mounted Exposed On Flat Wall.....	10.20	3.11
	16MOD-0023		For > 250 To 500, Deduct	-0.18	
	16MOD-0024		For > 500 To 1000, Deduct	-0.60	
	16MOD-0025		For > 1000, Deduct	-0.86	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.66	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	1.64	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	0.99	
	16MOD-0029		For Work In Restricted Working Space, Add	1.97	
	16MOD-0030		For Installation Above 14', Add	0.99	
16131-0258	LF		3-1/2" EMT Conduit, Mounted Exposed On Flat Wall	12.76	3.58
	16MOD-0023		For > 250 To 500, Deduct	-0.25	
	16MOD-0024		For > 500 To 1000, Deduct	-0.76	
	16MOD-0025		For > 1000, Deduct	-1.08	
	16MOD-0026		For Installation In Metal Stud Wall, Add	0.78	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	1.94	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	1.17	
	16MOD-0029		For Work In Restricted Working Space, Add	2.33	
	16MOD-0030		For Installation Above 14', Add	1.17	
16131-0259	LF		4" EMT Conduit, Mounted Exposed On Flat Wall.....	16.45	4.94
	16MOD-0023		For > 250 To 500, Deduct	-0.27	
	16MOD-0024		For > 500 To 1000, Deduct	-0.96	
	16MOD-0025		For > 1000, Deduct	-1.37	
	16MOD-0026		For Installation In Metal Stud Wall, Add	1.10	
	16MOD-0027		For Installation In Wood Stud Wall (Includes Drilling), Add	2.74	
	16MOD-0028		For Installation In Concrete (Excludes Concrete), Add	1.65	
	16MOD-0029		For Work In Restricted Working Space, Add	3.29	
	16MOD-0030		For Installation Above 14', Add	1.65	
16131-0260			90 Degree Elbow ⁽¹⁶¹³¹⁻⁰²⁴⁸⁾ See CSI section 16131-1572 for conduit field bending.		
16131-0261			Set Screw Coupling ⁽¹⁶¹³¹⁻⁰²⁴⁸⁾		
16131-0262	EA		1/2" EMT Set Screw Coupling.....	3.15	1.43
	16MOD-0029		For Work In Restricted Working Space, Add	0.90	
	16MOD-0030		For Installation Above 14', Add	0.45	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0263	EA	3/4" EMT Set Screw Coupling	3.86	1.43
	16MOD-0029	For Work In Restricted Working Space, Add	1.07	
	16MOD-0030	For Installation Above 14', Add	0.54	
16131-0264	EA	1" EMT Set Screw Coupling	4.66	1.68
	16MOD-0029	For Work In Restricted Working Space, Add	1.25	
	16MOD-0030	For Installation Above 14', Add	0.63	
16131-0265	EA	1-1/4" EMT Set Screw Coupling	6.23	2.15
	16MOD-0029	For Work In Restricted Working Space, Add	1.61	
	16MOD-0030	For Installation Above 14', Add	0.81	
16131-0266	EA	1-1/2" EMT Set Screw Coupling	7.79	2.63
	16MOD-0029	For Work In Restricted Working Space, Add	1.97	
	16MOD-0030	For Installation Above 14', Add	0.99	
16131-0267	EA	2" EMT Set Screw Coupling	10.56	3.58
	16MOD-0029	For Work In Restricted Working Space, Add	2.69	
	16MOD-0030	For Installation Above 14', Add	1.34	
16131-0268	EA	2-1/2" EMT Set Screw Coupling	15.43	4.78
	16MOD-0029	For Work In Restricted Working Space, Add	3.59	
	16MOD-0030	For Installation Above 14', Add	1.79	
16131-0269	EA	3" EMT Set Screw Coupling	19.18	5.50
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0270	EA	3-1/2" EMT Set Screw Coupling	23.08	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	5.38	
	16MOD-0030	For Installation Above 14', Add	2.69	
16131-0271	EA	4" EMT Set Screw Coupling	31.80	7.96
	16MOD-0029	For Work In Restricted Working Space, Add	7.73	
	16MOD-0030	For Installation Above 14', Add	3.86	
16131-0272		Compression Coupling (16131-0249)		
16131-0273	EA	1/2 EMT Compression Coupling	4.18	1.56
	16MOD-0029	For Work In Restricted Working Space, Add	1.18	
	16MOD-0030	For Installation Above 14', Add	0.59	
16131-0274	EA	3/4" EMT Compression Coupling	4.58	1.68
	16MOD-0029	For Work In Restricted Working Space, Add	1.25	
	16MOD-0030	For Installation Above 14', Add	0.63	
16131-0275	EA	1" EMT Compression Coupling	6.64	2.39
	16MOD-0029	For Work In Restricted Working Space, Add	1.79	
	16MOD-0030	For Installation Above 14', Add	0.90	
16131-0276	EA	1-1/4" EMT Compression Coupling	8.35	2.87
	16MOD-0029	For Work In Restricted Working Space, Add	2.15	
	16MOD-0030	For Installation Above 14', Add	1.08	
16131-0277	EA	1-1/2" EMT Compression Coupling	10.05	3.35
	16MOD-0029	For Work In Restricted Working Space, Add	2.51	
	16MOD-0030	For Installation Above 14', Add	1.26	
16131-0278	EA	2" EMT Compression Coupling	12.56	4.06
	16MOD-0029	For Work In Restricted Working Space, Add	3.05	
	16MOD-0030	For Installation Above 14', Add	1.52	
16131-0279	EA	2 1/2" EMT Compression Coupling	21.73	6.02
	16MOD-0029	For Work In Restricted Working Space, Add	4.51	
	16MOD-0030	For Installation Above 14', Add	2.25	
16131-0280	EA	3" EMT Compression Coupling	24.98	6.69
	16MOD-0029	For Work In Restricted Working Space, Add	5.02	
	16MOD-0030	For Installation Above 14', Add	2.51	
16131-0281	EA	3-1/2" EMT Compression Coupling	31.71	8.37
	16MOD-0029	For Work In Restricted Working Space, Add	6.28	
	16MOD-0030	For Installation Above 14', Add	3.14	
16131-0282	EA	4" EMT Compression Coupling	38.63	10.76
	16MOD-0029	For Work In Restricted Working Space, Add	8.07	
	16MOD-0030	For Installation Above 14', Add	4.03	
16131-0283		Steel Box Connector With Set Screw (16131-0248)		
16131-0284	EA	1/2" EMT Box Connector With Set Screw	3.18	1.19
	16MOD-0029	For Work In Restricted Working Space, Add	0.90	
	16MOD-0030	For Installation Above 14', Add	0.45	
16131-0285	EA	3/4" EMT Box Connector With Set Screw	3.90	1.43
	16MOD-0029	For Work In Restricted Working Space, Add	1.07	
	16MOD-0030	For Installation Above 14', Add	0.54	
16131-0286	EA	1" EMT Box Connector With Set Screw	4.64	1.68
	16MOD-0029	For Work In Restricted Working Space, Add	1.25	
	16MOD-0030	For Installation Above 14', Add	0.63	
16131-0287	EA	1-1/4" EMT Box Connector With Set Screw	6.75	2.39
	16MOD-0029	For Work In Restricted Working Space, Add	1.79	
	16MOD-0030	For Installation Above 14', Add	0.90	
16131-0288	EA	1-1/2" EMT Box Connector With Set Screw	8.49	2.87
	16MOD-0029	For Work In Restricted Working Space, Add	2.15	
	16MOD-0030	For Installation Above 14', Add	1.08	
16131-0289	EA	2" EMT Box Connector With Set Screw	10.68	3.58
	16MOD-0029	For Work In Restricted Working Space, Add	2.69	
	16MOD-0030	For Installation Above 14', Add	1.34	
16131-0290	EA	2-1/2" EMT Box Connector With Set Screw	16.12	4.78
	16MOD-0029	For Work In Restricted Working Space, Add	3.59	
	16MOD-0030	For Installation Above 14', Add	1.79	
16131-0291	EA	3" EMT Box Connector With Set Screw	19.90	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0292	EA	3-1/2" EMT Box Connector With Set Screw	23.82	7.17
	16MOD-0029	For Work In Restricted Working Space, Add	5.38	
	16MOD-0030	For Installation Above 14', Add	2.69	
16131-0293	EA	4" EMT Box Connector With Set Screw	27.74	8.37
	16MOD-0029	For Work In Restricted Working Space, Add	6.28	
	16MOD-0030	For Installation Above 14', Add	3.14	
16131-0294		Steel Insulated Box Connector With Set Screw <small>(16131-0248)</small>		
16131-0295	EA	1/2" EMT Insulated Box Connector With Set Screw	4.60	1.62
	16MOD-0029	For Work In Restricted Working Space, Add	1.20	
	16MOD-0030	For Installation Above 14', Add	0.60	
16131-0296	EA	3/4" EMT Insulated Box Connector With Set Screw	5.33	1.74
	16MOD-0029	For Work In Restricted Working Space, Add	1.31	
	16MOD-0030	For Installation Above 14', Add	0.65	
16131-0297	EA	1" EMT Insulated Box Connector With Set Screw	6.93	2.15
	16MOD-0029	For Work In Restricted Working Space, Add	1.60	
	16MOD-0030	For Installation Above 14', Add	0.80	
16131-0298	EA	1-1/4" EMT Insulated Box Connector With Set Screw	9.63	2.75
	16MOD-0029	For Work In Restricted Working Space, Add	2.04	
	16MOD-0030	For Installation Above 14', Add	1.02	
16131-0299	EA	1-1/2" EMT Insulated Box Connector With Set Screw	12.09	3.17
	16MOD-0029	For Work In Restricted Working Space, Add	2.39	
	16MOD-0030	For Installation Above 14', Add	1.19	
16131-0300	EA	2" EMT Insulated Box Connector With Set Screw	15.56	3.82
	16MOD-0029	For Work In Restricted Working Space, Add	2.87	
	16MOD-0030	For Installation Above 14', Add	1.43	
16131-0301	EA	2-1/2" EMT Insulated Box Connector With Set Screw	39.82	5.32
	16MOD-0029	For Work In Restricted Working Space, Add	3.98	
	16MOD-0030	For Installation Above 14', Add	1.99	
16131-0302	EA	3" EMT Insulated Box Connector With Set Screw	49.08	7.05
	16MOD-0029	For Work In Restricted Working Space, Add	5.31	
	16MOD-0030	For Installation Above 14', Add	2.65	
16131-0303	EA	3-1/2" EMT Insulated Box Connector With Set Screw	65.41	9.08
	16MOD-0029	For Work In Restricted Working Space, Add	6.83	
	16MOD-0030	For Installation Above 14', Add	3.41	
16131-0304	EA	4" EMT Insulated Box Connector With Set Screw	76.56	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0305		Compression Box Connector <small>(16131-0248)</small>		
16131-0306	EA	1/2" EMT Box Connector, Compression	4.67	1.43
	16MOD-0029	For Work In Restricted Working Space, Add	1.07	
	16MOD-0030	For Installation Above 14', Add	0.54	
16131-0307	EA	3/4" EMT Box Connector, Compression	5.67	1.68
	16MOD-0029	For Work In Restricted Working Space, Add	1.25	
	16MOD-0030	For Installation Above 14', Add	0.63	
16131-0308	EA	1" EMT Box Connector, Compression	7.40	1.92
	16MOD-0029	For Work In Restricted Working Space, Add	1.43	
	16MOD-0030	For Installation Above 14', Add	0.72	
16131-0309	EA	1-1/4" EMT Box Connector, Compression	12.24	2.87
	16MOD-0029	For Work In Restricted Working Space, Add	2.15	
	16MOD-0030	For Installation Above 14', Add	1.08	
16131-0310	EA	1-1/2" EMT Box Connector, Compression	15.81	3.35
	16MOD-0029	For Work In Restricted Working Space, Add	2.51	
	16MOD-0030	For Installation Above 14', Add	1.26	
16131-0311	EA	2" EMT Box Connector, Compression	21.83	4.30
	16MOD-0029	For Work In Restricted Working Space, Add	3.23	
	16MOD-0030	For Installation Above 14', Add	1.61	
16131-0312	EA	2-1/2" EMT Box Connector, Compression	52.16	5.74
	16MOD-0029	For Work In Restricted Working Space, Add	4.30	
	16MOD-0030	For Installation Above 14', Add	2.15	
16131-0313	EA	3" EMT Box Connector, Compression	68.63	7.17
	16MOD-0029	For Work In Restricted Working Space, Add	5.38	
	16MOD-0030	For Installation Above 14', Add	2.69	
16131-0314	EA	3-1/2" EMT Box Connector, Compression	94.15	8.37
	16MOD-0029	For Work In Restricted Working Space, Add	6.28	
	16MOD-0030	For Installation Above 14', Add	3.14	
16131-0315	EA	4" EMT Box Connector, Compression	99.55	9.56
	16MOD-0029	For Work In Restricted Working Space, Add	7.17	
	16MOD-0030	For Installation Above 14', Add	3.59	
16131-0316		Compression Insulated Box Connector <small>(16131-0248)</small>		
16131-0317	EA	1/2" EMT Insulated Box Connector, Compression	5.21	1.62
	16MOD-0029	For Work In Restricted Working Space, Add	1.20	
	16MOD-0030	For Installation Above 14', Add	0.60	
16131-0318	EA	3/4" EMT Insulated Box Connector, Compression	6.05	1.74
	16MOD-0029	For Work In Restricted Working Space, Add	1.31	
	16MOD-0030	For Installation Above 14', Add	0.65	
16131-0319	EA	1" EMT Insulated Box Connector, Compression	8.22	2.15
	16MOD-0029	For Work In Restricted Working Space, Add	1.60	
	16MOD-0030	For Installation Above 14', Add	0.80	
16131-0320	EA	1-1/4" EMT Insulated Box Connector, Compression	12.60	2.75
	16MOD-0029	For Work In Restricted Working Space, Add	2.04	
	16MOD-0030	For Installation Above 14', Add	1.02	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0321	EA	1-1/2" EMT Insulated Box Connector, Compression	16.36	3.17
	16MOD-0029	For Work In Restricted Working Space, Add	2.39	
	16MOD-0030	For Installation Above 14', Add	1.19	
16131-0322	EA	2" EMT Insulated Box Connector, Compression	21.79	3.82
	16MOD-0029	For Work In Restricted Working Space, Add	2.87	
	16MOD-0030	For Installation Above 14', Add	1.43	
16131-0323	EA	2-1/2" EMT Insulated Box Connector, Compression	60.74	5.32
	16MOD-0029	For Work In Restricted Working Space, Add	3.98	
	16MOD-0030	For Installation Above 14', Add	1.99	
16131-0324	EA	3" EMT Insulated Box Connector, Compression	78.85	7.05
	16MOD-0029	For Work In Restricted Working Space, Add	5.31	
	16MOD-0030	For Installation Above 14', Add	2.65	
16131-0325	EA	3-1/2" EMT Insulated Box Connector, Compression	107.26	9.08
	16MOD-0029	For Work In Restricted Working Space, Add	6.83	
	16MOD-0030	For Installation Above 14', Add	3.41	
16131-0326	EA	4" EMT Insulated Box Connector, Compression	120.82	11.95
	16MOD-0029	For Work In Restricted Working Space, Add	8.96	
	16MOD-0030	For Installation Above 14', Add	4.48	
16131-0327		Expansion Fitting, No Jumper (16131-0248)		
16131-0328	EA	1/2" EMT Expansion Fitting	44.02	7.95
	16MOD-0029	For Work In Restricted Working Space, Add	5.96	
	16MOD-0030	For Installation Above 14', Add	2.98	
16131-0329	EA	3/4" EMT Expansion Fitting	52.91	9.62
	16MOD-0029	For Work In Restricted Working Space, Add	7.23	
	16MOD-0030	For Installation Above 14', Add	3.62	
16131-0330	EA	1" EMT Expansion Fitting	66.56	12.07
	16MOD-0029	For Work In Restricted Working Space, Add	9.04	
	16MOD-0030	For Installation Above 14', Add	4.52	
16131-0331	EA	1-1/4" EMT Expansion Fitting	81.97	14.82
	16MOD-0029	For Work In Restricted Working Space, Add	11.12	
	16MOD-0030	For Installation Above 14', Add	5.56	
16131-0332	EA	1-1/2" EMT Expansion Fitting	104.46	17.39
	16MOD-0029	For Work In Restricted Working Space, Add	13.04	
	16MOD-0030	For Installation Above 14', Add	6.52	
16131-0333	EA	2" EMT Expansion Fitting	143.57	21.15
	16MOD-0029	For Work In Restricted Working Space, Add	15.88	
	16MOD-0030	For Installation Above 14', Add	7.94	
16131-0334	EA	2-1/2" EMT Expansion Fitting	211.14	27.19
	16MOD-0029	For Work In Restricted Working Space, Add	20.39	
	16MOD-0030	For Installation Above 14', Add	10.20	
16131-0335	EA	3" EMT Expansion Fitting	254.85	31.78
	16MOD-0029	For Work In Restricted Working Space, Add	23.85	
	16MOD-0030	For Installation Above 14', Add	11.93	
16131-0336	EA	3-1/2" EMT Expansion Fitting	328.09	34.65
	16MOD-0029	For Work In Restricted Working Space, Add	26.00	
	16MOD-0030	For Installation Above 14', Add	13.00	
16131-0337	EA	4" EMT Expansion Fitting	400.59	38.24
	16MOD-0029	For Work In Restricted Working Space, Add	28.69	
	16MOD-0030	For Installation Above 14', Add	14.34	
16131-0338		EMT To Flexible Conduit Adapter, Compression (16131-0248)		
16131-0339	EA	1/2" To 3/8" EMT To Flexible Adapter	6.75	2.15
	16MOD-0029	For Work In Restricted Working Space, Add	1.59	
	16MOD-0030	For Installation Above 14', Add	0.80	
16131-0340	EA	1/2" EMT To Flexible Adapter	7.94	2.15
	16MOD-0029	For Work In Restricted Working Space, Add	1.59	
	16MOD-0030	For Installation Above 14', Add	0.80	
16131-0341	EA	3/4" EMT To Flexible Adapter	9.29	2.33
	16MOD-0029	For Work In Restricted Working Space, Add	1.77	
	16MOD-0030	For Installation Above 14', Add	0.89	
16131-0342	EA	1" EMT To Flexible Adapter	15.60	2.69
	16MOD-0029	For Work In Restricted Working Space, Add	2.01	
	16MOD-0030	For Installation Above 14', Add	1.01	
16131-0343	EA	1-1/4" EMT To Flexible Adapter	18.92	3.23
	16MOD-0029	For Work In Restricted Working Space, Add	2.44	
	16MOD-0030	For Installation Above 14', Add	1.22	
16131-0344	EA	1-1/2" EMT To Flexible Adapter	21.51	3.70
	16MOD-0029	For Work In Restricted Working Space, Add	2.78	
	16MOD-0030	For Installation Above 14', Add	1.39	
16131-0345	EA	2" EMT To Flexible Adapter	29.38	4.67
	16MOD-0029	For Work In Restricted Working Space, Add	3.48	
	16MOD-0030	For Installation Above 14', Add	1.74	
16131-0346		LB, LR Or LL Fitting With Cover And Set Screw (16131-0248)		
16131-0347	EA	1/2" EMT LB, LR, Or LL Fitting With Cover And Set Screw	16.70	4.54
	16MOD-0029	For Work In Restricted Working Space, Add	3.41	
	16MOD-0030	For Installation Above 14', Add	1.70	
16131-0348	EA	3/4" EMT LB, LR, Or LL Fitting With Cover And Set Screw	21.46	5.98
	16MOD-0029	For Work In Restricted Working Space, Add	4.48	
	16MOD-0030	For Installation Above 14', Add	2.24	
16131-0349	EA	1" EMT LB, LR, Or LL Fitting With Cover And Set Screw	28.13	7.41
	16MOD-0029	For Work In Restricted Working Space, Add	5.56	
	16MOD-0030	For Installation Above 14', Add	2.78	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0350	EA		1-1/4" EMT LB, LR, Or LL Fitting With Cover And Set Screw	36.51	9.08
	16MOD-0029		For Work In Restricted Working Space, Add	6.81	
	16MOD-0030		For Installation Above 14', Add	3.41	
16131-0351	EA		1-1/2" EMT LB, LR, Or LL Fitting With Cover And Set Screw	43.67	10.51
	16MOD-0029		For Work In Restricted Working Space, Add	7.89	
	16MOD-0030		For Installation Above 14', Add	3.95	
16131-0352	EA		2" EMT LB, LR, Or LL Fitting With Cover And Set Screw	58.68	11.95
	16MOD-0029		For Work In Restricted Working Space, Add	8.96	
	16MOD-0030		For Installation Above 14', Add	4.48	
16131-0353			T Fitting With Cover And Set Screw (16131-0249)		
16131-0354	EA		1/2" EMT "T" Fitting With Cover And Set Screw	21.63	5.98
	16MOD-0029		For Work In Restricted Working Space, Add	4.48	
	16MOD-0030		For Installation Above 14', Add	2.24	
16131-0355	EA		3/4" EMT "T" Fitting With Cover And Set Screw	26.99	7.41
	16MOD-0029		For Work In Restricted Working Space, Add	5.56	
	16MOD-0030		For Installation Above 14', Add	2.78	
16131-0356	EA		1" EMT "T" Fitting With Cover And Set Screw	34.26	9.08
	16MOD-0029		For Work In Restricted Working Space, Add	6.81	
	16MOD-0030		For Installation Above 14', Add	3.41	
16131-0357	EA		1-1/4" EMT "T" Fitting With Cover And Set Screw	45.78	10.51
	16MOD-0029		For Work In Restricted Working Space, Add	7.89	
	16MOD-0030		For Installation Above 14', Add	3.95	
16131-0358	EA		1-1/2" EMT "T" Fitting With Cover And Set Screw	55.72	11.95
	16MOD-0029		For Work In Restricted Working Space, Add	8.96	
	16MOD-0030		For Installation Above 14', Add	4.48	
16131-0359	EA		2" EMT "T" Fitting With Cover And Set Screw	74.97	13.38
	16MOD-0029		For Work In Restricted Working Space, Add	10.04	
	16MOD-0030		For Installation Above 14', Add	5.02	
16131-0360			Intermediate Metal Steel Conduit (IMC) (16131-0001)		
			Note: Exposed installation, conditions branch and feeder conduit. Includes field bend conduit up to 1". Excludes supporting strap, hanger and fastening.		
16131-0361			IMC Conduit (16131-0360)		
			Note: Includes field bending conduit up to 1".		
16131-0362	LF		1/2" IMC Conduit, Mounted Exposed On Flat Wall	3.81	0.71
	16MOD-0031		For > 250 To 500, Deduct	-0.04	
	16MOD-0032		For > 500 To 1000, Deduct	-0.06	
	16MOD-0033		For > 1000, Deduct	-0.08	
	16MOD-0034		For Installation In Metal Stud Wall, Add	0.30	
	16MOD-0035		For Installation In Wood Stud Wall (Includes Drilling), Add	0.75	
	16MOD-0036		For Installation In Concrete (Excludes Concrete), Add	0.45	
	16MOD-0037		For Work In Restricted Working Space, Add	0.90	
	16MOD-0038		For Installation Above 14', Add	0.45	
16131-0363	LF		3/4" IMC Conduit, Mounted Exposed On Flat Wall	4.27	0.95
	16MOD-0031		For > 250 To 500, Deduct	-0.05	
	16MOD-0032		For > 500 To 1000, Deduct	-0.07	
	16MOD-0033		For > 1000, Deduct	-0.10	
	16MOD-0034		For Installation In Metal Stud Wall, Add	0.33	
	16MOD-0035		For Installation In Wood Stud Wall (Includes Drilling), Add	0.82	
	16MOD-0036		For Installation In Concrete (Excludes Concrete), Add	0.49	
	16MOD-0037		For Work In Restricted Working Space, Add	0.99	
	16MOD-0038		For Installation Above 14', Add	0.49	
16131-0364	LF		1" IMC Conduit, Mounted Exposed On Flat Wall	5.10	1.19
	16MOD-0031		For > 250 To 500, Deduct	-0.08	
	16MOD-0032		For > 500 To 1000, Deduct	-0.11	
	16MOD-0033		For > 1000, Deduct	-0.15	
	16MOD-0034		For Installation In Metal Stud Wall, Add	0.36	
	16MOD-0035		For Installation In Wood Stud Wall (Includes Drilling), Add	0.90	
	16MOD-0036		For Installation In Concrete (Excludes Concrete), Add	0.54	
	16MOD-0037		For Work In Restricted Working Space, Add	1.07	
	16MOD-0038		For Installation Above 14', Add	0.54	
16131-0365	LF		1-1/4" IMC Conduit, Mounted Exposed On Flat Wall	6.10	1.43
	16MOD-0031		For > 250 To 500, Deduct	-0.10	
	16MOD-0032		For > 500 To 1000, Deduct	-0.14	
	16MOD-0033		For > 1000, Deduct	-0.19	
	16MOD-0034		For Installation In Metal Stud Wall, Add	0.42	
	16MOD-0035		For Installation In Wood Stud Wall (Includes Drilling), Add	1.05	
	16MOD-0036		For Installation In Concrete (Excludes Concrete), Add	0.63	
	16MOD-0037		For Work In Restricted Working Space, Add	1.25	
	16MOD-0038		For Installation Above 14', Add	0.63	
16131-0366	LF		1-1/2" IMC Conduit, Mounted Exposed On Flat Wall	7.05	1.92
	16MOD-0031		For > 250 To 500, Deduct	-0.11	
	16MOD-0032		For > 500 To 1000, Deduct	-0.17	
	16MOD-0033		For > 1000, Deduct	-0.23	
	16MOD-0034		For Installation In Metal Stud Wall, Add	0.48	
	16MOD-0035		For Installation In Wood Stud Wall (Includes Drilling), Add	1.20	
	16MOD-0036		For Installation In Concrete (Excludes Concrete), Add	0.72	
	16MOD-0037		For Work In Restricted Working Space, Add	1.43	
	16MOD-0038		For Installation Above 14', Add	0.72	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0367	LF	2" IMC Conduit, Mounted Exposed On Flat Wall.....	8.46	2.15
	16MOD-0031	For > 250 To 500, Deduct	-0.15	
	16MOD-0032	For > 500 To 1000, Deduct	-0.23	
	16MOD-0033	For > 1000, Deduct	-0.31	
	16MOD-0034	For Installation In Metal Stub Wall, Add	0.54	
	16MOD-0035	For Installation In Wood Stud Wall (Includes Drilling), Add	1.35	
	16MOD-0036	For Installation In Concrete (Excludes Concrete), Add	0.81	
	16MOD-0037	For Work In Restricted Working Space, Add	1.61	
	16MOD-0038	For Installation Above 14', Add	0.81	
16131-0368	LF	2-1/2" IMC Conduit, Mounted Exposed On Flat Wall.....	13.99	2.87
	16MOD-0031	For > 250 To 500, Deduct	-0.34	
	16MOD-0032	For > 500 To 1000, Deduct	-0.51	
	16MOD-0033	For > 1000, Deduct	-0.68	
	16MOD-0034	For Installation In Metal Stub Wall, Add	0.72	
	16MOD-0035	For Installation In Wood Stud Wall (Includes Drilling), Add	1.79	
	16MOD-0036	For Installation In Concrete (Excludes Concrete), Add	1.08	
	16MOD-0037	For Work In Restricted Working Space, Add	2.15	
	16MOD-0038	For Installation Above 14', Add	1.08	
16131-0369	LF	3" IMC Conduit, Mounted Exposed On Flat Wall.....	17.35	3.58
	16MOD-0031	For > 250 To 500, Deduct	-0.42	
	16MOD-0032	For > 500 To 1000, Deduct	-0.63	
	16MOD-0033	For > 1000, Deduct	-0.84	
	16MOD-0034	For Installation In Metal Stub Wall, Add	0.90	
	16MOD-0035	For Installation In Wood Stud Wall (Includes Drilling), Add	2.24	
	16MOD-0036	For Installation In Concrete (Excludes Concrete), Add	1.34	
	16MOD-0037	For Work In Restricted Working Space, Add	2.69	
	16MOD-0038	For Installation Above 14', Add	1.34	
16131-0370	LF	3-1/2" IMC Conduit, Mounted Exposed On Flat Wall.....	20.48	4.30
	16MOD-0031	For > 250 To 500, Deduct	-0.49	
	16MOD-0032	For > 500 To 1000, Deduct	-0.73	
	16MOD-0033	For > 1000, Deduct	-0.97	
	16MOD-0034	For Installation In Metal Stub Wall, Add	1.08	
	16MOD-0035	For Installation In Wood Stud Wall (Includes Drilling), Add	2.69	
	16MOD-0036	For Installation In Concrete (Excludes Concrete), Add	1.61	
	16MOD-0037	For Work In Restricted Working Space, Add	3.23	
	16MOD-0038	For Installation Above 14', Add	1.61	
16131-0371	LF	4" IMC Conduit, Mounted Exposed On Flat Wall.....	23.99	4.54
	16MOD-0031	For > 250 To 500, Deduct	-0.57	
	16MOD-0032	For > 500 To 1000, Deduct	-0.86	
	16MOD-0033	For > 1000, Deduct	-1.14	
	16MOD-0034	For Installation In Metal Stub Wall, Add	1.26	
	16MOD-0035	For Installation In Wood Stud Wall (Includes Drilling), Add	3.14	
	16MOD-0036	For Installation In Concrete (Excludes Concrete), Add	1.88	
	16MOD-0037	For Work In Restricted Working Space, Add	3.77	
	16MOD-0038	For Installation Above 14', Add	1.88	
16131-0372		90 Degree Elbow <small>(16131-0369)</small> See CSI section 16131-1572 for conduit field bending.		
16131-0373	EA	1" IMC Elbow Mounted Exposed On Flat Wall.....	29.47	9.02
	16MOD-0037	For Work In Restricted Working Space, Add	6.75	
	16MOD-0038	For Installation Above 14', Add	3.37	
16131-0374	EA	1-1/4" IMC Elbow Mounted Exposed On Flat Wall.....	35.92	10.45
	16MOD-0037	For Work In Restricted Working Space, Add	7.84	
	16MOD-0038	For Installation Above 14', Add	3.92	
16131-0375	EA	1-1/2" IMC Elbow Mounted Exposed On Flat Wall.....	42.36	12.01
	16MOD-0037	For Work In Restricted Working Space, Add	8.99	
	16MOD-0038	For Installation Above 14', Add	4.50	
16131-0376	EA	2" IMC Elbows Mounted Exposed On Flat Wall.....	50.80	13.20
	16MOD-0037	For Work In Restricted Working Space, Add	9.89	
	16MOD-0038	For Installation Above 14', Add	4.95	
16131-0377	EA	2-1/2" IMC Elbow Mounted Exposed On Flat Wall.....	71.48	16.49
	16MOD-0037	For Work In Restricted Working Space, Add	12.37	
	16MOD-0038	For Installation Above 14', Add	6.18	
16131-0378	EA	3" IMC Elbow Mounted Exposed On Flat Wall.....	102.49	22.46
	16MOD-0037	For Work In Restricted Working Space, Add	16.85	
	16MOD-0038	For Installation Above 14', Add	8.42	
16131-0379	EA	3-1/2" IMC Elbow Mounted Exposed On Flat Wall.....	145.14	25.33
	16MOD-0037	For Work In Restricted Working Space, Add	19.01	
	16MOD-0038	For Installation Above 14', Add	9.50	
16131-0380	EA	4" IMC Elbow Mounted Exposed On Flat Wall.....	177.31	32.99
	16MOD-0037	For Work In Restricted Working Space, Add	24.73	
	16MOD-0038	For Installation Above 14', Add	12.37	
16131-0381		Bushing Set With Locknut <small>(16131-0380)</small>		
16131-0382	EA	1/2" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	8.07	3.11
16131-0383	EA	3/4" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	9.48	0.36
16131-0384	EA	1" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	12.22	4.54
16131-0385	EA	1-1/4" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	14.89	5.50
16131-0386	EA	1-1/2" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	16.58	5.98
16131-0387	EA	2" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	21.23	7.41
16131-0388	EA	2-1/2" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	38.32	11.95
16131-0389	EA	3" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	48.13	16.25
16131-0390	EA	3-1/2" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	61.96	19.36
16131-0391	EA	4" IMC Bushing Set With Locknut, Mounted Exposed On Flat Wall.....	72.93	22.46
16131-0392		Type LB Conduit Body With Cover <small>(16131-0380)</small>		



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0393	EA		1/2" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	34.89	11.48
	16MOD-0037		For Work In Restricted Working Space, Add	8.60	
	16MOD-0038		For Installation Above 14', Add	4.30	
16131-0394	EA		3/4" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	41.78	13.14
	16MOD-0037		For Work In Restricted Working Space, Add	9.86	
	16MOD-0038		For Installation Above 14', Add	4.93	
16131-0395	EA		1" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	51.18	15.30
	16MOD-0037		For Work In Restricted Working Space, Add	11.47	
	16MOD-0038		For Installation Above 14', Add	5.74	
16131-0396	EA		1-1/4" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	62.54	17.45
	16MOD-0037		For Work In Restricted Working Space, Add	13.09	
	16MOD-0038		For Installation Above 14', Add	6.54	
16131-0397	EA		1-1/2" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	68.42	19.12
	16MOD-0037		For Work In Restricted Working Space, Add	14.34	
	16MOD-0038		For Installation Above 14', Add	7.17	
16131-0398	EA		2" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	91.70	22.94
	16MOD-0037		For Work In Restricted Working Space, Add	17.21	
	16MOD-0038		For Installation Above 14', Add	8.61	
16131-0399	EA		2-1/2" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	131.26	32.27
	16MOD-0037		For Work In Restricted Working Space, Add	24.20	
	16MOD-0038		For Installation Above 14', Add	12.10	
16131-0400	EA		3" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	173.33	43.02
	16MOD-0037		For Work In Restricted Working Space, Add	32.27	
	16MOD-0038		For Installation Above 14', Add	16.13	
16131-0401	EA		3-1/2" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	230.57	53.78
	16MOD-0037		For Work In Restricted Working Space, Add	40.34	
	16MOD-0038		For Installation Above 14', Add	20.17	
16131-0402	EA		4" IMC Type LB Conduit Body With Cover, Mounted Exposed On Flat Wall	290.19	65.49
	16MOD-0037		For Work In Restricted Working Space, Add	49.12	
	16MOD-0038		For Installation Above 14', Add	24.56	
16131-0403			Type LL Or LR Conduit Body With Cover (16131-0360)		
16131-0404	EA		1/2" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	34.88	11.48
16131-0405	EA		3/4" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	41.78	13.14
16131-0406	EA		1" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	51.18	15.30
16131-0407	EA		1-1/4" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	62.54	17.45
16131-0408	EA		1-1/2" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	68.42	19.12
16131-0409	EA		2" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	91.70	22.94
16131-0410	EA		2-1/2" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	131.26	32.27
16131-0411	EA		3" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	173.33	43.02
16131-0412	EA		3-1/2" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	230.57	53.78
16131-0413	EA		4" IMC Type LL Or LR Conduit Body With Cover, Mounted Exposed On Flat Wall	290.19	65.49
16131-0414			Type T Or X Conduit Body With Cover (16131-0360)		
16131-0415	EA		1/2" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	45.60	15.06
	16MOD-0037		For Work In Restricted Working Space, Add	11.29	
	16MOD-0038		For Installation Above 14', Add	5.65	
16131-0416	EA		3/4" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	51.39	16.73
	16MOD-0037		For Work In Restricted Working Space, Add	12.55	
	16MOD-0038		For Installation Above 14', Add	6.27	
16131-0417	EA		1" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	59.77	18.40
	16MOD-0037		For Work In Restricted Working Space, Add	13.80	
	16MOD-0038		For Installation Above 14', Add	6.90	
16131-0418	EA		1-1/4" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	73.60	21.03
	16MOD-0037		For Work In Restricted Working Space, Add	15.77	
	16MOD-0038		For Installation Above 14', Add	7.89	
16131-0419	EA		1-1/2" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	85.40	22.94
	16MOD-0037		For Work In Restricted Working Space, Add	17.21	
	16MOD-0038		For Installation Above 14', Add	8.61	
16131-0420	EA		2" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	113.83	28.20
	16MOD-0037		For Work In Restricted Working Space, Add	21.15	
	16MOD-0038		For Installation Above 14', Add	10.58	
16131-0421	EA		2-1/2" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	178.40	41.34
	16MOD-0037		For Work In Restricted Working Space, Add	31.01	
	16MOD-0038		For Installation Above 14', Add	15.51	
16131-0422	EA		3" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	233.14	53.78
	16MOD-0037		For Work In Restricted Working Space, Add	40.34	
	16MOD-0038		For Installation Above 14', Add	20.17	
16131-0423	EA		3-1/2" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	349.47	66.45
	16MOD-0037		For Work In Restricted Working Space, Add	49.83	
	16MOD-0038		For Installation Above 14', Add	24.92	
16131-0424	EA		4" IMC Type T Or X Conduit Body With Cover, Mounted Exposed On Flat Wall	404.72	79.83
	16MOD-0037		For Work In Restricted Working Space, Add	59.87	
	16MOD-0038		For Installation Above 14', Add	29.94	
16131-0425			Type C Conduit Body With Cover (16131-0360)		
16131-0426	EA		1/2" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	34.89	11.48
	16MOD-0037		For Work In Restricted Working Space, Add	8.60	
	16MOD-0038		For Installation Above 14', Add	4.30	
16131-0427	EA		3/4" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	41.78	13.14
	16MOD-0037		For Work In Restricted Working Space, Add	9.86	
	16MOD-0038		For Installation Above 14', Add	4.93	
16131-0428	EA		1" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	50.58	15.06
	16MOD-0037		For Work In Restricted Working Space, Add	11.29	
	16MOD-0038		For Installation Above 14', Add	5.65	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0429	EA	1-1/4" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	62.54	17.45
	16MOD-0037	For Work In Restricted Working Space, Add	13.09	
	16MOD-0038	For Installation Above 14', Add	6.54	
16131-0430	EA	1-1/2" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	68.43	19.12
	16MOD-0037	For Work In Restricted Working Space, Add	14.34	
	16MOD-0038	For Installation Above 14', Add	7.17	
16131-0431	EA	2" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	91.71	22.94
	16MOD-0037	For Work In Restricted Working Space, Add	17.21	
	16MOD-0038	For Installation Above 14', Add	8.61	
16131-0432	EA	2-1/2" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	201.84	60.53
	16MOD-0037	For Work In Restricted Working Space, Add	45.38	
	16MOD-0038	For Installation Above 14', Add	22.69	
16131-0433	EA	3" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	173.32	43.02
	16MOD-0037	For Work In Restricted Working Space, Add	32.27	
	16MOD-0038	For Installation Above 14', Add	16.13	
16131-0434	EA	3-1/2" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	230.52	53.78
	16MOD-0037	For Work In Restricted Working Space, Add	40.34	
	16MOD-0038	For Installation Above 14', Add	20.17	
16131-0435	EA	4" IMC Type C Conduit Body With Cover, Mounted Exposed On Flat Wall	290.18	65.49
	16MOD-0037	For Work In Restricted Working Space, Add	49.11	
	16MOD-0038	For Installation Above 14', Add	24.56	
16131-0436		Erickson Fitting <small>(16131-0360)</small>		
		Note: 3-Piece coupling.		
16131-0437	EA	1/2" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	26.28	9.56
	16MOD-0037	For Work In Restricted Working Space, Add	7.18	
	16MOD-0038	For Installation Above 14', Add	3.59	
16131-0438	EA	3/4" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	29.73	10.69
	16MOD-0037	For Work In Restricted Working Space, Add	8.01	
	16MOD-0038	For Installation Above 14', Add	4.01	
16131-0439	EA	1" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	35.58	11.89
	16MOD-0037	For Work In Restricted Working Space, Add	8.93	
	16MOD-0038	For Installation Above 14', Add	4.46	
16131-0440	EA	1-1/4" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	43.29	13.02
	16MOD-0037	For Work In Restricted Working Space, Add	9.77	
	16MOD-0038	For Installation Above 14', Add	4.88	
16131-0441	EA	1-1/2" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	49.08	14.22
	16MOD-0037	For Work In Restricted Working Space, Add	10.69	
	16MOD-0038	For Installation Above 14', Add	5.34	
16131-0442	EA	2" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	65.50	15.42
	16MOD-0037	For Work In Restricted Working Space, Add	11.57	
	16MOD-0038	For Installation Above 14', Add	5.79	
16131-0443	EA	2-1/2" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	105.40	19.12
	16MOD-0037	For Work In Restricted Working Space, Add	14.34	
	16MOD-0038	For Installation Above 14', Add	7.17	
16131-0444	EA	3" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	147.57	23.90
	16MOD-0037	For Work In Restricted Working Space, Add	17.93	
	16MOD-0038	For Installation Above 14', Add	8.96	
16131-0445	EA	3-1/2" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	212.81	28.68
	16MOD-0037	For Work In Restricted Working Space, Add	21.52	
	16MOD-0038	For Installation Above 14', Add	10.76	
16131-0446	EA	4" IMC Erickson Or "Kwik-Couple", Mounted Exposed On Flat Wall	244.67	31.07
	16MOD-0037	For Work In Restricted Working Space, Add	23.30	
	16MOD-0038	For Installation Above 14', Add	11.65	
16131-0447		Rigid/IMC To EMT Connection <small>(16131-0360)</small>		
16131-0448	EA	1/2" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	37.50	4.78
	16MOD-0037	For Work In Restricted Working Space, Add	3.59	
	16MOD-0038	For Installation Above 14', Add	1.79	
16131-0449	EA	3/4" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	43.37	5.26
	16MOD-0037	For Work In Restricted Working Space, Add	3.94	
	16MOD-0038	For Installation Above 14', Add	1.97	
16131-0450	EA	1" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	50.93	5.98
	16MOD-0037	For Work In Restricted Working Space, Add	4.48	
	16MOD-0038	For Installation Above 14', Add	2.24	
16131-0451	EA	1-1/4" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	63.64	6.45
	16MOD-0037	For Work In Restricted Working Space, Add	4.84	
	16MOD-0038	For Installation Above 14', Add	2.42	
16131-0452	EA	1-1/2" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	84.15	7.17
	16MOD-0037	For Work In Restricted Working Space, Add	5.38	
	16MOD-0038	For Installation Above 14', Add	2.69	
16131-0453	EA	2" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	117.62	7.89
	16MOD-0037	For Work In Restricted Working Space, Add	5.92	
	16MOD-0038	For Installation Above 14', Add	2.96	
16131-0454	EA	2-1/2" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	180.82	9.56
	16MOD-0037	For Work In Restricted Working Space, Add	7.17	
	16MOD-0038	For Installation Above 14', Add	3.59	
16131-0455	EA	3" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	221.36	11.95
	16MOD-0037	For Work In Restricted Working Space, Add	8.96	
	16MOD-0038	For Installation Above 14', Add	4.48	
16131-0456	EA	3-1/2" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	266.20	14.34
	16MOD-0037	For Work In Restricted Working Space, Add	10.76	
	16MOD-0038	For Installation Above 14', Add	5.38	
16131-0457	EA	4" IMC Rigid To EMT Connector, Mounted Exposed On Flat Wall	312.38	15.53
	16MOD-0037	For Work In Restricted Working Space, Add	11.65	
	16MOD-0038	For Installation Above 14', Add	5.83	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16131-0458 Rain Tight Threaded Hubs <small>(16131-0360)</small>					
16131-0459	EA	1/2"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	13.02	4.78
	16MOD-0037		For Work In Restricted Working Space, Add	3.59	
	16MOD-0038		For Installation Above 14', Add	1.79	
16131-0460	EA	3/4"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	16.54	5.98
	16MOD-0037		For Work In Restricted Working Space, Add	4.48	
	16MOD-0038		For Installation Above 14', Add	2.24	
16131-0461	EA	1"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	20.29	7.17
	16MOD-0037		For Work In Restricted Working Space, Add	5.38	
	16MOD-0038		For Installation Above 14', Add	2.69	
16131-0462	EA	1-1/4"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	24.26	8.37
	16MOD-0037		For Work In Restricted Working Space, Add	6.28	
	16MOD-0038		For Installation Above 14', Add	3.14	
16131-0463	EA	1-1/2"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	28.20	9.56
	16MOD-0037		For Work In Restricted Working Space, Add	7.17	
	16MOD-0038		For Installation Above 14', Add	3.59	
16131-0464	EA	2"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	33.11	10.76
	16MOD-0037		For Work In Restricted Working Space, Add	8.07	
	16MOD-0038		For Installation Above 14', Add	4.03	
16131-0465	EA	2-1/2"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	40.30	11.95
	16MOD-0037		For Work In Restricted Working Space, Add	8.96	
	16MOD-0038		For Installation Above 14', Add	4.48	
16131-0466	EA	3"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	46.91	13.14
	16MOD-0037		For Work In Restricted Working Space, Add	9.86	
	16MOD-0038		For Installation Above 14', Add	4.93	
16131-0467	EA	3-1/2"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	57.04	15.53
	16MOD-0037		For Work In Restricted Working Space, Add	11.65	
	16MOD-0038		For Installation Above 14', Add	5.83	
16131-0468	EA	4"	IMC Threaded Hubs, Rain Tight, Die Cast Zinc, Mounted Exposed On Flat Wall.....	64.78	16.73
	16MOD-0037		For Work In Restricted Working Space, Add	12.55	
	16MOD-0038		For Installation Above 14', Add	6.27	

16131-0469 Expansion Fitting <small>(16131-0360)</small>					
16131-0470	EA	1/2"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	69.98	9.56
	16MOD-0037		For Work In Restricted Working Space, Add	7.17	
	16MOD-0038		For Installation Above 14', Add	3.59	
16131-0471	EA	3/4"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	77.57	10.76
	16MOD-0037		For Work In Restricted Working Space, Add	8.07	
	16MOD-0038		For Installation Above 14', Add	4.03	
16131-0472	EA	1"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	86.20	11.95
	16MOD-0037		For Work In Restricted Working Space, Add	8.96	
	16MOD-0038		For Installation Above 14', Add	4.48	
16131-0473	EA	1-1/4"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	103.13	13.14
	16MOD-0037		For Work In Restricted Working Space, Add	9.86	
	16MOD-0038		For Installation Above 14', Add	4.93	
16131-0474	EA	1-1/2"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	124.97	14.34
	16MOD-0037		For Work In Restricted Working Space, Add	10.76	
	16MOD-0038		For Installation Above 14', Add	5.38	
16131-0475	EA	2"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	161.73	15.53
	16MOD-0037		For Work In Restricted Working Space, Add	11.65	
	16MOD-0038		For Installation Above 14', Add	5.83	
16131-0476	EA	2-1/2"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	240.84	19.12
	16MOD-0037		For Work In Restricted Working Space, Add	14.34	
	16MOD-0038		For Installation Above 14', Add	7.17	
16131-0477	EA	3"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	290.24	23.90
	16MOD-0037		For Work In Restricted Working Space, Add	17.93	
	16MOD-0038		For Installation Above 14', Add	8.96	
16131-0478	EA	3-1/2"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	400.99	28.68
	16MOD-0037		For Work In Restricted Working Space, Add	21.51	
	16MOD-0038		For Installation Above 14', Add	10.76	
16131-0479	EA	4"	IMC Expansion Fittings, Mounted Exposed On Flat Wall.....	462.12	31.07
	16MOD-0037		For Work In Restricted Working Space, Add	23.30	
	16MOD-0038		For Installation Above 14', Add	11.65	

16131-0480 Sealing Fitting Vertical/Horizontal <small>(16131-0360)</small>					
16131-0481	EA	1/2"	IMC Conduit Sealing Fitting Vertical/Horizontal.....	47.61	14.94
	16MOD-0037		For Work In Restricted Working Space, Add	8.96	
	16MOD-0038		For Installation Above 14', Add	4.48	
16131-0482	EA	3/4"	IMC Conduit Sealing Fitting Vertical/Horizontal.....	56.67	17.93
	16MOD-0037		For Work In Restricted Working Space, Add	10.76	
	16MOD-0038		For Installation Above 14', Add	5.38	
16131-0483	EA	1"	IMC Conduit Sealing Fitting Vertical/Horizontal.....	68.59	20.92
	16MOD-0037		For Work In Restricted Working Space, Add	12.55	
	16MOD-0038		For Installation Above 14', Add	6.27	
16131-0484	EA	1-1/4"	IMC Conduit Sealing Fitting Vertical/Horizontal.....	80.30	23.90
	16MOD-0037		For Work In Restricted Working Space, Add	14.34	
	16MOD-0038		For Installation Above 14', Add	7.17	
16131-0485	EA	1-1/2"	IMC Conduit Sealing Fitting Vertical/Horizontal.....	102.70	26.89
	16MOD-0037		For Work In Restricted Working Space, Add	16.13	
	16MOD-0038		For Installation Above 14', Add	8.07	
16131-0486	EA	2"	IMC Conduit Sealing Fitting Vertical/Horizontal.....	123.13	29.88
	16MOD-0037		For Work In Restricted Working Space, Add	17.93	
	16MOD-0038		For Installation Above 14', Add	8.96	
16131-0487	EA	2-1/2"	IMC Conduit Sealing Fitting Vertical/Horizontal.....	170.18	35.85
	16MOD-0037		For Work In Restricted Working Space, Add	21.51	
	16MOD-0038		For Installation Above 14', Add	10.76	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0488	EA	3" IMC Conduit Sealing Fitting Vertical/Horizontal	203.94	41.83
	16MOD-0037	For Work In Restricted Working Space, Add	25.10	
	16MOD-0038	For Installation Above 14', Add	12.55	
16131-0489	EA	3-1/2" IMC Conduit Sealing Fitting Vertical/Horizontal	442.54	47.81
	16MOD-0037	For Work In Restricted Working Space, Add	28.68	
	16MOD-0038	For Installation Above 14', Add	14.34	
16131-0490	EA	4" IMC Conduit Sealing Fitting Vertical/Horizontal	509.08	53.78
	16MOD-0037	For Work In Restricted Working Space, Add	32.27	
	16MOD-0038	For Installation Above 14', Add	16.13	
16131-0491		Coupling <small>(16131-0360)</small>		
16131-0492	EA	1/2" IMC Coupling, Mounted Exposed On Flat Wall	7.76	2.87
	16MOD-0037	For Work In Restricted Working Space, Add	2.15	
	16MOD-0038	For Installation Above 14', Add	1.07	
16131-0493	EA	3/4" IMC Coupling, Mounted Exposed On Flat Wall	10.89	4.06
	16MOD-0037	For Work In Restricted Working Space, Add	3.05	
	16MOD-0038	For Installation Above 14', Add	1.52	
16131-0494	EA	1" IMC Coupling, Mounted Exposed On Flat Wall	14.22	5.26
	16MOD-0037	For Work In Restricted Working Space, Add	3.94	
	16MOD-0038	For Installation Above 14', Add	1.97	
16131-0495	EA	1-1/4" IMC Coupling, Mounted Exposed On Flat Wall	16.31	5.98
	16MOD-0037	For Work In Restricted Working Space, Add	4.48	
	16MOD-0038	For Installation Above 14', Add	2.24	
16131-0496	EA	1-1/2" IMC Coupling, Mounted Exposed On Flat Wall	19.65	7.17
	16MOD-0037	For Work In Restricted Working Space, Add	5.38	
	16MOD-0038	For Installation Above 14', Add	2.69	
16131-0497	EA	2" IMC Coupling, Mounted Exposed On Flat Wall	22.60	8.13
	16MOD-0037	For Work In Restricted Working Space, Add	6.10	
	16MOD-0038	For Installation Above 14', Add	3.05	
16131-0498	EA	2-1/2" IMC Coupling, Mounted Exposed On Flat Wall	27.74	9.08
	16MOD-0037	For Work In Restricted Working Space, Add	6.81	
	16MOD-0038	For Installation Above 14', Add	3.41	
16131-0499	EA	3" IMC Coupling, Mounted Exposed On Flat Wall	32.57	10.27
	16MOD-0037	For Work In Restricted Working Space, Add	7.71	
	16MOD-0038	For Installation Above 14', Add	3.85	
16131-0500	EA	3-1/2" IMC Coupling, Mounted Exposed On Flat Wall	37.29	11.24
	16MOD-0037	For Work In Restricted Working Space, Add	8.43	
	16MOD-0038	For Installation Above 14', Add	4.21	
16131-0501	EA	4" IMC Coupling, Mounted Exposed On Flat Wall	39.14	11.95
	16MOD-0037	For Work In Restricted Working Space, Add	8.96	
	16MOD-0038	For Installation Above 14', Add	4.48	
16131-0502		Reducer Bushing <small>(16131-0360)</small>		
16131-0503	EA	1/2" To 3/4" IMC Reducing Bushing, Mounted Exposed On Flat Wall	3.67	1.19
	16MOD-0037	For Work In Restricted Working Space, Add	0.90	
	16MOD-0038	For Installation Above 14', Add	0.45	
16131-0504	EA	3/4" To 1" IMC Reducing Bushing, Mounted Exposed On Flat Wall	4.06	1.19
	16MOD-0037	For Work In Restricted Working Space, Add	0.90	
	16MOD-0038	For Installation Above 14', Add	0.45	
16131-0505		PVC Coated Rigid Galvanized Steel (RGS) Conduit <small>(16131-0001)</small>		
		Note: Urethane lined (Ocal Blue, Crouse-Hinds, Appleton or O-Z/Gedney). Used in hazardous locations.		
16131-0506		PVC Coated Urethane Lined RGS Conduit <small>(16131-0505)</small>		
16131-0507	LF	1/2" RGS Conduit, PVC Coated, Urethane Lined	7.33	1.25
	16MOD-0011	For > 250 To 500, Deduct	-0.28	
	16MOD-0012	For > 500 To 1000, Deduct	-0.47	
	16MOD-0013	For > 1000, Deduct	-0.65	
	16MOD-0014	For Installation Above 14', Add	0.49	
	16MOD-0015	For Work In Restricted Working Space, Add	0.99	
16131-0508	LF	3/4" RGS Conduit, PVC Coated, Urethane Lined	8.26	1.56
	16MOD-0011	For > 250 To 500, Deduct	-0.32	
	16MOD-0012	For > 500 To 1000, Deduct	-0.53	
	16MOD-0013	For > 1000, Deduct	-0.74	
	16MOD-0014	For Installation Above 14', Add	0.54	
	16MOD-0015	For Work In Restricted Working Space, Add	1.07	
16131-0509	LF	1" RGS Conduit, PVC Coated, Urethane Lined	10.24	1.74
	16MOD-0011	For > 250 To 500, Deduct	-0.41	
	16MOD-0012	For > 500 To 1000, Deduct	-0.66	
	16MOD-0013	For > 1000, Deduct	-0.92	
	16MOD-0014	For Installation Above 14', Add	0.63	
	16MOD-0015	For Work In Restricted Working Space, Add	1.25	
16131-0510	LF	1-1/4" RGS Conduit, PVC Coated, Urethane Lined	12.46	2.33
	16MOD-0011	For > 250 To 500, Deduct	-0.50	
	16MOD-0012	For > 500 To 1000, Deduct	-0.82	
	16MOD-0013	For > 1000, Deduct	-1.13	
	16MOD-0014	For Installation Above 14', Add	0.72	
	16MOD-0015	For Work In Restricted Working Space, Add	1.43	
16131-0511	LF	1-1/2" RGS Conduit, PVC Coated, Urethane Lined	14.72	2.63
	16MOD-0011	For > 250 To 500, Deduct	-0.60	
	16MOD-0012	For > 500 To 1000, Deduct	-0.97	
	16MOD-0013	For > 1000, Deduct	-1.34	
	16MOD-0014	For Installation Above 14', Add	0.81	
	16MOD-0015	For Work In Restricted Working Space, Add	1.61	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0512	LF		2" RGS Conduit, PVC Coated, Urethane Lined	18.74	2.87
	16MOD-0011		For > 250 To 500, Deduct	-0.77	
	16MOD-0012		For > 500 To 1000, Deduct	-1.24	
	16MOD-0013		For > 1000, Deduct	-1.71	
	16MOD-0014		For Installation Above 14', Add	0.99	
	16MOD-0015		For Work In Restricted Working Space, Add	1.97	
16131-0513	LF		2-1/2" RGS Conduit, PVC Coated, Urethane Lined	27.41	4.30
	16MOD-0011		For > 250 To 500, Deduct	-1.15	
	16MOD-0012		For > 500 To 1000, Deduct	-1.83	
	16MOD-0013		For > 1000, Deduct	-2.52	
	16MOD-0014		For Installation Above 14', Add	1.34	
	16MOD-0015		For Work In Restricted Working Space, Add	2.69	
16131-0514	LF		3" RGS Conduit, PVC Coated, Urethane Lined	35.21	5.38
	16MOD-0011		For > 250 To 500, Deduct	-1.46	
	16MOD-0012		For > 500 To 1000, Deduct	-2.34	
	16MOD-0013		For > 1000, Deduct	-3.22	
	16MOD-0014		For Installation Above 14', Add	1.79	
	16MOD-0015		For Work In Restricted Working Space, Add	3.59	
16131-0515	LF		3-1/2" RGS Conduit, PVC Coated, Urethane Lined	43.40	5.68
	16MOD-0011		For > 250 To 500, Deduct	-1.80	
	16MOD-0012		For > 500 To 1000, Deduct	-2.88	
	16MOD-0013		For > 1000, Deduct	-3.97	
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	
16131-0516	LF		4" RGS Conduit, PVC Coated, Urethane Lined	51.48	6.27
	16MOD-0011		For > 250 To 500, Deduct	-2.13	
	16MOD-0012		For > 500 To 1000, Deduct	-3.41	
	16MOD-0013		For > 1000, Deduct	-4.70	
	16MOD-0014		For Installation Above 14', Add	2.69	
	16MOD-0015		For Work In Restricted Working Space, Add	5.38	
16131-0517	LF		5" RGS Conduit, PVC Coated, Urethane Lined	82.16	8.67
	16MOD-0011		For > 250 To 500, Deduct	-3.54	
	16MOD-0012		For > 500 To 1000, Deduct	-5.59	
	16MOD-0013		For > 1000, Deduct	-7.65	
	16MOD-0014		For Installation Above 14', Add	3.41	
	16MOD-0015		For Work In Restricted Working Space, Add	6.81	
16131-0518	LF		6" RGS Conduit, PVC Coated, Urethane Lined	110.16	11.36
	16MOD-0011		For > 250 To 500, Deduct	-4.79	
	16MOD-0012		For > 500 To 1000, Deduct	-7.55	
	16MOD-0013		For > 1000, Deduct	-10.30	
	16MOD-0014		For Installation Above 14', Add	4.30	
	16MOD-0015		For Work In Restricted Working Space, Add	8.60	
16131-0519			Couplings <small>(16131-0509)</small>		
16131-0520	EA		1/2" Coupling, RGS PVC Coated, Urethane Lined	7.84	1.80
	16MOD-0014		For Installation Above 14', Add	0.54	
	16MOD-0015		For Work In Restricted Working Space, Add	1.07	
16131-0521	EA		3/4" Coupling, RGS PVC Coated, Urethane Lined	9.25	2.39
	16MOD-0014		For Installation Above 14', Add	0.72	
	16MOD-0015		For Work In Restricted Working Space, Add	1.43	
16131-0522	EA		1" Coupling, RGS PVC Coated, Urethane Lined	11.78	2.99
	16MOD-0014		For Installation Above 14', Add	0.90	
	16MOD-0015		For Work In Restricted Working Space, Add	1.79	
16131-0523	EA		1-1/4" Coupling, RGS PVC Coated, Urethane Lined	13.34	3.29
	16MOD-0014		For Installation Above 14', Add	0.99	
	16MOD-0015		For Work In Restricted Working Space, Add	1.97	
16131-0524	EA		1-1/2" Coupling, RGS PVC Coated, Urethane Lined	15.81	3.88
	16MOD-0014		For Installation Above 14', Add	1.17	
	16MOD-0015		For Work In Restricted Working Space, Add	2.33	
16131-0525	EA		2" Coupling, RGS PVC Coated, Urethane Lined	20.73	4.48
	16MOD-0014		For Installation Above 14', Add	1.34	
	16MOD-0015		For Work In Restricted Working Space, Add	2.69	
16131-0526	EA		2-1/2" Coupling, RGS PVC Coated, Urethane Lined	39.89	5.38
	16MOD-0014		For Installation Above 14', Add	1.61	
	16MOD-0015		For Work In Restricted Working Space, Add	3.23	
16131-0527	EA		3" Coupling, RGS PVC Coated, Urethane Lined	50.32	7.46
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	
16131-0528	EA		3-1/2" Coupling, RGS PVC Coated, Urethane Lined	62.72	8.67
	16MOD-0014		For Installation Above 14', Add	2.60	
	16MOD-0015		For Work In Restricted Working Space, Add	5.20	
16131-0529	EA		4" Coupling, RGS PVC Coated, Urethane Lined	76.97	11.95
	16MOD-0014		For Installation Above 14', Add	3.59	
	16MOD-0015		For Work In Restricted Working Space, Add	7.17	
16131-0530	EA		5" Coupling, RGS PVC Coated, Urethane Lined	205.80	16.43
	16MOD-0014		For Installation Above 14', Add	4.93	
	16MOD-0015		For Work In Restricted Working Space, Add	9.86	
16131-0531	EA		6" Coupling, RGS PVC Coated, Urethane Lined	211.70	9.26
	16MOD-0014		For Installation Above 14', Add	2.78	
	16MOD-0015		For Work In Restricted Working Space, Add	5.56	
16131-0532			Standard Radius Elbows <small>(16131-0505)</small>		
			Note: 90 Degree, 45 Degree, 30 Degree.		
16131-0533	EA		1/2" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	29.89	7.46
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0534	EA	3/4" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	34.04	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0535	EA	1" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	40.49	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0536	EA	1-1/4" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	48.17	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0537	EA	1-1/2" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	56.75	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0538	EA	2" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	70.37	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0539	EA	2-1/2" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	111.88	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0540	EA	3" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	169.07	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0541	EA	3-1/2" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	211.49	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0542	EA	4" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	239.06	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0543	EA	5" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	511.84	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0544	EA	6" Standard Degree Elbow, RGS PVC Coated, Urethane Lined	808.58	100.98
	16MOD-0014	For Installation Above 14', Add	30.29	
	16MOD-0015	For Work In Restricted Working Space, Add	60.59	
16131-0545		12" Large Radius Elbows (16131-0505)		
16131-0546	EA	1" 12" Radius Elbow, RGS PVC Coated, Urethane Lined	75.72	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0547	EA	1-1/4" 12" Radius Elbow, RGS PVC Coated, Urethane Lined	84.94	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0548	EA	1-1/2" 12" Radius Elbow, RGS PVC Coated, Urethane Lined	97.02	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0549	EA	2" 12" Radius Elbow, RGS PVC Coated, Urethane Lined	116.83	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0550	EA	2-1/2" 12" Radius Elbow, RGS PVC Coated, Urethane Lined	164.46	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0551		15" Large Radius Elbows (16131-0505)		
16131-0552	EA	1" 15" Radius Elbow, RGS PVC Coated, Urethane Lined	85.24	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0553	EA	1-1/4" 15" Radius Elbow, RGS PVC Coated, Urethane Lined	100.68	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0554	EA	1-1/2" 15" Radius Elbow, RGS PVC Coated, Urethane Lined	108.30	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0555	EA	2" 15" Radius Elbow, RGS PVC Coated, Urethane Lined	141.44	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0556	EA	2-1/2" 15" Radius Elbow, RGS PVC Coated, Urethane Lined	188.19	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0557	EA	3" 15" Radius Elbow, RGS PVC Coated, Urethane Lined	239.45	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0558		18" Large Radius Elbows (16131-0505)		
16131-0559	EA	1" 18" Radius Elbow, RGS PVC Coated, Urethane Lined	96.64	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0560	EA	1-1/4" 18" Radius Elbow, RGS PVC Coated, Urethane Lined	108.88	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0561	EA	1-1/2" 18" Radius Elbow, RGS PVC Coated, Urethane Lined	122.78	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0562	EA	2" 18" Radius Elbow, RGS PVC Coated, Urethane Lined	149.61	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0563	EA	2-1/2" 18" Radius Elbow, RGS PVC Coated, Urethane Lined.....	215.46	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0564	EA	3" 18" Radius Elbow, RGS PVC Coated, Urethane Lined.....	271.46	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0565	EA	3-1/2" 18" Radius Elbow, RGS PVC Coated, Urethane Lined.....	345.57	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0566	EA	4" 18" Radius Elbow, RGS PVC Coated, Urethane Lined.....	385.14	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0567		24" Large Radius Elbows (16131-0505)		
16131-0568	EA	1" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	116.31	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0569	EA	1-1/4" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	128.13	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0570	EA	1-1/2" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	144.63	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0571	EA	2" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	181.07	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0572	EA	2-1/2" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	264.27	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0573	EA	3" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	325.70	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0574	EA	3-1/2" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	378.69	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0575	EA	4" 24" Radius Elbow, RGS PVC Coated, Urethane Lined.....	445.94	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0576		30" Large Radius Elbows (16131-0505)		
16131-0577	EA	1" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	131.62	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0578	EA	1-1/4" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	146.04	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0579	EA	1-1/2" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	166.14	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0580	EA	2" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	208.46	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0581	EA	2-1/2" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	290.90	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0582	EA	3" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	369.09	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0583	EA	3-1/2" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	459.22	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0584	EA	4" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	501.76	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0585	EA	5" 30" Radius Elbow, RGS PVC Coated, Urethane Lined.....	837.68	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0586		36" Large Radius Elbows (16131-0505)		
16131-0587	EA	1" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	151.64	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0588	EA	1-1/4" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	167.68	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0589	EA	1-1/2" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	189.71	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0590	EA	2" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	238.83	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0591	EA	2-1/2" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	335.27	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0592	EA	3" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	424.37	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0593	EA	3-1/2" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	499.57	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0594	EA	4" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	573.81	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0595	EA	5" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	888.18	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0596	EA	6" 36" Radius Elbow, RGS PVC Coated, Urethane Lined.....	1,207.60	100.98
	16MOD-0014	For Installation Above 14', Add	30.29	
	16MOD-0015	For Work In Restricted Working Space, Add	60.59	
16131-0597		42" Large Radius Elbows (16131-0505)		
16131-0598	EA	1" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	179.51	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0599	EA	1-1/4" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	186.98	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0600	EA	1-1/2" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	221.26	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0601	EA	2" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	281.12	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0602	EA	2-1/2" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	395.12	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0603	EA	3" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	498.89	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0604	EA	3-1/2" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	611.75	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0605	EA	4" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	713.98	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0606	EA	5" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	1,052.90	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0607	EA	6" 42" Radius Elbow, RGS PVC Coated, Urethane Lined.....	1,283.21	100.98
	16MOD-0014	For Installation Above 14', Add	30.29	
	16MOD-0015	For Work In Restricted Working Space, Add	60.59	
16131-0608		48" Large Radius Elbows (16131-0505)		
16131-0609	EA	1" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	186.22	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0610	EA	1-1/4" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	219.61	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0611	EA	1-1/2" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	248.55	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0612	EA	2" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	293.84	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0613	EA	2-1/2" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	410.06	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0614	EA	3" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	521.81	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0615	EA	3-1/2" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	672.84	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0616	EA	4" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	745.78	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0617	EA	5" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	1,097.15	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0618	EA	6" 48" Radius Elbow, RGS PVC Coated, Urethane Lined.....	1,321.63	100.98
	16MOD-0014	For Installation Above 14', Add	30.29	
	16MOD-0015	For Work In Restricted Working Space, Add	60.59	
16131-0619		45 Degree Sealight Conduit Fittings (16131-0505)		
16131-0620	EA	1/2" 45 Degree Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	65.20	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0621	EA	3/4"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	78.98	9.86
	16MOD-0014		For Installation Above 14', Add	2.96	
	16MOD-0015		For Work In Restricted Working Space, Add	5.91	
16131-0622	EA	1"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	107.34	11.36
	16MOD-0014		For Installation Above 14', Add	3.41	
	16MOD-0015		For Work In Restricted Working Space, Add	6.81	
16131-0623	EA	1-1/4"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	182.58	13.14
	16MOD-0014		For Installation Above 14', Add	3.95	
	16MOD-0015		For Work In Restricted Working Space, Add	7.89	
16131-0624	EA	1-1/2"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	201.10	14.94
	16MOD-0014		For Installation Above 14', Add	4.48	
	16MOD-0015		For Work In Restricted Working Space, Add	8.96	
16131-0625	EA	2"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	256.89	16.43
	16MOD-0014		For Installation Above 14', Add	4.93	
	16MOD-0015		For Work In Restricted Working Space, Add	9.86	
16131-0626	EA	2-1/2"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	727.44	20.62
	16MOD-0014		For Installation Above 14', Add	6.18	
	16MOD-0015		For Work In Restricted Working Space, Add	12.37	
16131-0627	EA	3"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	864.27	28.08
	16MOD-0014		For Installation Above 14', Add	8.43	
	16MOD-0015		For Work In Restricted Working Space, Add	16.85	
16131-0628	EA	4"	45 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	1,143.89	41.22
	16MOD-0014		For Installation Above 14', Add	12.37	
	16MOD-0015		For Work In Restricted Working Space, Add	24.74	
16131-0629			90 Degree Sealright Conduit Fittings (16131-0509)		
16131-0630	EA	1/2"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	62.14	7.46
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	
16131-0631	EA	3/4"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	75.52	9.86
	16MOD-0014		For Installation Above 14', Add	2.96	
	16MOD-0015		For Work In Restricted Working Space, Add	5.91	
16131-0632	EA	1"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	107.34	11.36
	16MOD-0014		For Installation Above 14', Add	3.41	
	16MOD-0015		For Work In Restricted Working Space, Add	6.81	
16131-0633	EA	1-1/4"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	180.80	13.14
	16MOD-0014		For Installation Above 14', Add	3.95	
	16MOD-0015		For Work In Restricted Working Space, Add	7.89	
16131-0634	EA	1-1/2"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	193.94	14.94
	16MOD-0014		For Installation Above 14', Add	4.48	
	16MOD-0015		For Work In Restricted Working Space, Add	8.96	
16131-0635	EA	2"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	256.97	16.43
	16MOD-0014		For Installation Above 14', Add	4.93	
	16MOD-0015		For Work In Restricted Working Space, Add	9.86	
16131-0636	EA	2-1/2"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	696.87	20.62
	16MOD-0014		For Installation Above 14', Add	6.18	
	16MOD-0015		For Work In Restricted Working Space, Add	12.37	
16131-0637	EA	3"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	841.97	28.08
	16MOD-0014		For Installation Above 14', Add	8.43	
	16MOD-0015		For Work In Restricted Working Space, Add	16.85	
16131-0638	EA	4"	90 Degree Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	1,143.83	41.22
	16MOD-0014		For Installation Above 14', Add	12.37	
	16MOD-0015		For Work In Restricted Working Space, Add	24.74	
16131-0639			Straight Sealright Conduit Fittings (16131-0509)		
16131-0640	EA	1/2"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	55.38	7.46
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	
16131-0641	EA	3/4"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	65.26	9.86
	16MOD-0014		For Installation Above 14', Add	2.96	
	16MOD-0015		For Work In Restricted Working Space, Add	5.91	
16131-0642	EA	1"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	77.32	11.36
	16MOD-0014		For Installation Above 14', Add	3.41	
	16MOD-0015		For Work In Restricted Working Space, Add	6.81	
16131-0643	EA	1-1/4"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	113.27	13.14
	16MOD-0014		For Installation Above 14', Add	3.95	
	16MOD-0015		For Work In Restricted Working Space, Add	7.89	
16131-0644	EA	1-1/2"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	132.78	14.94
	16MOD-0014		For Installation Above 14', Add	4.48	
	16MOD-0015		For Work In Restricted Working Space, Add	8.96	
16131-0645	EA	2"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	212.77	16.43
	16MOD-0014		For Installation Above 14', Add	4.93	
	16MOD-0015		For Work In Restricted Working Space, Add	9.86	
16131-0646	EA	2-1/2"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	611.75	20.62
	16MOD-0014		For Installation Above 14', Add	6.18	
	16MOD-0015		For Work In Restricted Working Space, Add	12.37	
16131-0647	EA	3"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	682.98	28.08
	16MOD-0014		For Installation Above 14', Add	8.43	
	16MOD-0015		For Work In Restricted Working Space, Add	16.85	
16131-0648	EA	4"	Straight Sealright Conduit Fittings, RGS PVC Coated, Urethane Lined	866.04	41.22
	16MOD-0014		For Installation Above 14', Add	12.37	
	16MOD-0015		For Work In Restricted Working Space, Add	24.74	
16131-0649			45 Degree Grounded Sealright Conduit Fittings (16131-0509)		

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0650	EA	1/2" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	100.63	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0651	EA	3/4" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	153.26	9.86
	16MOD-0014	For Installation Above 14', Add	2.96	
	16MOD-0015	For Work In Restricted Working Space, Add	5.91	
16131-0652	EA	1" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	193.87	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0653	EA	1-1/4" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	223.76	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0654	EA	1-1/2" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	254.10	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0655	EA	2" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	338.10	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0656	EA	2-1/2" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,099.50	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0657	EA	3" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,279.21	28.08
	16MOD-0014	For Installation Above 14', Add	8.43	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0658	EA	4" 45 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,565.15	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0659		90 Degree Grounded Sealight Conduit Fittings <small>(16131-0609)</small>		
16131-0660	EA	1/2" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	112.64	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0661	EA	3/4" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	164.60	9.86
	16MOD-0014	For Installation Above 14', Add	2.96	
	16MOD-0015	For Work In Restricted Working Space, Add	5.91	
16131-0662	EA	1" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	196.03	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0663	EA	1-1/4" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	227.31	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0664	EA	1-1/2" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	263.85	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0665	EA	2" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	423.81	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0666	EA	2-1/2" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,228.82	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0667	EA	3" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,730.70	28.08
	16MOD-0014	For Installation Above 14', Add	8.43	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0668	EA	4" 90 Degree Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,793.70	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0669		Straight Grounded Sealight Conduit Fittings <small>(16131-0609)</small>		
16131-0670	EA	1/2" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	87.39	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0671	EA	3/4" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	109.77	9.86
	16MOD-0014	For Installation Above 14', Add	2.96	
	16MOD-0015	For Work In Restricted Working Space, Add	5.91	
16131-0672	EA	1" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	132.03	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0673	EA	1-1/4" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	145.68	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0674	EA	1-1/2" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	199.31	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0675	EA	2" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	287.02	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0676	EA	2-1/2" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	992.39	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0677	EA	3" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,111.74	28.08
	16MOD-0014	For Installation Above 14', Add	8.43	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0678	EA	4" Straight Grounded Sealight Conduit Fittings, RGS PVC Coated, Urethane Lined.....	1,312.28	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0679		C, LB, LR, LL Conduit Bodies (16131-0505) Note: Includes covers.		
16131-0680	EA	1/2" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	70.53	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0681	EA	3/4" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	51.03	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0682	EA	1" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	99.74	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0683	EA	1-1/4" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	133.76	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0684	EA	1-1/2" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	157.89	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0685	EA	2" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	219.65	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0686	EA	2-1/2" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	378.48	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	
16131-0687	EA	3" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	482.19	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0688	EA	3-1/2" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	678.75	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0689	EA	4" Type C, LB, LL Or LR Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	773.84	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0690		X Conduit Bodies (16131-0505) Note: Includes covers.		
16131-0691	EA	1/2" Type X Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	92.06	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0692	EA	3/4" Type X Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	105.55	20.92
	16MOD-0014	For Installation Above 14', Add	6.27	
	16MOD-0015	For Work In Restricted Working Space, Add	12.55	
16131-0693	EA	1" Type X Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	131.84	23.01
	16MOD-0014	For Installation Above 14', Add	6.90	
	16MOD-0015	For Work In Restricted Working Space, Add	13.80	
16131-0694	EA	1-1/4" Type X Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	182.62	26.30
	16MOD-0014	For Installation Above 14', Add	7.89	
	16MOD-0015	For Work In Restricted Working Space, Add	15.77	
16131-0695	EA	1-1/2" Type X Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	218.56	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0696	EA	2" Type X Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	302.05	35.25
	16MOD-0014	For Installation Above 14', Add	10.58	
	16MOD-0015	For Work In Restricted Working Space, Add	21.15	
16131-0697		T Or TB Conduit Bodies (16131-0505) Note: Includes covers.		
16131-0698	EA	1/2" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	81.18	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0699	EA	3/4" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	92.19	19.12
	16MOD-0014	For Installation Above 14', Add	5.74	
	16MOD-0015	For Work In Restricted Working Space, Add	11.47	
16131-0700	EA	1" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	114.11	20.92
	16MOD-0014	For Installation Above 14', Add	6.27	
	16MOD-0015	For Work In Restricted Working Space, Add	12.55	
16131-0701	EA	1-1/4" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	149.57	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0702	EA	1-1/2" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	179.65	26.30
	16MOD-0014	For Installation Above 14', Add	7.89	
	16MOD-0015	For Work In Restricted Working Space, Add	15.77	
16131-0703	EA	2" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	246.07	30.77
	16MOD-0014	For Installation Above 14', Add	9.23	
	16MOD-0015	For Work In Restricted Working Space, Add	18.46	
16131-0704	EA	2-1/2" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	401.34	44.82
	16MOD-0014	For Installation Above 14', Add	13.44	
	16MOD-0015	For Work In Restricted Working Space, Add	26.89	
16131-0705	EA	3" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	532.46	58.26
	16MOD-0014	For Installation Above 14', Add	17.48	
	16MOD-0015	For Work In Restricted Working Space, Add	34.95	
16131-0706	EA	3-1/2" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	741.26	71.70
	16MOD-0014	For Installation Above 14', Add	21.51	
	16MOD-0015	For Work In Restricted Working Space, Add	43.02	
16131-0707	EA	4" Type T Or TB Conduit Bodies And Cover, RGS PVC Coated, Urethane Lined	821.28	86.34
	16MOD-0014	For Installation Above 14', Add	25.90	
	16MOD-0015	For Work In Restricted Working Space, Add	51.81	

MINOR CSI UOM DESCRIPTION		TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0708	Conduit Body Covers <small>(16131-0505)</small> Note: For replacement.		
16131-0709	EA 1/2" Conduit Body Covers, RGS PVC Coated, Urethane Lined	12.74	1.80
	16MOD-0014 For Installation Above 14', Add	0.54	
	16MOD-0015 For Work In Restricted Working Space, Add	1.07	
16131-0710	EA 3/4" Conduit Body Covers, RGS PVC Coated, Urethane Lined	14.30	2.09
	16MOD-0014 For Installation Above 14', Add	0.63	
	16MOD-0015 For Work In Restricted Working Space, Add	1.25	
16131-0711	EA 1" Conduit Body Covers, RGS PVC Coated, Urethane Lined	18.66	2.69
	16MOD-0014 For Installation Above 14', Add	0.81	
	16MOD-0015 For Work In Restricted Working Space, Add	1.61	
16131-0712	EA 1-1/4" Conduit Body Covers, RGS PVC Coated, Urethane Lined	23.98	3.29
	16MOD-0014 For Installation Above 14', Add	0.99	
	16MOD-0015 For Work In Restricted Working Space, Add	1.97	
16131-0713	EA 1-1/2" Conduit Body Covers, RGS PVC Coated, Urethane Lined	26.86	3.88
	16MOD-0014 For Installation Above 14', Add	1.17	
	16MOD-0015 For Work In Restricted Working Space, Add	2.33	
16131-0714	EA 2" Conduit Body Covers, RGS PVC Coated, Urethane Lined	33.23	4.48
	16MOD-0014 For Installation Above 14', Add	1.34	
	16MOD-0015 For Work In Restricted Working Space, Add	2.69	
16131-0715	EA 2-1/2" Conduit Body Covers, RGS PVC Coated, Urethane Lined	42.97	5.08
	16MOD-0014 For Installation Above 14', Add	1.52	
	16MOD-0015 For Work In Restricted Working Space, Add	3.05	
16131-0716	EA 3" Conduit Body Covers, RGS PVC Coated, Urethane Lined	47.16	7.17
	16MOD-0014 For Installation Above 14', Add	2.15	
	16MOD-0015 For Work In Restricted Working Space, Add	4.30	
16131-0717	EA 3-1/2" Conduit Body Covers, RGS PVC Coated, Urethane Lined	57.28	8.07
	16MOD-0014 For Installation Above 14', Add	2.42	
	16MOD-0015 For Work In Restricted Working Space, Add	4.84	
16131-0718	EA 4" Conduit Body Covers, RGS PVC Coated, Urethane Lined	61.47	10.15
	16MOD-0014 For Installation Above 14', Add	3.05	
	16MOD-0015 For Work In Restricted Working Space, Add	6.10	
16131-0719	Sealing Conduit Bodies, EYS <small>(16131-0505)</small>		
16131-0720	EA 1/2" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	81.78	14.34
	16MOD-0014 For Installation Above 14', Add	4.30	
	16MOD-0015 For Work In Restricted Working Space, Add	8.60	
16131-0721	EA 3/4" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	89.98	16.43
	16MOD-0014 For Installation Above 14', Add	4.93	
	16MOD-0015 For Work In Restricted Working Space, Add	9.86	
16131-0722	EA 1" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	105.48	18.82
	16MOD-0014 For Installation Above 14', Add	5.65	
	16MOD-0015 For Work In Restricted Working Space, Add	11.29	
16131-0723	EA 1-1/4" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	125.79	21.81
	16MOD-0014 For Installation Above 14', Add	6.54	
	16MOD-0015 For Work In Restricted Working Space, Add	13.09	
16131-0724	EA 1-1/2" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	160.13	23.90
	16MOD-0014 For Installation Above 14', Add	7.17	
	16MOD-0015 For Work In Restricted Working Space, Add	14.34	
16131-0725	EA 2" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	194.37	28.68
	16MOD-0014 For Installation Above 14', Add	8.61	
	16MOD-0015 For Work In Restricted Working Space, Add	17.21	
16131-0726	EA 2-1/2" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	282.78	40.33
	16MOD-0014 For Installation Above 14', Add	12.10	
	16MOD-0015 For Work In Restricted Working Space, Add	24.20	
16131-0727	EA 3" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	360.34	53.78
	16MOD-0014 For Installation Above 14', Add	16.13	
	16MOD-0015 For Work In Restricted Working Space, Add	32.27	
16131-0728	EA 3-1/2" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	765.04	67.22
	16MOD-0014 For Installation Above 14', Add	20.17	
	16MOD-0015 For Work In Restricted Working Space, Add	40.34	
16131-0729	EA 4" Sealing Conduit Bodies, EYS, RGS PVC Coated, Urethane Lined.....	1,138.48	81.86
	16MOD-0014 For Installation Above 14', Add	24.56	
	16MOD-0015 For Work In Restricted Working Space, Add	49.12	
16131-0730	Sealing Conduit Bodies, EYD <small>(16131-0505)</small>		
16131-0731	EA 1/2" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined.....	150.91	14.34
	16MOD-0014 For Installation Above 14', Add	4.30	
	16MOD-0015 For Work In Restricted Working Space, Add	8.60	
16131-0732	EA 3/4" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined.....	161.45	16.43
	16MOD-0014 For Installation Above 14', Add	4.93	
	16MOD-0015 For Work In Restricted Working Space, Add	9.86	
16131-0733	EA 1" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	184.29	18.82
	16MOD-0014 For Installation Above 14', Add	5.65	
	16MOD-0015 For Work In Restricted Working Space, Add	11.29	
16131-0734	EA 1-1/4" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	205.49	21.81
	16MOD-0014 For Installation Above 14', Add	6.54	
	16MOD-0015 For Work In Restricted Working Space, Add	13.09	
16131-0735	EA 1-1/2" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	251.88	23.90
	16MOD-0014 For Installation Above 14', Add	7.17	
	16MOD-0015 For Work In Restricted Working Space, Add	14.34	
16131-0736	EA 2" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	281.64	28.68
	16MOD-0014 For Installation Above 14', Add	8.61	
	16MOD-0015 For Work In Restricted Working Space, Add	17.21	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0737	EA	2-1/2" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	396.25	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	
16131-0738	EA	3" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	554.67	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0739	EA	3-1/2" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	821.48	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0740	EA	4" Sealing Conduit Bodies, EYD, RGS PVC Coated, Urethane Lined	1,212.33	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0741		Sealing Conduit Bodies, EZS (16131-0505)		
16131-0742	EA	1/2" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	117.63	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0743	EA	3/4" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	124.19	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0744	EA	1" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	142.73	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0745	EA	1-1/4" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	158.35	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0746	EA	1-1/2" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	224.43	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0747	EA	2" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	283.30	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0748	EA	2-1/2" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	444.50	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	
16131-0749	EA	3" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	652.85	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0750	EA	3-1/2" Sealing Conduit Bodies, EZS, RGS PVC Coated, Urethane Lined.....	821.48	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0751		Sealing Conduit Bodies, EZD (16131-0505)		
16131-0752	EA	1/2" Sealing Conduit Bodies, EZD, RGS PVC Coated, Urethane Lined.....	160.67	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0753	EA	3/4" Sealing Conduit Bodies, EZD, RGS PVC Coated, Urethane Lined.....	177.74	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0754	EA	1" Sealing Conduit Bodies, EZD, RGS PVC Coated, Urethane Lined.....	221.98	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0755	EA	1-1/4" Sealing Conduit Bodies, EZD, RGS PVC Coated, Urethane Lined.....	275.20	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0756	EA	1-1/2" Sealing Conduit Bodies, EZD, RGS PVC Coated, Urethane Lined.....	389.51	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0757	EA	2" Sealing Conduit Bodies, EZD, RGS PVC Coated, Urethane Lined.....	466.78	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0758		Split Coupling (16131-0505)		
16131-0759	EA	1/2" Split Coupling, RGS PVC Coated, Urethane Lined.....	31.11	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0760	EA	3/4" Split Coupling, RGS PVC Coated, Urethane Lined.....	42.22	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0761	EA	1" Split Coupling, RGS PVC Coated, Urethane Lined.....	51.47	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0762	EA	1-1/4" Split Coupling, RGS PVC Coated, Urethane Lined.....	69.48	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0763	EA	1-1/2" Split Coupling, RGS PVC Coated, Urethane Lined.....	90.54	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0764	EA	2" Split Coupling, RGS PVC Coated, Urethane Lined.....	161.14	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0765	EA	2-1/2" Split Coupling, RGS PVC Coated, Urethane Lined.....	243.16	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0766	EA	3" Split Coupling, RGS PVC Coated, Urethane Lined.....	315.12	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0767	EA	3-1/2" Split Coupling, RGS PVC Coated, Urethane Lined.....	438.32	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0768	EA	4" Split Coupling, RGS PVC Coated, Urethane Lined.....	543.11	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0769	EA	5" Split Coupling, RGS PVC Coated, Urethane Lined.....	873.20	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0770	EA	6" Split Coupling, RGS PVC Coated, Urethane Lined.....	1,190.15	100.98
	16MOD-0014	For Installation Above 14', Add	30.29	
	16MOD-0015	For Work In Restricted Working Space, Add	60.59	
16131-0771		Pulling Elbow (16131-0505)		
16131-0772	EA	1/2" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	110.04	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0773	EA	3/4" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	131.34	15.83
	16MOD-0014	For Installation Above 14', Add	4.75	
	16MOD-0015	For Work In Restricted Working Space, Add	9.50	
16131-0774	EA	1" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	143.42	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0775	EA	1-1/4" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	211.94	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0776	EA	1-1/2" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	284.99	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0777	EA	2" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	304.41	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0778	EA	2-1/2" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	750.17	39.74
	16MOD-0014	For Installation Above 14', Add	11.92	
	16MOD-0015	For Work In Restricted Working Space, Add	23.84	
16131-0779	EA	3" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	778.42	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0780	EA	3-1/2" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	1,296.49	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0781	EA	4" Pulling Elbow, RGS PVC Coated, Urethane Lined.....	1,337.04	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0782		Hazardous Locations Pulling Elbow (16131-0505)		
16131-0783	EA	1/2" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	167.94	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0784	EA	3/4" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	191.22	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0785	EA	1" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	392.51	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0786	EA	1-1/4" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	409.45	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0787	EA	1-1/2" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	566.34	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0788	EA	2" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	600.50	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0789	EA	2-1/2" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	507.47	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	
16131-0790	EA	3" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	1,219.69	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0791	EA	3-1/2" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	1,799.85	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0792	EA	4" Pulling Elbow, Hazardous Location, RGS PVC Coated, Urethane Lined.....	2,031.56	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0793		Male - Male 90 Degree Malleable Elbows (16131-0505)		
16131-0794	EA	1/2" Malleable Elbow, M - M, 90 Degree, RGS PVC Coated, Urethane Lined.....	62.21	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0795	EA	3/4" Malleable Elbow, M - M, 90 Degree, RGS PVC Coated, Urethane Lined	71.75	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0796	EA	1" Malleable Elbow, M - M, 90 Degree, RGS PVC Coated, Urethane Lined	85.11	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0797	EA	1-1/4" Malleable Elbow, M - M, 90 Degree, RGS PVC Coated, Urethane Lined	100.77	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0798		Female - Female 90 Degree Malleable Elbows (16131-0505)		
16131-0799	EA	1/2" Malleable Elbow, F - F, 90 Degree, RGS PVC Coated, Urethane Lined	47.13	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0800	EA	3/4" Malleable Elbow, F - F, 90 Degree, RGS PVC Coated, Urethane Lined	53.64	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0801	EA	1" Malleable Elbow, F - F, 90 Degree, RGS PVC Coated, Urethane Lined	76.29	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0802	EA	1-1/4" Malleable Elbow, F - F, 90 Degree, RGS PVC Coated, Urethane Lined	100.84	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0803	EA	1-1/2" Malleable Elbow, F - F, 90 Degree, RGS PVC Coated, Urethane Lined	124.15	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0804	EA	2" Malleable Elbow, F - F, 90 Degree, RGS PVC Coated, Urethane Lined	184.43	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0805	EA	2-1/2" Malleable Elbow, F - F, 90 Degree, RGS PVC Coated, Urethane Lined	254.19	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0806		Male - Female 90 Degree Malleable Elbows (16131-0505)		
16131-0807	EA	1/2" Malleable Elbow, M - F, 90 Degree, RGS PVC Coated, Urethane Lined	62.25	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0808	EA	3/4" Malleable Elbow, M - F, 90 Degree, RGS PVC Coated, Urethane Lined	73.83	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0809	EA	1" Malleable Elbow, M - F, 90 Degree, RGS PVC Coated, Urethane Lined	85.12	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0810	EA	1-1/4" Malleable Elbow, M - F, 90 Degree, RGS PVC Coated, Urethane Lined	100.81	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0811		Female - Female 45 Degree Malleable Elbows (16131-0505)		
16131-0812	EA	1/2" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	47.18	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0813	EA	3/4" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	53.64	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0814	EA	1" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	70.04	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0815	EA	1-1/4" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	88.71	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0816	EA	1-1/2" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	104.39	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0817	EA	2" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	121.15	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0818	EA	2-1/2" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	238.05	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0819	EA	3" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	267.61	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0820	EA	3-1/2" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	287.13	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0821	EA	4" Malleable Elbow, F - F, 45 Degree, RGS PVC Coated, Urethane Lined	351.71	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0822		Service Entrance Elbow (16131-0505)		
16131-0823	EA	1/2" Service Entrance, RGS PVC Coated, Urethane Lined	100.27	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0824	EA	3/4" Service Entrance, RGS PVC Coated, Urethane Lined.....	107.27	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0825	EA	1" Service Entrance, RGS PVC Coated, Urethane Lined.....	116.44	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0826	EA	1-1/4" Service Entrance, RGS PVC Coated, Urethane Lined.....	160.46	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0827	EA	1-1/2" Service Entrance, RGS PVC Coated, Urethane Lined.....	208.68	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0828		GUAB, GUAC, GUAL, GUAN Junction Boxes (16131-0505)		
		Note: Includes cast iron covers.		
16131-0829	EA	1/2" Junction Box With Cast Iron Cover, GUAB, GUAC, GUAL, GUAN, RGS PVC Coated, Urethane Lined.....	66.05	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0830	EA	3/4" Junction Box With Cast Iron Cover, GUAB, GUAC, GUAL, GUAN, RGS PVC Coated, Urethane Lined.....	71.92	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0831	EA	1" Junction Box With Cast Iron Cover, GUAB, GUAC, GUAL, GUAN, RGS PVC Coated, Urethane Lined.....	83.76	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0832	EA	1-1/4" Junction Box With Cast Iron Cover, GUAB, GUAC, GUAL, GUAN, RGS PVC Coated, Urethane Lined.....	115.86	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0833	EA	1-1/2" Junction Box With Cast Iron Cover, GUAB, GUAC, GUAL, GUAN, RGS PVC Coated, Urethane Lined.....	179.48	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0834	EA	2" Junction Box With Cast Iron Cover, GUAB, GUAC, GUAL, GUAN, RGS PVC Coated, Urethane Lined.....	196.10	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0835		GUAT Junction Boxes (16131-0505)		
		Note: Includes cast iron covers.		
16131-0836	EA	1/2" Junction Box With Cast Iron Cover, GUAT, RGS PVC Coated, Urethane Lined.....	71.36	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0837	EA	3/4" Junction Box With Cast Iron Cover, GUAT, RGS PVC Coated, Urethane Lined.....	80.77	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0838	EA	1" Junction Box With Cast Iron Cover, GUAT, RGS PVC Coated, Urethane Lined.....	88.81	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0839	EA	1-1/4" Junction Box With Cast Iron Cover, GUAT, RGS PVC Coated, Urethane Lined.....	121.00	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0840	EA	1-1/2" Junction Box With Cast Iron Cover, GUAT, RGS PVC Coated, Urethane Lined.....	191.72	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0841	EA	2" Junction Box With Cast Iron Cover, GUAT, RGS PVC Coated, Urethane Lined.....	207.34	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0842		GUAW, GUAX Junction Boxes (16131-0505)		
		Note: Includes cast iron covers.		
16131-0843	EA	1/2" Junction Box With Cast Iron Cover, GUAW, GUAX, RGS PVC Coated, Urethane Lined.....	71.40	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0844	EA	3/4" Junction Box With Cast Iron Cover, GUAW, GUAX, RGS PVC Coated, Urethane Lined.....	79.20	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0845	EA	1" Junction Box With Cast Iron Cover, GUAW, GUAX, RGS PVC Coated, Urethane Lined.....	93.69	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0846	EA	1-1/4" Junction Box With Cast Iron Cover, GUAW, GUAX, RGS PVC Coated, Urethane Lined.....	124.91	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0847	EA	1-1/2" Junction Box With Cast Iron Cover, GUAW, GUAX, RGS PVC Coated, Urethane Lined.....	197.56	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0848	EA	2" Junction Box With Cast Iron Cover, GUAW, GUAX, RGS PVC Coated, Urethane Lined.....	214.53	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0849		GUAD Junction Boxes (16131-0505)		
		Note: Includes cast iron covers.		
16131-0850	EA	1/2" Junction Box With Cast Iron Cover, GUAD, RGS PVC Coated, Urethane Lined.....	86.10	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0851	EA	3/4" Junction Box With Cast Iron Cover, GUAD, RGS PVC Coated, Urethane Lined.....	95.54	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0852	EA	1" Junction Box With Cast Iron Cover, GUAD, RGS PVC Coated, Urethane Lined.....	104.31	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0853	EA	1-1/4" Junction Box With Cast Iron Cover, GUAD, RGS PVC Coated, Urethane Lined.....	243.69	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0854		FS Series Bodies Junction Boxes (16131-0505)		
		Note: Excludes cover.		
16131-0855	EA	1/2" Junction Box Without Cover, FS, RGS PVC Coated, Urethane Lined.....	46.91	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0856	EA	3/4" Junction Box Without Cover, FS, RGS PVC Coated, Urethane Lined.....	52.09	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0857	EA	1" Junction Box Without Cover, FS, RGS PVC Coated, Urethane Lined.....	58.50	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0858	EA	1/2" Junction Box Without Cover, FSC, RGS PVC Coated, Urethane Lined.....	50.89	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0859	EA	3/4" Junction Box Without Cover, FSC, RGS PVC Coated, Urethane Lined.....	55.57	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0860	EA	1" Junction Box Without Cover, FSC, RGS PVC Coated, Urethane Lined.....	63.35	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0861		FD Series Bodies Junction Boxes (16131-0505)		
		Note: Excludes cover.		
16131-0862	EA	1/2" Junction Box Without Cover, FD, RGS PVC Coated, Urethane Lined.....	48.79	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0863	EA	3/4" Junction Box Without Cover, FD, RGS PVC Coated, Urethane Lined.....	54.21	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0864	EA	1" Junction Box Without Cover, FD, RGS PVC Coated, Urethane Lined.....	59.97	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0865	EA	1/2" Junction Box Without Cover, FDC, RGS PVC Coated, Urethane Lined.....	53.59	14.34
	16MOD-0014	For Installation Above 14', Add	4.30	
	16MOD-0015	For Work In Restricted Working Space, Add	8.60	
16131-0866	EA	3/4" Junction Box Without Cover, FDC, RGS PVC Coated, Urethane Lined.....	59.05	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0867	EA	1" Junction Box Without Cover, FDC, RGS PVC Coated, Urethane Lined.....	66.93	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0868		FS And FD Series Covers (16131-0505)		
16131-0869	EA	DS23 - FS And FD Series Covers.....	14.86	1.80
	16MOD-0014	For Installation Above 14', Add	0.54	
	16MOD-0015	For Work In Restricted Working Space, Add	1.07	
16131-0870	EA	DS21G - FS And FD Series Covers.....	19.96	2.09
	16MOD-0014	For Installation Above 14', Add	0.63	
	16MOD-0015	For Work In Restricted Working Space, Add	1.25	
16131-0871	EA	DS32G - FS And FD Series Covers.....	18.92	2.09
	16MOD-0014	For Installation Above 14', Add	0.63	
	16MOD-0015	For Work In Restricted Working Space, Add	1.25	
16131-0872	EA	DS100G - FS And FD Series Covers.....	16.99	2.09
	16MOD-0014	For Installation Above 14', Add	0.63	
	16MOD-0015	For Work In Restricted Working Space, Add	1.25	
16131-0873	EA	WLRD1 - FS And FD Series Covers.....	77.58	2.99
	16MOD-0014	For Installation Above 14', Add	0.90	
	16MOD-0015	For Work In Restricted Working Space, Add	1.79	
16131-0874	EA	WLRD1 - FS And FD Series Covers.....	69.20	2.99
	16MOD-0014	For Installation Above 14', Add	0.90	
	16MOD-0015	For Work In Restricted Working Space, Add	1.79	
16131-0875		Mogul Conduit Bodies, Without Covers (16131-0505)		
16131-0876	EA	1" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined.....	178.09	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0877	EA	1-1/4" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined.....	199.22	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0878	EA	1-1/2" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined.....	282.72	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0879	EA	2" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined.....	336.63	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0880	EA	2-1/2" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined.....	487.65	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0881	EA	3" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined	611.78	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0882	EA	3-1/2" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined	911.02	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0883	EA	4" Conduit Bodies, Mogul, BC, RGS PVC Coated, Urethane Lined	1,132.29	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0884	EA	1" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	178.09	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0885	EA	1-1/4" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	199.22	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0886	EA	1-1/2" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	281.85	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0887	EA	2" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	327.92	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0888	EA	2-1/2" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	495.68	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	
16131-0889	EA	3" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	647.78	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0890	EA	3-1/2" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	954.47	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0891	EA	4" Conduit Bodies, Mogul, BLB, RGS PVC Coated, Urethane Lined	1,159.35	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0892	EA	1" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	178.09	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0893	EA	1-1/4" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	199.22	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0894	EA	1-1/2" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	281.85	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0895	EA	2" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	327.92	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0896	EA	2-1/2" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	495.68	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	
16131-0897	EA	3" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	647.78	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0898	EA	3-1/2" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	954.47	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0899	EA	4" Conduit Bodies, Mogul, BT, RGS PVC Coated, Urethane Lined	1,159.35	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0900	EA	1" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	178.09	18.82
	16MOD-0014	For Installation Above 14', Add	5.65	
	16MOD-0015	For Work In Restricted Working Space, Add	11.29	
16131-0901	EA	1-1/4" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	199.22	21.81
	16MOD-0014	For Installation Above 14', Add	6.54	
	16MOD-0015	For Work In Restricted Working Space, Add	13.09	
16131-0902	EA	1-1/2" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	282.72	23.90
	16MOD-0014	For Installation Above 14', Add	7.17	
	16MOD-0015	For Work In Restricted Working Space, Add	14.34	
16131-0903	EA	2" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	332.61	28.68
	16MOD-0014	For Installation Above 14', Add	8.61	
	16MOD-0015	For Work In Restricted Working Space, Add	17.21	
16131-0904	EA	2-1/2" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	487.65	40.33
	16MOD-0014	For Installation Above 14', Add	12.10	
	16MOD-0015	For Work In Restricted Working Space, Add	24.20	
16131-0905	EA	3" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	611.78	53.78
	16MOD-0014	For Installation Above 14', Add	16.13	
	16MOD-0015	For Work In Restricted Working Space, Add	32.27	
16131-0906	EA	3-1/2" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	911.02	67.22
	16MOD-0014	For Installation Above 14', Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0907	EA	4" Conduit Bodies, Mogul, BUB, RGS PVC Coated, Urethane Lined	1,143.56	81.86
	16MOD-0014	For Installation Above 14', Add	24.56	
	16MOD-0015	For Work In Restricted Working Space, Add	49.12	
16131-0908		Mogul Covers <small>(16131-0505)</small>		
16131-0909	EA	1" Cover, Mogul, RGS PVC Coated, Urethane Lined	96.88	2.69
	16MOD-0014	For Installation Above 14', Add	0.81	
	16MOD-0015	For Work In Restricted Working Space, Add	1.61	
16131-0910	EA	1-1/4" Cover, Mogul, RGS PVC Coated, Urethane Lined	97.48	2.99
	16MOD-0014	For Installation Above 14', Add	0.90	
	16MOD-0015	For Work In Restricted Working Space, Add	1.79	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0911	EA	1-1/2" Cover, Mogul, RGS PVC Coated, Urethane Lined	137.86	4.18
	16MOD-0014	For Installation Above 14', Add	1.26	
	16MOD-0015	For Work In Restricted Working Space, Add	2.51	
16131-0912	EA	2" Cover, Mogul, RGS PVC Coated, Urethane Lined	139.05	4.78
	16MOD-0014	For Installation Above 14', Add	1.43	
	16MOD-0015	For Work In Restricted Working Space, Add	2.87	
16131-0913	EA	2-1/2" Cover, Mogul, RGS PVC Coated, Urethane Lined	246.34	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	
16131-0914	EA	3" Cover, Mogul, RGS PVC Coated, Urethane Lined	249.32	7.17
	16MOD-0014	For Installation Above 14', Add	2.15	
	16MOD-0015	For Work In Restricted Working Space, Add	4.30	
16131-0915	EA	3-1/2" Cover, Mogul, RGS PVC Coated, Urethane Lined	378.92	8.07
	16MOD-0014	For Installation Above 14', Add	2.42	
	16MOD-0015	For Work In Restricted Working Space, Add	4.84	
16131-0916	EA	4" Cover, Mogul, RGS PVC Coated, Urethane Lined	383.71	10.45
	16MOD-0014	For Installation Above 14', Add	3.14	
	16MOD-0015	For Work In Restricted Working Space, Add	6.28	
16131-0917		Expansion Fittings <small>(16131-0509)</small>		
16131-0918	EA	1/2" Expansion Fitting, RGS PVC Coated, Urethane Lined	163.29	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0919	EA	3/4" Expansion Fitting, RGS PVC Coated, Urethane Lined	192.38	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0920	EA	1" Expansion Fitting, RGS PVC Coated, Urethane Lined	227.23	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0921	EA	1-1/4" Expansion Fitting, RGS PVC Coated, Urethane Lined	281.00	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0922	EA	1-1/2" Expansion Fitting, RGS PVC Coated, Urethane Lined	378.93	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0923	EA	2" Expansion Fitting, RGS PVC Coated, Urethane Lined	529.97	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0924	EA	2-1/2" Expansion Fitting, RGS PVC Coated, Urethane Lined	760.44	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0925	EA	3" Expansion Fitting, RGS PVC Coated, Urethane Lined	942.49	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0926	EA	3-1/2" Expansion Fitting, RGS PVC Coated, Urethane Lined	1,332.05	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0927	EA	4" Expansion Fitting, RGS PVC Coated, Urethane Lined	1,529.31	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0928		Expansion Fittings With Bonding Jumpers <small>(16131-0505)</small>		
16131-0929	EA	1/2" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	264.93	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0930	EA	3/4" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	273.22	9.26
	16MOD-0014	For Installation Above 14', Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0931	EA	1" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	305.67	11.36
	16MOD-0014	For Installation Above 14', Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0932	EA	1-1/4" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	370.64	13.14
	16MOD-0014	For Installation Above 14', Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0933	EA	1-1/2" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	450.51	14.94
	16MOD-0014	For Installation Above 14', Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0934	EA	2" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	579.24	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0935	EA	2-1/2" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	859.69	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0936	EA	3" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	1,075.12	28.08
	16MOD-0014	For Installation Above 14', Add	8.42	
	16MOD-0015	For Work In Restricted Working Space, Add	16.85	
16131-0937	EA	3-1/2" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	1,374.87	31.67
	16MOD-0014	For Installation Above 14', Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0938	EA	4" Expansion Fitting With Bonding Jumpers, RGS PVC Coated, Urethane Lined	1,718.95	41.22
	16MOD-0014	For Installation Above 14', Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0939		STG Knockout Hubs <small>(16131-0505)</small>		

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0940	EA	1/2" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	24.93	3.58
	16MOD-0014	For Installation Above 14', Add	1.08	
	16MOD-0015	For Work In Restricted Working Space, Add	2.15	
16131-0941	EA	3/4" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	27.47	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-0942	EA	1" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	30.56	5.38
	16MOD-0014	For Installation Above 14', Add	1.61	
	16MOD-0015	For Work In Restricted Working Space, Add	3.23	
16131-0943	EA	1-1/4" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	34.93	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-0944	EA	1-1/2" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	45.98	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0945	EA	2" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	55.61	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-0946	EA	2-1/2" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	78.49	10.45
	16MOD-0014	For Installation Above 14', Add	3.14	
	16MOD-0015	For Work In Restricted Working Space, Add	6.28	
16131-0947	EA	3" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	102.75	14.05
	16MOD-0014	For Installation Above 14', Add	4.21	
	16MOD-0015	For Work In Restricted Working Space, Add	8.42	
16131-0948	EA	3-1/2" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	129.65	15.83
	16MOD-0014	For Installation Above 14', Add	4.75	
	16MOD-0015	For Work In Restricted Working Space, Add	9.50	
16131-0949	EA	4" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	163.57	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0950	EA	5" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	209.21	33.46
	16MOD-0014	For Installation Above 14', Add	10.04	
	16MOD-0015	For Work In Restricted Working Space, Add	20.08	
16131-0951	EA	6" Knockout Hubs, STG, RGS PVC Coated, Urethane Lined	315.54	50.49
	16MOD-0014	For Installation Above 14', Add	15.15	
	16MOD-0015	For Work In Restricted Working Space, Add	30.29	
16131-0952		STTB Knockout Hubs (16131-0505)		
16131-0953	EA	1/2" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	36.23	3.58
	16MOD-0014	For Installation Above 14', Add	1.08	
	16MOD-0015	For Work In Restricted Working Space, Add	2.15	
16131-0954	EA	3/4" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	38.85	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-0955	EA	1" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	42.19	5.38
	16MOD-0014	For Installation Above 14', Add	1.61	
	16MOD-0015	For Work In Restricted Working Space, Add	3.23	
16131-0956	EA	1-1/4" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	48.49	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-0957	EA	1-1/2" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	52.38	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0958	EA	2" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	59.18	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-0959	EA	2-1/2" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	88.50	10.45
	16MOD-0014	For Installation Above 14', Add	3.14	
	16MOD-0015	For Work In Restricted Working Space, Add	6.28	
16131-0960	EA	3" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	107.06	14.05
	16MOD-0014	For Installation Above 14', Add	4.21	
	16MOD-0015	For Work In Restricted Working Space, Add	8.42	
16131-0961	EA	3-1/2" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	130.58	15.83
	16MOD-0014	For Installation Above 14', Add	4.75	
	16MOD-0015	For Work In Restricted Working Space, Add	9.50	
16131-0962	EA	4" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	169.58	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0963	EA	5" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	264.86	33.46
	16MOD-0014	For Installation Above 14', Add	10.04	
	16MOD-0015	For Work In Restricted Working Space, Add	20.08	
16131-0964	EA	6" Knockout Hubs, STTB, RGS PVC Coated, Urethane Lined.....	430.23	50.49
	16MOD-0014	For Installation Above 14', Add	15.15	
	16MOD-0015	For Work In Restricted Working Space, Add	30.29	
16131-0965		STTTB Knockout Hubs (16131-0509)		
16131-0966	EA	1/2" Knockout Hubs, STTTB, RGS PVC Coated, Urethane Lined.....	38.75	3.58
	16MOD-0014	For Installation Above 14', Add	1.08	
	16MOD-0015	For Work In Restricted Working Space, Add	2.15	
16131-0967	EA	3/4" Knockout Hubs, STTTB, RGS PVC Coated, Urethane Lined.....	41.24	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-0968	EA	1" Knockout Hubs, STTTB, RGS PVC Coated, Urethane Lined.....	44.69	5.38
	16MOD-0014	For Installation Above 14', Add	1.61	
	16MOD-0015	For Work In Restricted Working Space, Add	3.23	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-0969	EA	1-1/4" Knockout Hubs, STTTB, RGS PVC Coated, Urethane Lined	56.06	6.57
	16MOD-0014	For Installation Above 14'; Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-0970	EA	1-1/2" Knockout Hubs, STTTB, RGS PVC Coated, Urethane Lined	61.51	7.46
	16MOD-0014	For Installation Above 14'; Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0971	EA	2" Knockout Hubs, STTTB, RGS PVC Coated, Urethane Lined	65.48	8.37
	16MOD-0014	For Installation Above 14'; Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-0972		Conduit Hubs <small>(16131-0505)</small>		
16131-0973	EA	1/2" Conduit Hubs, RGS PVC Coated, Urethane Lined	19.86	3.58
	16MOD-0014	For Installation Above 14'; Add	1.08	
	16MOD-0015	For Work In Restricted Working Space, Add	2.15	
16131-0974	EA	3/4" Conduit Hubs, RGS PVC Coated, Urethane Lined	23.38	4.48
	16MOD-0014	For Installation Above 14'; Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-0975	EA	1" Conduit Hubs, RGS PVC Coated, Urethane Lined	28.77	5.38
	16MOD-0014	For Installation Above 14'; Add	1.61	
	16MOD-0015	For Work In Restricted Working Space, Add	3.23	
16131-0976	EA	1-1/4" Conduit Hubs, RGS PVC Coated, Urethane Lined	33.84	6.57
	16MOD-0014	For Installation Above 14'; Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-0977	EA	1-1/2" Conduit Hubs, RGS PVC Coated, Urethane Lined	38.61	7.46
	16MOD-0014	For Installation Above 14'; Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0978	EA	2" Conduit Hubs, RGS PVC Coated, Urethane Lined	50.79	8.37
	16MOD-0014	For Installation Above 14'; Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-0979	EA	2-1/2" Conduit Hubs, RGS PVC Coated, Urethane Lined	74.19	10.45
	16MOD-0014	For Installation Above 14'; Add	3.14	
	16MOD-0015	For Work In Restricted Working Space, Add	6.28	
16131-0980	EA	3" Conduit Hubs, RGS PVC Coated, Urethane Lined	101.22	14.05
	16MOD-0014	For Installation Above 14'; Add	4.21	
	16MOD-0015	For Work In Restricted Working Space, Add	8.42	
16131-0981	EA	3-1/2" Conduit Hubs, RGS PVC Coated, Urethane Lined	126.57	15.83
	16MOD-0014	For Installation Above 14'; Add	4.75	
	16MOD-0015	For Work In Restricted Working Space, Add	9.50	
16131-0982	EA	4" Conduit Hubs, RGS PVC Coated, Urethane Lined	157.24	20.62
	16MOD-0014	For Installation Above 14'; Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0983	EA	5" Conduit Hubs, RGS PVC Coated, Urethane Lined	206.16	33.46
	16MOD-0014	For Installation Above 14'; Add	10.04	
	16MOD-0015	For Work In Restricted Working Space, Add	20.08	
16131-0984	EA	6" Conduit Hubs, RGS PVC Coated, Urethane Lined	266.35	50.49
	16MOD-0014	For Installation Above 14'; Add	15.15	
	16MOD-0015	For Work In Restricted Working Space, Add	30.29	
16131-0985		UNF Conduit Unions <small>(16131-0505)</small>		
16131-0986	EA	1/2" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	59.48	7.46
	16MOD-0014	For Installation Above 14'; Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-0987	EA	3/4" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	63.88	9.26
	16MOD-0014	For Installation Above 14'; Add	2.78	
	16MOD-0015	For Work In Restricted Working Space, Add	5.56	
16131-0988	EA	1" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	83.50	11.36
	16MOD-0014	For Installation Above 14'; Add	3.41	
	16MOD-0015	For Work In Restricted Working Space, Add	6.81	
16131-0989	EA	1-1/4" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	124.16	13.14
	16MOD-0014	For Installation Above 14'; Add	3.95	
	16MOD-0015	For Work In Restricted Working Space, Add	7.89	
16131-0990	EA	1-1/2" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	147.91	14.94
	16MOD-0014	For Installation Above 14'; Add	4.48	
	16MOD-0015	For Work In Restricted Working Space, Add	8.96	
16131-0991	EA	2" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	190.16	16.43
	16MOD-0014	For Installation Above 14'; Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-0992	EA	2-1/2" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	254.17	20.62
	16MOD-0014	For Installation Above 14'; Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0993	EA	3" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	334.81	20.62
	16MOD-0014	For Installation Above 14'; Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-0994	EA	3-1/2" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	427.51	31.67
	16MOD-0014	For Installation Above 14'; Add	9.50	
	16MOD-0015	For Work In Restricted Working Space, Add	19.00	
16131-0995	EA	4" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	550.06	41.22
	16MOD-0014	For Installation Above 14'; Add	12.37	
	16MOD-0015	For Work In Restricted Working Space, Add	24.74	
16131-0996	EA	5" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	1,008.46	67.22
	16MOD-0014	For Installation Above 14'; Add	20.17	
	16MOD-0015	For Work In Restricted Working Space, Add	40.34	
16131-0997	EA	6" Conduit Union, UNF, RGS PVC Coated, Urethane Lined	1,242.89	100.98
	16MOD-0014	For Installation Above 14'; Add	30.29	
	16MOD-0015	For Work In Restricted Working Space, Add	60.59	

16000 Electrical**16100 Basic Materials And Methods****16131 Conduit**

MINOR		TOTAL DIRECT		DEMOLITION	
CSI	UOM	DESCRIPTION	UNIT COST	UNIT COST	
16131-0998 UNY Conduit Unions (16131-0505)					
16131-0999	EA	1/2" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	60.99		7.46
	16MOD-0014	For Installation Above 14', Add	2.24		
	16MOD-0015	For Work In Restricted Working Space, Add	4.48		
16131-1000	EA	3/4" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	69.61		9.26
	16MOD-0014	For Installation Above 14', Add	2.78		
	16MOD-0015	For Work In Restricted Working Space, Add	5.56		
16131-1001	EA	1" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	86.56		11.36
	16MOD-0014	For Installation Above 14', Add	3.41		
	16MOD-0015	For Work In Restricted Working Space, Add	6.81		
16131-1002	EA	1-1/4" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	129.76		13.14
	16MOD-0014	For Installation Above 14', Add	3.95		
	16MOD-0015	For Work In Restricted Working Space, Add	7.89		
16131-1003	EA	1-1/2" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	155.69		14.94
	16MOD-0014	For Installation Above 14', Add	4.48		
	16MOD-0015	For Work In Restricted Working Space, Add	8.96		
16131-1004	EA	2" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	206.97		16.43
	16MOD-0014	For Installation Above 14', Add	4.93		
	16MOD-0015	For Work In Restricted Working Space, Add	9.86		
16131-1005	EA	2-1/2" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	290.14		20.62
	16MOD-0014	For Installation Above 14', Add	6.18		
	16MOD-0015	For Work In Restricted Working Space, Add	12.37		
16131-1006	EA	3" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	371.38		20.62
	16MOD-0014	For Installation Above 14', Add	6.18		
	16MOD-0015	For Work In Restricted Working Space, Add	12.37		
16131-1007	EA	3-1/2" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	493.63		31.67
	16MOD-0014	For Installation Above 14', Add	9.50		
	16MOD-0015	For Work In Restricted Working Space, Add	19.00		
16131-1008	EA	4" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	615.94		41.22
	16MOD-0014	For Installation Above 14', Add	12.37		
	16MOD-0015	For Work In Restricted Working Space, Add	24.74		
16131-1009	EA	5" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	1,129.22		67.22
	16MOD-0014	For Installation Above 14', Add	20.17		
	16MOD-0015	For Work In Restricted Working Space, Add	40.34		
16131-1010	EA	6" Conduit Union, UNY, RGS PVC Coated, Urethane Lined.....	1,437.88		100.98
	16MOD-0014	For Installation Above 14', Add	30.29		
	16MOD-0015	For Work In Restricted Working Space, Add	60.59		
16131-1011 Reducing Couplings (16131-0505)					
16131-1012	EA	3/4" x 1/2" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	34.91		2.39
	16MOD-0014	For Installation Above 14', Add	0.72		
	16MOD-0015	For Work In Restricted Working Space, Add	1.43		
16131-1013	EA	1" x 1/2" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	37.93		2.99
	16MOD-0014	For Installation Above 14', Add	0.90		
	16MOD-0015	For Work In Restricted Working Space, Add	1.79		
16131-1014	EA	1" x 3/4" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	43.55		2.99
	16MOD-0014	For Installation Above 14', Add	0.90		
	16MOD-0015	For Work In Restricted Working Space, Add	1.79		
16131-1015	EA	1-1/4" x 3/4" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	54.24		3.29
	16MOD-0014	For Installation Above 14', Add	0.99		
	16MOD-0015	For Work In Restricted Working Space, Add	1.97		
16131-1016	EA	1-1/4" x 1" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	57.48		3.29
	16MOD-0014	For Installation Above 14', Add	0.99		
	16MOD-0015	For Work In Restricted Working Space, Add	1.97		
16131-1017	EA	1-1/2" x 3/4" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	48.28		3.88
	16MOD-0014	For Installation Above 14', Add	1.17		
	16MOD-0015	For Work In Restricted Working Space, Add	2.33		
16131-1018	EA	1-1/2" x 1" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	55.52		3.88
	16MOD-0014	For Installation Above 14', Add	1.17		
	16MOD-0015	For Work In Restricted Working Space, Add	2.33		
16131-1019	EA	1-1/2" x 1-1/4" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	88.13		3.88
	16MOD-0014	For Installation Above 14', Add	1.17		
	16MOD-0015	For Work In Restricted Working Space, Add	2.33		
16131-1020	EA	2" x 3/4" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	97.79		4.48
	16MOD-0014	For Installation Above 14', Add	1.34		
	16MOD-0015	For Work In Restricted Working Space, Add	2.69		
16131-1021	EA	2" x 1" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	94.98		4.48
	16MOD-0014	For Installation Above 14', Add	1.34		
	16MOD-0015	For Work In Restricted Working Space, Add	2.69		
16131-1022	EA	2" x 1-1/4" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	100.21		4.48
	16MOD-0014	For Installation Above 14', Add	1.34		
	16MOD-0015	For Work In Restricted Working Space, Add	2.69		
16131-1023	EA	2" x 1-1/2" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	113.36		4.48
	16MOD-0014	For Installation Above 14', Add	1.34		
	16MOD-0015	For Work In Restricted Working Space, Add	2.69		
16131-1024	EA	2-1/2" x 1-1/2" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	111.62		5.38
	16MOD-0014	For Installation Above 14', Add	1.61		
	16MOD-0015	For Work In Restricted Working Space, Add	3.23		
16131-1025	EA	3" x 2" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	141.69		7.46
	16MOD-0014	For Installation Above 14', Add	2.24		
	16MOD-0015	For Work In Restricted Working Space, Add	4.48		
16131-1026	EA	3-1/2" x 2-1/2" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	211.06		8.67
	16MOD-0014	For Installation Above 14', Add	2.60		
	16MOD-0015	For Work In Restricted Working Space, Add	5.20		
16131-1027	EA	4" x 3" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	282.00		11.95
	16MOD-0014	For Installation Above 14', Add	3.59		
	16MOD-0015	For Work In Restricted Working Space, Add	7.17		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1028	EA	5" x 4" Reducing Coupling, RGS PVC Coated, Urethane Lined.....	351.10	16.43
	16MOD-0014	For Installation Above 14', Add	4.93	
	16MOD-0015	For Work In Restricted Working Space, Add	9.86	
16131-1029		PVC Coated Conduit Nipples (16131-0505)		
16131-1030	EA	1/2" x 2" Long PVC Coated Conduit Nipple.....	19.80	3.58
	16MOD-0014	For Installation Above 14', Add	1.08	
	16MOD-0015	For Work In Restricted Working Space, Add	2.15	
16131-1031	EA	3/4" x 2" Long PVC Coated Conduit Nipple.....	21.84	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-1032	EA	1" x 2" Long PVC Coated Conduit Nipple.....	24.94	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	
16131-1033	EA	1-1/4" x 2" Long PVC Coated Conduit Nipple	29.85	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-1034	EA	1-1/2" x 2" Long PVC Coated Conduit Nipple	32.20	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-1035	EA	1/2" x 2-1/2" Long PVC Coated Conduit Nipple	22.03	3.88
	16MOD-0014	For Installation Above 14', Add	1.17	
	16MOD-0015	For Work In Restricted Working Space, Add	2.33	
16131-1036	EA	3/4" x 2-1/2" Long PVC Coated Conduit Nipple	23.56	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-1037	EA	1" x 2-1/2" Long PVC Coated Conduit Nipple	26.69	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	
16131-1038	EA	1-1/4" x 2-1/2" Long PVC Coated Conduit Nipple	31.69	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-1039	EA	1-1/2" x 2-1/2" Long PVC Coated Conduit Nipple	34.18	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-1040	EA	2" x 2-1/2" Long PVC Coated Conduit Nipple	36.84	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-1041	EA	1/2" x 3" Long PVC Coated Conduit Nipple.....	22.15	3.88
	16MOD-0014	For Installation Above 14', Add	1.17	
	16MOD-0015	For Work In Restricted Working Space, Add	2.33	
16131-1042	EA	3/4" x 3" Long PVC Coated Conduit Nipple.....	23.68	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-1043	EA	1" x 3" Long PVC Coated Conduit Nipple.....	26.91	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	
16131-1044	EA	1-1/4" x 3" Long PVC Coated Conduit Nipple	31.93	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-1045	EA	1-1/2" x 3" Long PVC Coated Conduit Nipple	34.42	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-1046	EA	2" x 3" Long PVC Coated Conduit Nipple.....	37.45	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-1047	EA	1/2" x 3-1/2" Long PVC Coated Conduit Nipple	23.79	3.88
	16MOD-0014	For Installation Above 14', Add	1.17	
	16MOD-0015	For Work In Restricted Working Space, Add	2.33	
16131-1048	EA	3/4" x 3-1/2" Long PVC Coated Conduit Nipple	25.32	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-1049	EA	1" x 3-1/2" Long PVC Coated Conduit Nipple	28.67	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	
16131-1050	EA	1-1/4" x 3-1/2" Long PVC Coated Conduit Nipple	32.94	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-1051	EA	1-1/2" x 3-1/2" Long PVC Coated Conduit Nipple	35.53	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-1052	EA	2" x 3-1/2" Long PVC Coated Conduit Nipple	39.38	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-1053	EA	2-1/2" x 3-1/2" Long PVC Coated Conduit Nipple	56.29	10.15
	16MOD-0014	For Installation Above 14', Add	3.05	
	16MOD-0015	For Work In Restricted Working Space, Add	6.10	
16131-1054	EA	3" x 3-1/2" Long PVC Coated Conduit Nipple	72.09	14.05
	16MOD-0014	For Installation Above 14', Add	4.21	
	16MOD-0015	For Work In Restricted Working Space, Add	8.42	
16131-1055	EA	1/2" x 4" Long PVC Coated Conduit Nipple.....	23.91	3.88
	16MOD-0014	For Installation Above 14', Add	1.17	
	16MOD-0015	For Work In Restricted Working Space, Add	2.33	
16131-1056	EA	3/4" x 4" Long PVC Coated Conduit Nipple.....	25.55	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-1057	EA	1" x 4" Long PVC Coated Conduit Nipple.....	28.91	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1058	EA	1-1/4" x 4" Long PVC Coated Conduit Nipple.....	33.94	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-1059	EA	1-1/2" x 4" Long PVC Coated Conduit Nipple.....	36.63	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-1060	EA	2" x 4" Long PVC Coated Conduit Nipple.....	41.31	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-1061	EA	2-1/2" x 4" Long PVC Coated Conduit Nipple.....	58.00	10.15
	16MOD-0014	For Installation Above 14', Add	3.05	
	16MOD-0015	For Work In Restricted Working Space, Add	6.10	
16131-1062	EA	3" x 4" Long PVC Coated Conduit Nipple.....	75.77	14.05
	16MOD-0014	For Installation Above 14', Add	4.21	
	16MOD-0015	For Work In Restricted Working Space, Add	8.42	
16131-1063	EA	3-1/2" x 4" Long PVC Coated Conduit Nipple.....	91.13	15.83
	16MOD-0014	For Installation Above 14', Add	4.75	
	16MOD-0015	For Work In Restricted Working Space, Add	9.50	
16131-1064	EA	4" x 4" Long PVC Coated Conduit Nipple.....	104.85	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-1065	EA	1/2" x 5" Long PVC Coated Conduit Nipple.....	24.13	3.88
	16MOD-0014	For Installation Above 14', Add	1.17	
	16MOD-0015	For Work In Restricted Working Space, Add	2.33	
16131-1066	EA	3/4" x 5" Long PVC Coated Conduit Nipple.....	25.79	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-1067	EA	1" x 5" Long PVC Coated Conduit Nipple.....	29.17	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	
16131-1068	EA	1-1/4" x 5" Long PVC Coated Conduit Nipple.....	34.40	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-1069	EA	1-1/2" x 5" Long PVC Coated Conduit Nipple.....	37.12	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-1070	EA	2" x 5" Long PVC Coated Conduit Nipple.....	42.37	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-1071	EA	2-1/2" x 5" Long PVC Coated Conduit Nipple.....	64.80	10.15
	16MOD-0014	For Installation Above 14', Add	3.05	
	16MOD-0015	For Work In Restricted Working Space, Add	6.10	
16131-1072	EA	3" x 5" Long PVC Coated Conduit Nipple.....	81.27	14.05
	16MOD-0014	For Installation Above 14', Add	4.21	
	16MOD-0015	For Work In Restricted Working Space, Add	8.42	
16131-1073	EA	3-1/2" x 5" Long PVC Coated Conduit Nipple.....	92.31	15.83
	16MOD-0014	For Installation Above 14', Add	4.75	
	16MOD-0015	For Work In Restricted Working Space, Add	9.50	
16131-1074	EA	4" x 5" Long PVC Coated Conduit Nipple.....	107.99	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-1075	EA	5" x 5" Long PVC Coated Conduit Nipple.....	160.62	28.38
	16MOD-0014	For Installation Above 14', Add	8.51	
	16MOD-0015	For Work In Restricted Working Space, Add	17.03	
16131-1076	EA	1/2" x 6" Long PVC Coated Conduit Nipple.....	24.56	3.88
	16MOD-0014	For Installation Above 14', Add	1.17	
	16MOD-0015	For Work In Restricted Working Space, Add	2.33	
16131-1077	EA	3/4" x 6" Long PVC Coated Conduit Nipple.....	26.22	4.48
	16MOD-0014	For Installation Above 14', Add	1.34	
	16MOD-0015	For Work In Restricted Working Space, Add	2.69	
16131-1078	EA	1" x 6" Long PVC Coated Conduit Nipple.....	29.64	5.68
	16MOD-0014	For Installation Above 14', Add	1.70	
	16MOD-0015	For Work In Restricted Working Space, Add	3.41	
16131-1079	EA	1-1/4" x 6" Long PVC Coated Conduit Nipple.....	35.27	6.57
	16MOD-0014	For Installation Above 14', Add	1.97	
	16MOD-0015	For Work In Restricted Working Space, Add	3.94	
16131-1080	EA	1-1/2" x 6" Long PVC Coated Conduit Nipple.....	38.15	7.46
	16MOD-0014	For Installation Above 14', Add	2.24	
	16MOD-0015	For Work In Restricted Working Space, Add	4.48	
16131-1081	EA	2" x 6" Long PVC Coated Conduit Nipple.....	43.42	8.37
	16MOD-0014	For Installation Above 14', Add	2.51	
	16MOD-0015	For Work In Restricted Working Space, Add	5.02	
16131-1082	EA	2-1/2" x 6" Long PVC Coated Conduit Nipple.....	71.70	10.15
	16MOD-0014	For Installation Above 14', Add	3.05	
	16MOD-0015	For Work In Restricted Working Space, Add	6.10	
16131-1083	EA	3" x 6" Long PVC Coated Conduit Nipple.....	88.59	14.05
	16MOD-0014	For Installation Above 14', Add	4.21	
	16MOD-0015	For Work In Restricted Working Space, Add	8.42	
16131-1084	EA	3-1/2" x 6" Long PVC Coated Conduit Nipple.....	98.90	15.83
	16MOD-0014	For Installation Above 14', Add	4.75	
	16MOD-0015	For Work In Restricted Working Space, Add	9.50	
16131-1085	EA	4" x 6" Long PVC Coated Conduit Nipple.....	119.11	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-1086	EA	5" x 6" Long PVC Coated Conduit Nipple.....	177.24	28.38
	16MOD-0014	For Installation Above 14', Add	8.51	
	16MOD-0015	For Work In Restricted Working Space, Add	17.03	
16131-1087	EA	1/2" x 8" Long PVC Coated Conduit Nipple.....	25.24	3.88
	16MOD-0014	For Installation Above 14', Add	1.17	
	16MOD-0015	For Work In Restricted Working Space, Add	2.33	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1088	EA		3/4" x 8" Long PVC Coated Conduit Nipple.....	26.87	4.48
	16MOD-0014		For Installation Above 14', Add	1.34	
	16MOD-0015		For Work In Restricted Working Space, Add	2.69	
16131-1089	EA		1" x 8" Long PVC Coated Conduit Nipple.....	30.67	5.68
	16MOD-0014		For Installation Above 14', Add	1.70	
	16MOD-0015		For Work In Restricted Working Space, Add	3.41	
16131-1090	EA		1-1/4" x 8" Long PVC Coated Conduit Nipple	35.49	6.57
	16MOD-0014		For Installation Above 14', Add	1.97	
	16MOD-0015		For Work In Restricted Working Space, Add	3.94	
16131-1091	EA		1-1/2" x 8" Long PVC Coated Conduit Nipple	40.26	7.46
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	
16131-1092	EA		2" x 8" Long PVC Coated Conduit Nipple.....	48.56	8.37
	16MOD-0014		For Installation Above 14', Add	2.51	
	16MOD-0015		For Work In Restricted Working Space, Add	5.02	
16131-1093	EA		2-1/2" x 8" Long PVC Coated Conduit Nipple	80.19	10.15
	16MOD-0014		For Installation Above 14', Add	3.05	
	16MOD-0015		For Work In Restricted Working Space, Add	6.10	
16131-1094	EA		3" x 8" Long PVC Coated Conduit Nipple.....	98.60	14.05
	16MOD-0014		For Installation Above 14', Add	4.21	
	16MOD-0015		For Work In Restricted Working Space, Add	8.42	
16131-1095	EA		3-1/2" x 8" Long PVC Coated Conduit Nipple	115.40	15.83
	16MOD-0014		For Installation Above 14', Add	4.75	
	16MOD-0015		For Work In Restricted Working Space, Add	9.50	
16131-1096	EA		4" x 8" Long PVC Coated Conduit Nipple.....	135.80	20.62
	16MOD-0014		For Installation Above 14', Add	6.18	
	16MOD-0015		For Work In Restricted Working Space, Add	12.37	
16131-1097	EA		5" x 8" Long PVC Coated Conduit Nipple.....	188.63	28.38
	16MOD-0014		For Installation Above 14', Add	8.51	
	16MOD-0015		For Work In Restricted Working Space, Add	17.03	
16131-1098	EA		1/2" x 10" Long PVC Coated Conduit Nipple.....	25.94	3.88
	16MOD-0014		For Installation Above 14', Add	1.17	
	16MOD-0015		For Work In Restricted Working Space, Add	2.33	
16131-1099	EA		3/4" x 10" Long PVC Coated Conduit Nipple.....	27.56	4.48
	16MOD-0014		For Installation Above 14', Add	1.34	
	16MOD-0015		For Work In Restricted Working Space, Add	2.69	
16131-1100	EA		1" x 10" Long PVC Coated Conduit Nipple.....	31.69	5.68
	16MOD-0014		For Installation Above 14', Add	1.70	
	16MOD-0015		For Work In Restricted Working Space, Add	3.41	
16131-1101	EA		1-1/4" x 10" Long PVC Coated Conduit Nipple	38.60	6.57
	16MOD-0014		For Installation Above 14', Add	1.97	
	16MOD-0015		For Work In Restricted Working Space, Add	3.94	
16131-1102	EA		1-1/2" x 10" Long PVC Coated Conduit Nipple	45.26	7.46
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	
16131-1103	EA		2" x 10" Long PVC Coated Conduit Nipple.....	56.12	8.37
	16MOD-0014		For Installation Above 14', Add	2.51	
	16MOD-0015		For Work In Restricted Working Space, Add	5.02	
16131-1104	EA		2-1/2" x 10" Long PVC Coated Conduit Nipple	89.16	10.15
	16MOD-0014		For Installation Above 14', Add	3.05	
	16MOD-0015		For Work In Restricted Working Space, Add	6.10	
16131-1105	EA		3" x 10" Long PVC Coated Conduit Nipple.....	111.42	14.05
	16MOD-0014		For Installation Above 14', Add	4.21	
	16MOD-0015		For Work In Restricted Working Space, Add	8.42	
16131-1106	EA		3-1/2" x 10" Long PVC Coated Conduit Nipple	132.73	15.83
	16MOD-0014		For Installation Above 14', Add	4.75	
	16MOD-0015		For Work In Restricted Working Space, Add	9.50	
16131-1107	EA		4" x 10" Long PVC Coated Conduit Nipple.....	165.00	20.62
	16MOD-0014		For Installation Above 14', Add	6.18	
	16MOD-0015		For Work In Restricted Working Space, Add	12.37	
16131-1108	EA		5" x 10" Long PVC Coated Conduit Nipple.....	211.36	28.38
	16MOD-0014		For Installation Above 14', Add	8.51	
	16MOD-0015		For Work In Restricted Working Space, Add	17.03	
16131-1109	EA		1/2" x 12" Long PVC Coated Conduit Nipple.....	26.67	3.88
	16MOD-0014		For Installation Above 14', Add	1.17	
	16MOD-0015		For Work In Restricted Working Space, Add	2.33	
16131-1110	EA		3/4" x 12" Long PVC Coated Conduit Nipple.....	28.38	4.48
	16MOD-0014		For Installation Above 14', Add	1.34	
	16MOD-0015		For Work In Restricted Working Space, Add	2.69	
16131-1111	EA		1" x 12" Long PVC Coated Conduit Nipple.....	34.28	5.68
	16MOD-0014		For Installation Above 14', Add	1.70	
	16MOD-0015		For Work In Restricted Working Space, Add	3.41	
16131-1112	EA		1-1/4" x 12" Long PVC Coated Conduit Nipple	43.70	6.57
	16MOD-0014		For Installation Above 14', Add	1.97	
	16MOD-0015		For Work In Restricted Working Space, Add	3.94	
16131-1113	EA		1-1/2" x 12" Long PVC Coated Conduit Nipple	51.32	7.46
	16MOD-0014		For Installation Above 14', Add	2.24	
	16MOD-0015		For Work In Restricted Working Space, Add	4.48	
16131-1114	EA		2" x 12" Long PVC Coated Conduit Nipple.....	62.20	8.37
	16MOD-0014		For Installation Above 14', Add	2.51	
	16MOD-0015		For Work In Restricted Working Space, Add	5.02	
16131-1115	EA		2-1/2" x 12" Long PVC Coated Conduit Nipple	101.14	10.15
	16MOD-0014		For Installation Above 14', Add	3.05	
	16MOD-0015		For Work In Restricted Working Space, Add	6.10	
16131-1116	EA		3" x 12" Long PVC Coated Conduit Nipple.....	130.65	14.05
	16MOD-0014		For Installation Above 14', Add	4.21	
	16MOD-0015		For Work In Restricted Working Space, Add	8.42	
16131-1117	EA		3-1/2" x 12" Long PVC Coated Conduit Nipple	143.36	15.83
	16MOD-0014		For Installation Above 14', Add	4.75	
	16MOD-0015		For Work In Restricted Working Space, Add	9.50	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1118	EA	4" x 12" Long PVC Coated Conduit Nipple.....	173.96	20.62
	16MOD-0014	For Installation Above 14', Add	6.18	
	16MOD-0015	For Work In Restricted Working Space, Add	12.37	
16131-1119	EA	5" x 12" Long PVC Coated Conduit Nipple.....	214.61	28.38
	16MOD-0014	For Installation Above 14', Add	8.51	
	16MOD-0015	For Work In Restricted Working Space, Add	17.03	
16131-1120		Aluminum Conduit <small>(16131-0001)</small> Note: Exposed installation, conditions branch and feeder conduit. Includes field bend conduit up to 3/4". Excludes supporting strap, hanger and fastening.		
16131-1121		Aluminum Conduit With Threaded Coupling <small>(16131-1120)</small>		
16131-1122	LF	1/2" Aluminum Conduit With Coupling.....	3.92	1.13
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	0.43	
	16MOD-0050	For Work In Restricted Working Space, Add	0.86	
16131-1123	LF	3/4" Aluminum Conduit With Coupling.....	4.57	1.25
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	0.48	
	16MOD-0050	For Work In Restricted Working Space, Add	0.95	
16131-1124	LF	1" Aluminum Conduit With Coupling.....	5.45	1.37
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	0.52	
	16MOD-0050	For Work In Restricted Working Space, Add	1.04	
16131-1125	LF	1-1/4" Aluminum Conduit With Coupling.....	6.55	1.56
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	0.59	
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1126	LF	1-1/2" Aluminum Conduit With Coupling.....	7.72	1.80
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	0.67	
	16MOD-0050	For Work In Restricted Working Space, Add	1.34	
16131-1127	LF	2" Aluminum Conduit With Coupling.....	9.41	2.03
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	0.76	
	16MOD-0050	For Work In Restricted Working Space, Add	1.52	
16131-1128	LF	2-1/2" Aluminum Conduit With Coupling.....	13.29	2.57
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	0.97	
	16MOD-0050	For Work In Restricted Working Space, Add	1.94	
16131-1129	LF	3" Aluminum Conduit With Coupling.....	16.76	3.11
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	1.17	
	16MOD-0050	For Work In Restricted Working Space, Add	2.33	
16131-1130	LF	3-1/2" Aluminum Conduit With Coupling.....	20.05	3.70
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	1.39	
	16MOD-0050	For Work In Restricted Working Space, Add	2.78	
16131-1131	LF	4" Aluminum Conduit With Coupling.....	23.84	4.42
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	1.66	
	16MOD-0050	For Work In Restricted Working Space, Add	3.32	
16131-1132	LF	5" Aluminum Conduit With Coupling.....	32.28	5.62
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	2.10	
	16MOD-0050	For Work In Restricted Working Space, Add	4.20	
16131-1133	LF	6" Aluminum Conduit With Coupling.....	41.70	7.05
	16MOD-0049	For Installation In Concrete (Excludes Concrete), Add	2.64	
	16MOD-0050	For Work In Restricted Working Space, Add	5.29	
16131-1134		90 Degree Elbow <small>(16131-1120)</small>		
16131-1135	EA	1" Aluminum Elbow.....	26.67	6.21
	16MOD-0050	For Work In Restricted Working Space, Add	4.66	
16131-1136	EA	1-1/4" Aluminum Elbow.....	35.33	7.05
	16MOD-0050	For Work In Restricted Working Space, Add	5.29	
16131-1137	EA	1-1/2" Aluminum Elbow.....	43.87	8.13
	16MOD-0050	For Work In Restricted Working Space, Add	6.10	
16131-1138	EA	2" Aluminum Elbow.....	57.98	9.32
	16MOD-0050	For Work In Restricted Working Space, Add	6.99	
16131-1139	EA	2-1/2" Aluminum Elbow.....	86.81	11.36
	16MOD-0050	For Work In Restricted Working Space, Add	8.51	
16131-1140	EA	3" Aluminum Elbow.....	127.00	14.70
	16MOD-0050	For Work In Restricted Working Space, Add	11.03	
16131-1141	EA	3-1/2" Aluminum Elbow.....	181.98	16.49
	16MOD-0050	For Work In Restricted Working Space, Add	12.37	
16131-1142	EA	4" Aluminum Elbow.....	218.59	20.68
	16MOD-0050	For Work In Restricted Working Space, Add	15.51	
16131-1143	EA	5" Aluminum Elbow.....	257.74	33.70
	16MOD-0050	For Work In Restricted Working Space, Add	25.28	
16131-1144	EA	6" Aluminum Elbow.....	309.45	50.67
	16MOD-0050	For Work In Restricted Working Space, Add	38.00	
16131-1145		Bushing Set With Locknut <small>(16131-1120)</small>		
16131-1146	EA	1/2" Aluminum Bushing Set With Locknut.....	6.83	2.39
	16MOD-0050	For Work In Restricted Working Space, Add	1.79	
16131-1147	EA	3/4" Aluminum Bushing Set With Locknut.....	11.18	3.11
	16MOD-0050	For Work In Restricted Working Space, Add	2.33	
16131-1148	EA	1" Aluminum Bushing Set With Locknut.....	10.11	3.82
	16MOD-0050	For Work In Restricted Working Space, Add	2.87	
16131-1149	EA	1-1/4" Aluminum Bushing Set With Locknut.....	11.37	4.30
	16MOD-0050	For Work In Restricted Working Space, Add	3.23	
16131-1150	EA	1-1/2" Aluminum Bushing Set With Locknut.....	13.92	5.26
	16MOD-0050	For Work In Restricted Working Space, Add	3.94	
16131-1151	EA	2" Aluminum Bushing Set With Locknut.....	17.13	6.33
	16MOD-0050	For Work In Restricted Working Space, Add	4.75	
16131-1152	EA	2-1/2" Aluminum Bushing Set With Locknut.....	21.46	7.52
	16MOD-0050	For Work In Restricted Working Space, Add	5.65	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1153	EA	3" Aluminum Bushing Set With Locknut.....	25.42	8.61
		16MOD-0050 For Work In Restricted Working Space, Add	6.45	
16131-1154	EA	3-1/2" Aluminum Bushing Set With Locknut.....	27.47	9.32
		16MOD-0050 For Work In Restricted Working Space, Add	6.99	
16131-1155	EA	4" Aluminum Bushing Set With Locknut.....	30.09	10.04
		16MOD-0050 For Work In Restricted Working Space, Add	7.53	
16131-1156	EA	5" Aluminum Bushing Set With Locknut.....	39.71	13.38
		16MOD-0050 For Work In Restricted Working Space, Add	10.04	
16131-1157	EA	6" Aluminum Bushing Set With Locknut.....	58.77	20.08
		16MOD-0050 For Work In Restricted Working Space, Add	15.06	
16131-1158		LB, LL Or LR 2 Hub Conduit Body With Gasket And Cover (16131-1120)		
16131-1159	EA	1/2" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	28.67	8.61
16131-1160	EA	3/4" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	33.90	9.86
16131-1161	EA	1" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	42.19	11.48
16131-1162	EA	1-1/4" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	52.70	13.08
16131-1163	EA	1-1/2" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	61.90	14.34
16131-1164	EA	2" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	86.20	17.21
16131-1165	EA	2-1/2" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	166.71	24.20
16131-1166	EA	3" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	220.03	32.27
16131-1167	EA	3-1/2" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	349.59	40.33
16131-1168	EA	4" Aluminum Type LB, LL Or LR 2 Hub, Mounted Exposed On Flat Wall.....	384.70	49.12
16131-1169		Type T 3 Hub Conduit Body With Gasket And Cover (16131-1120)		
16131-1170	EA	1/2" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	33.39	9.86
16131-1171	EA	3/4" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	39.76	11.48
16131-1172	EA	1" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	46.99	12.55
16131-1173	EA	1-1/4" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	60.37	14.34
16131-1174	EA	1-1/2" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	72.19	15.77
16131-1175	EA	2" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	97.32	18.46
16131-1176	EA	2-1/2" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	196.74	26.89
16131-1177	EA	3" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	226.78	34.95
16131-1178	EA	3-1/2" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	413.80	43.02
16131-1179	EA	4" Aluminum Type T 3 Hub, Mounted Exposed On Flat Wall.....	438.97	51.99
16131-1180		Type C Conduit Body With Gasket And Cover (16131-1120)		
16131-1181	EA	1/2" Aluminum Type C, Mounted Exposed On Flat Wall.....	29.00	8.61
16131-1182	EA	3/4" Aluminum Type C, Mounted Exposed On Flat Wall.....	33.49	9.86
16131-1183	EA	1" Aluminum Type C, Mounted Exposed On Flat Wall.....	41.56	11.30
16131-1184	EA	1-1/4" Aluminum Type C, Mounted Exposed On Flat Wall.....	52.80	13.08
16131-1185	EA	1-1/2" Aluminum Type C, Mounted Exposed On Flat Wall.....	62.05	14.34
16131-1186	EA	2" Aluminum Type C, Mounted Exposed On Flat Wall.....	86.18	17.21
16131-1187	EA	2-1/2" Aluminum Type C, Mounted Exposed On Flat Wall.....	165.86	24.20
16131-1188	EA	3" Aluminum Type C, Mounted Exposed On Flat Wall.....	201.57	32.27
16131-1189	EA	3-1/2" Aluminum Type C, Mounted Exposed On Flat Wall.....	348.34	40.33
16131-1190	EA	4" Aluminum Type C, Mounted Exposed On Flat Wall.....	382.60	49.12
16131-1191		Type X 4 Hub Conduit Body With Gasket And Cover (16131-1120)		
16131-1192	EA	1/2" Aluminum Type X 4 Hub, Mounted Exposed On Flat Wall.....	38.69	11.30
16131-1193	EA	3/4" Aluminum Type X 4 Hub, Mounted Exposed On Flat Wall.....	45.38	12.55
16131-1194	EA	1" Aluminum Type X 4 Hub, Mounted Exposed On Flat Wall.....	54.07	13.80
16131-1195	EA	1-1/4" Aluminum Type X 4 Hub, Mounted Exposed On Flat Wall.....	73.71	15.77
16131-1196	EA	1-1/2" Aluminum Type X 4 Hub, Mounted Exposed On Flat Wall.....	77.29	17.21
16131-1197	EA	2" Aluminum Type X 4 Hub, Mounted Exposed On Flat Wall.....	128.89	21.15
16131-1198		PVC Schedule 40 Conduit With Glued Couplings (16131-0001)		
		Note: Exposed installation, conditions branch and feeder conduit. Includes field bend conduit up to 3/4". Excludes supporting strap, hanger and fastening.		
16131-1199		PVC Conduit And Coupling (16131-1198)		
16131-1200	LF	1/2" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall.....	2.02	
		16MOD-0040 For Schedule 60, Add	0.13	
		16MOD-0041 For Schedule 80, Add	0.24	
16131-1201	LF	3/4" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall.....	2.70	
		16MOD-0040 For Schedule 60, Add	0.18	
		16MOD-0041 For Schedule 80, Add	0.32	
16131-1202	LF	1" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall.....	3.11	
		16MOD-0040 For Schedule 60, Add	0.22	
		16MOD-0041 For Schedule 80, Add	0.39	
16131-1203	LF	1-1/4" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall.....	3.83	
		16MOD-0040 For Schedule 60, Add	0.27	
		16MOD-0041 For Schedule 80, Add	0.48	
16131-1204	LF	1-1/2" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall.....	3.91	
		16MOD-0040 For Schedule 60, Add	0.29	
		16MOD-0041 For Schedule 80, Add	0.51	
16131-1205	LF	2" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall.....	4.55	
		16MOD-0040 For Schedule 60, Add	0.35	
		16MOD-0041 For Schedule 80, Add	0.61	
16131-1206	LF	2-1/2" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall.....	6.04	
		16MOD-0040 For Schedule 60, Add	0.50	
		16MOD-0041 For Schedule 80, Add	0.85	

16000 Electrical
16100 Basic Materials And Methods
16131 Conduit



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1207	LF	3" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall	7.75	
		16MOD-0040 For Schedule 60, Add	0.62	
		16MOD-0041 For Schedule 80, Add	1.07	
16131-1208	LF	3-1/2" PVC Schedule 40 Conduit With Couplings, Glued Coupling, Mounted Exposed On Flat Wall	9.43	
		16MOD-0040 For Schedule 60, Add	0.77	
		16MOD-0041 For Schedule 80, Add	1.32	
16131-1209	LF	4" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall	10.87	
		16MOD-0040 For Schedule 60, Add	0.88	
		16MOD-0041 For Schedule 80, Add	1.50	
16131-1210	LF	5" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall	14.23	
		16MOD-0040 For Schedule 60, Add	1.19	
		16MOD-0041 For Schedule 80, Add	2.03	
16131-1211	LF	6" PVC Schedule 40 Conduit With Coupling, Glued Coupling, Mounted Exposed On Flat Wall	19.02	
		16MOD-0040 For Schedule 60, Add	1.59	
		16MOD-0041 For Schedule 80, Add	2.70	
16131-1212		Elbows <small>(16131-1198)</small>		
		See CSI section 16131-1582 for conduit field bending.		
16131-1213	EA	1/2" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	13.08	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.04	
		16MOD-0040 For Schedule 60, Add	0.77	
		16MOD-0041 For Schedule 80, Add	1.46	
16131-1214	EA	3/4" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	16.37	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.04	
		16MOD-0040 For Schedule 60, Add	0.96	
		16MOD-0041 For Schedule 80, Add	1.81	
16131-1215	EA	1" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	19.73	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.07	
		16MOD-0040 For Schedule 60, Add	1.21	
		16MOD-0041 For Schedule 80, Add	2.25	
16131-1216	EA	1-1/4" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	24.90	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.10	
		16MOD-0040 For Schedule 60, Add	1.57	
		16MOD-0041 For Schedule 80, Add	2.89	
16131-1217	EA	1-1/2" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	25.47	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.13	
		16MOD-0040 For Schedule 60, Add	1.71	
		16MOD-0041 For Schedule 80, Add	3.09	
16131-1218	EA	2" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	33.95	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.17	
		16MOD-0040 For Schedule 60, Add	2.28	
		16MOD-0041 For Schedule 80, Add	4.12	
16131-1219	EA	2-1/2" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	40.75	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.33	
		16MOD-0040 For Schedule 60, Add	3.13	
		16MOD-0041 For Schedule 80, Add	5.44	
16131-1220	EA	3" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	48.74	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.55	
		16MOD-0040 For Schedule 60, Add	4.27	
		16MOD-0041 For Schedule 80, Add	7.16	
16131-1221	EA	3-1/2" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	59.15	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.77	
		16MOD-0040 For Schedule 60, Add	5.53	
		16MOD-0041 For Schedule 80, Add	9.13	
16131-1222	EA	4" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	69.37	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-0.99	
		16MOD-0040 For Schedule 60, Add	6.78	
		16MOD-0041 For Schedule 80, Add	11.08	
16131-1223	EA	5" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	91.99	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-1.72	
		16MOD-0040 For Schedule 60, Add	10.33	
		16MOD-0041 For Schedule 80, Add	16.36	
16131-1224	EA	6" PVC Schedule 40 Elbow 90 Degree, Glued Coupling, Mounted Exposed On Flat Wall	129.73	
		See CSI section 16131-1582 for conduit field bending.		
		16MOD-0039 For 45 Degree Elbows, Deduct	-2.19	
		16MOD-0040 For Schedule 60, Add	13.80	
		16MOD-0041 For Schedule 80, Add	22.12	
16131-1225		Adapter <small>(16131-1198)</small>		
16131-1226	EA	1/2" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	9.65	
		16MOD-0040 For Schedule 60, Add	0.54	
		16MOD-0041 For Schedule 80, Add	1.04	
16131-1227	EA	3/4" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	11.59	
		16MOD-0040 For Schedule 60, Add	0.65	
		16MOD-0041 For Schedule 80, Add	1.25	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1228	EA	1" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	12.98	
	16MOD-0040	For Schedule 60, Add	0.75	
	16MOD-0041	For Schedule 80, Add	1.42	
16131-1229	EA	1-1/4" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	14.58	
	16MOD-0040	For Schedule 60, Add	0.87	
	16MOD-0041	For Schedule 80, Add	1.63	
16131-1230	EA	1-1/2" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	14.62	
	16MOD-0040	For Schedule 60, Add	0.88	
	16MOD-0041	For Schedule 80, Add	1.64	
16131-1231	EA	2" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	16.08	
	16MOD-0040	For Schedule 60, Add	0.88	
	16MOD-0041	For Schedule 80, Add	1.71	
16131-1232	EA	2-1/2" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	19.48	
	16MOD-0040	For Schedule 60, Add	1.37	
	16MOD-0041	For Schedule 80, Add	2.45	
16131-1233	EA	3" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	21.39	
	16MOD-0040	For Schedule 60, Add	1.62	
	16MOD-0041	For Schedule 80, Add	2.83	
16131-1234	EA	3-1/2" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	25.46	
	16MOD-0040	For Schedule 60, Add	1.98	
	16MOD-0041	For Schedule 80, Add	3.43	
16131-1235	EA	4" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	28.77	
	16MOD-0040	For Schedule 60, Add	2.16	
	16MOD-0041	For Schedule 80, Add	3.78	
16131-1236	EA	5" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	38.20	
	16MOD-0040	For Schedule 60, Add	3.34	
	16MOD-0041	For Schedule 80, Add	5.61	
16131-1237	EA	6" PVC Schedule 40 Adapter, Glued Coupling, Mounted Exposed On Flat Wall	46.29	
	16MOD-0040	For Schedule 60, Add	4.03	
	16MOD-0041	For Schedule 80, Add	6.77	
16131-1238		Bell End And Plug <small>(16131-1198)</small>		
16131-1239	EA	1-1/4" PVC Schedule 40 Bell End And Cap, Glued Coupling, Mounted Exposed On Flat Wall	10.63	
	16MOD-0040	For Schedule 60, Add	1.28	
	16MOD-0041	For Schedule 80, Add	2.00	
16131-1240	EA	1-1/2" PVC Schedule 40 Bell End And Cap, Glued Coupling, Mounted Exposed On Flat Wall	11.04	
	16MOD-0040	For Schedule 60, Add	1.38	
	16MOD-0041	For Schedule 80, Add	2.14	
16131-1241	EA	2" PVC Schedule 40 Bell End And Plug, Glued Coupling, Mounted Exposed On Flat Wall	21.02	
	16MOD-0040	For Schedule 60, Add	2.12	
	16MOD-0041	For Schedule 80, Add	3.44	
16131-1242	EA	2-1/2" PVC Schedule 40 Bell End And Plug, Glued Coupling, Mounted Exposed On Flat Wall	23.33	
	16MOD-0040	For Schedule 60, Add	2.33	
	16MOD-0041	For Schedule 80, Add	3.79	
16131-1243	EA	3" PVC Schedule 40 Bell End And Plug, Glued Coupling, Mounted Exposed On Flat Wall	24.96	
	16MOD-0040	For Schedule 60, Add	2.51	
	16MOD-0041	For Schedule 80, Add	4.08	
16131-1244	EA	3-1/2" PVC Schedule 40 Bell End And Plug, Glued Coupling, Mounted Exposed On Flat Wall	29.70	
	16MOD-0040	For Schedule 60, Add	3.04	
	16MOD-0041	For Schedule 80, Add	4.92	
16131-1245	EA	4" PVC Schedule 40 Bell End And Plug, Glued Coupling, Mounted Exposed On Flat Wall	32.92	
	16MOD-0040	For Schedule 60, Add	3.20	
	16MOD-0041	For Schedule 80, Add	5.24	
16131-1246	EA	5" PVC Schedule 40 Bell End And Plug, Glued Coupling, Mounted Exposed On Flat Wall	42.65	
	16MOD-0040	For Schedule 60, Add	4.45	
	16MOD-0041	For Schedule 80, Add	7.17	
16131-1247	EA	6" PVC Schedule 40 Bell End And Plug, Glued Coupling, Mounted Exposed On Flat Wall	50.79	
	16MOD-0040	For Schedule 60, Add	5.16	
	16MOD-0041	For Schedule 80, Add	8.35	
16131-1248		Terminal Adapter <small>(16131-1198)</small>		
16131-1249	EA	1/2" Terminal Adapter, Glued Coupling, Mounted Exposed On Flat Wall	9.59	
16131-1250	EA	3/4" Terminal Adapter, Glued Coupling, Mounted Exposed On Flat Wall	11.59	
16131-1251	EA	1" Terminal Adapter, Glued Coupling, Mounted Exposed On Flat Wall	12.91	
16131-1252	EA	1-1/4" Terminal Adapter, Glued Coupling, Mounted Exposed On Flat Wall	14.46	
16131-1253		LB, LR Or LL Fitting With Cover <small>(16131-1198)</small>		
16131-1254	EA	1/2" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	15.28	
	16MOD-0040	For Schedule 60, Add	1.32	
	16MOD-0041	For Schedule 80, Add	2.23	
16131-1255	EA	3/4" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	19.62	
	16MOD-0040	For Schedule 60, Add	1.77	
	16MOD-0041	For Schedule 80, Add	2.95	
16131-1256	EA	1" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	22.96	
	16MOD-0040	For Schedule 60, Add	2.01	
	16MOD-0041	For Schedule 80, Add	3.38	
16131-1257	EA	1-1/4" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	29.49	
	16MOD-0040	For Schedule 60, Add	2.71	
	16MOD-0041	For Schedule 80, Add	4.50	
16131-1258	EA	1-1/2" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	34.40	
	16MOD-0040	For Schedule 60, Add	3.16	
	16MOD-0041	For Schedule 80, Add	5.25	
16131-1259	EA	2" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	43.84	
	16MOD-0040	For Schedule 60, Add	4.75	
	16MOD-0041	For Schedule 80, Add	7.58	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1260	EA	2-1/2" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	84.55	
	16MOD-0040	For Schedule 60, Add	14.08	
	16MOD-0041	For Schedule 80, Add	20.77	
16131-1261	EA	3" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	90.49	
	16MOD-0040	For Schedule 60, Add	14.70	
	16MOD-0041	For Schedule 80, Add	21.77	
16131-1262	EA	3-1/2" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	98.81	
	16MOD-0040	For Schedule 60, Add	15.44	
	16MOD-0041	For Schedule 80, Add	23.01	
16131-1263	EA	4" PVC LB, LR Or LL Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	108.61	
	16MOD-0040	For Schedule 60, Add	16.59	
	16MOD-0041	For Schedule 80, Add	24.82	
16131-1264		T Fitting With Cover (16131-1198)		
16131-1265	EA	1/2" PVC "T" Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall.....	18.65	5.98
	16MOD-0040	For Schedule 60, Add	1.67	
	16MOD-0041	For Schedule 80, Add	2.79	
16131-1266	EA	3/4" PVC "T" Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall.....	23.13	7.41
	16MOD-0040	For Schedule 60, Add	2.08	
	16MOD-0041	For Schedule 80, Add	3.47	
16131-1267	EA	1" PVC "T" Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	27.36	9.08
	16MOD-0040	For Schedule 60, Add	2.30	
	16MOD-0041	For Schedule 80, Add	3.90	
16131-1268	EA	1-1/4" PVC "T" Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	34.81	10.51
	16MOD-0040	For Schedule 60, Add	3.44	
	16MOD-0041	For Schedule 80, Add	5.61	
16131-1269	EA	1-1/2" PVC "T" Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	39.88	11.95
	16MOD-0040	For Schedule 60, Add	3.99	
	16MOD-0041	For Schedule 80, Add	6.49	
16131-1270	EA	2" PVC "T" Fitting With Cover, Glued Coupling, Mounted Exposed On Flat Wall	47.95	13.38
	16MOD-0040	For Schedule 60, Add	5.30	
	16MOD-0041	For Schedule 80, Add	8.42	
16131-1271		Expansion Joint (16131-1198)		
16131-1272	EA	1/2" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	36.84	
		See CSI section 16131-1582 for conduit field bending.		
16131-1273	EA	3/4" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	40.61	
		See CSI section 16131-1582 for conduit field bending.		
16131-1274	EA	1" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	44.51	
		See CSI section 16131-1582 for conduit field bending.		
16131-1275	EA	1-1/4" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	49.74	
		See CSI section 16131-1582 for conduit field bending.		
16131-1276	EA	1-1/2" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	50.14	
		See CSI section 16131-1582 for conduit field bending.		
16131-1277	EA	2" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	59.33	
		See CSI section 16131-1582 for conduit field bending.		
16131-1278	EA	2-1/2" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	73.66	
		See CSI section 16131-1582 for conduit field bending.		
16131-1279	EA	3" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	89.44	
		See CSI section 16131-1582 for conduit field bending.		
16131-1280	EA	3-1/2" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	105.72	
		See CSI section 16131-1582 for conduit field bending.		
16131-1281	EA	4" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	125.17	
		See CSI section 16131-1582 for conduit field bending.		
16131-1282	EA	5" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	168.79	
		See CSI section 16131-1582 for conduit field bending.		
16131-1283	EA	6" PVC Expansion Joint, Glued Coupling, Mounted Exposed On Flat Wall	235.02	
		See CSI section 16131-1582 for conduit field bending.		
16131-1284		Conduit Installed Below Grade (16131)		
		Note: By direct burial In trench or in concrete slabs or duct banks. Excludes trenching, backfilling and concrete.		
16131-1285		PVC Schedule 40 Conduit With Glued Couplings (16131-1284)		
		Note: Direct burial.		
16131-1286		PVC Conduit And Coupling (16131-1285)		
16131-1287	LF	1/2" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling	1.38	
	16MOD-0040	For Schedule 60, Add	0.10	
	16MOD-0041	For Schedule 80, Add	0.18	
16131-1288	LF	3/4" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling	1.94	
	16MOD-0040	For Schedule 60, Add	0.14	
	16MOD-0041	For Schedule 80, Add	0.24	
16131-1289	LF	1" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling	2.26	
	16MOD-0040	For Schedule 60, Add	0.17	
	16MOD-0041	For Schedule 80, Add	0.30	
16131-1290	LF	1-1/4" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling	2.79	
	16MOD-0040	For Schedule 60, Add	0.22	
	16MOD-0041	For Schedule 80, Add	0.38	
16131-1291	LF	1-1/2" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling	3.05	
	16MOD-0040	For Schedule 60, Add	0.25	
	16MOD-0041	For Schedule 80, Add	0.42	
16131-1292	LF	2" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling	3.38	
	16MOD-0040	For Schedule 60, Add	0.29	
	16MOD-0041	For Schedule 80, Add	0.49	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1293	LF		2-1/2" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling.....	4.34	
	16MOD-0040		For Schedule 60, Add	0.42	
	16MOD-0041		For Schedule 80, Add	0.68	
16131-1294	LF		3" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling.....	5.45	
	16MOD-0040		For Schedule 60, Add	0.51	
	16MOD-0041		For Schedule 80, Add	0.84	
16131-1295	LF		3-1/2" PVC Schedule 40 Conduit With Couplings, Direct Burial, Glued Coupling.....	6.66	
	16MOD-0040		For Schedule 60, Add	0.64	
	16MOD-0041		For Schedule 80, Add	1.04	
16131-1296	LF		4" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling.....	7.65	
	16MOD-0040		For Schedule 60, Add	0.71	
	16MOD-0041		For Schedule 80, Add	1.18	
16131-1297	LF		5" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling.....	10.10	
	16MOD-0040		For Schedule 60, Add	0.99	
	16MOD-0041		For Schedule 80, Add	1.61	
16131-1298	LF		6" PVC Schedule 40 Conduit With Coupling, Direct Burial, Glued Coupling.....	13.47	
	16MOD-0040		For Schedule 60, Add	1.31	
	16MOD-0041		For Schedule 80, Add	2.14	
16131-1299			Elbows <small>(16131-1285)</small>		
			See CSI section 16131-1582 for conduit field bending.		
16131-1300	EA		1/2" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	9.33	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.04	
	16MOD-0040		For Schedule 60, Add	0.59	
	16MOD-0041		For Schedule 80, Add	1.08	
16131-1301	EA		3/4" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	11.65	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.04	
	16MOD-0040		For Schedule 60, Add	0.72	
	16MOD-0041		For Schedule 80, Add	1.34	
16131-1302	EA		1" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	13.77	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.07	
	16MOD-0040		For Schedule 60, Add	0.91	
	16MOD-0041		For Schedule 80, Add	1.65	
16131-1303	EA		1-1/4" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	17.20	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.10	
	16MOD-0040		For Schedule 60, Add	1.18	
	16MOD-0041		For Schedule 80, Add	2.12	
16131-1304	EA		1-1/2" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	20.12	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.13	
	16MOD-0040		For Schedule 60, Add	1.44	
	16MOD-0041		For Schedule 80, Add	2.56	
16131-1305	EA		2" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	23.40	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.17	
	16MOD-0040		For Schedule 60, Add	1.75	
	16MOD-0041		For Schedule 80, Add	3.07	
16131-1306	EA		2-1/2" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	28.75	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.33	
	16MOD-0040		For Schedule 60, Add	2.53	
	16MOD-0041		For Schedule 80, Add	4.24	
16131-1307	EA		3" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	35.28	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.55	
	16MOD-0040		For Schedule 60, Add	3.59	
	16MOD-0041		For Schedule 80, Add	5.82	
16131-1308	EA		3-1/2" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	43.42	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.77	
	16MOD-0040		For Schedule 60, Add	4.74	
	16MOD-0041		For Schedule 80, Add	7.56	
16131-1309	EA		4" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	51.42	
	16MOD-0039		For 45 Degree Elbows, Deduct	-0.99	
	16MOD-0040		For Schedule 60, Add	5.89	
	16MOD-0041		For Schedule 80, Add	9.29	
16131-1310	EA		5" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	70.46	
	16MOD-0039		For 45 Degree Elbows, Deduct	-1.72	
	16MOD-0040		For Schedule 60, Add	9.25	
	16MOD-0041		For Schedule 80, Add	14.21	
16131-1311	EA		6" PVC Schedule 40 Elbow 90 Degree Direct Burial, Glued Coupling.....	98.04	
	16MOD-0039		For 45 Degree Elbows, Deduct	-2.19	
	16MOD-0040		For Schedule 60, Add	12.22	
	16MOD-0041		For Schedule 80, Add	18.95	
16131-1312			Adapter <small>(16131-1285)</small>		
16131-1313	EA		1/2" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling.....	7.31	
	16MOD-0040		For Schedule 60, Add	0.42	
	16MOD-0041		For Schedule 80, Add	0.80	
16131-1314	EA		3/4" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling.....	8.79	
	16MOD-0040		For Schedule 60, Add	0.51	
	16MOD-0041		For Schedule 80, Add	0.97	
16131-1315	EA		1" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling.....	9.85	
	16MOD-0040		For Schedule 60, Add	0.59	
	16MOD-0041		For Schedule 80, Add	1.11	
16131-1316	EA		1-1/4" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling.....	11.11	
	16MOD-0040		For Schedule 60, Add	0.69	
	16MOD-0041		For Schedule 80, Add	1.28	
16131-1317	EA		1-1/2" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling.....	11.82	
	16MOD-0040		For Schedule 60, Add	0.74	
	16MOD-0041		For Schedule 80, Add	1.36	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1318	EA	2" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling	12.16	
	16MOD-0040	For Schedule 60, Add	0.69	
	16MOD-0041	For Schedule 80, Add	1.32	
16131-1319	EA	2-1/2" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling	15.11	
	16MOD-0040	For Schedule 60, Add	1.15	
	16MOD-0041	For Schedule 80, Add	2.01	
16131-1320	EA	3" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling	16.74	
	16MOD-0040	For Schedule 60, Add	1.39	
	16MOD-0041	For Schedule 80, Add	2.36	
16131-1321	EA	3-1/2" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling	19.98	
	16MOD-0040	For Schedule 60, Add	1.71	
	16MOD-0041	For Schedule 80, Add	2.88	
16131-1322	EA	4" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling	22.48	
	16MOD-0040	For Schedule 60, Add	1.85	
	16MOD-0041	For Schedule 80, Add	3.16	
16131-1323	EA	5" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling	30.45	
	16MOD-0040	For Schedule 60, Add	2.95	
	16MOD-0041	For Schedule 80, Add	4.83	
16131-1324	EA	6" PVC Schedule 40 Adapter, Direct Burial, Glued Coupling	36.86	
	16MOD-0040	For Schedule 60, Add	3.56	
	16MOD-0041	For Schedule 80, Add	5.83	
16131-1325		Bell End And Plug <small>(16131-1289)</small>		
16131-1326	EA	1-1/4" PVC Schedule 40 Bell End And Cap, Direct Burial, Glued Coupling	8.91	
	16MOD-0040	For Schedule 60, Add	1.20	
	16MOD-0041	For Schedule 80, Add	1.83	
16131-1327	EA	1-1/2" PVC Schedule 40 Bell End And Cap, Direct Burial, Glued Coupling	12.62	
	16MOD-0040	For Schedule 60, Add	1.46	
	16MOD-0041	For Schedule 80, Add	2.30	
16131-1328	EA	2" PVC Schedule 40 Bell End And Plug, Direct Burial, Glued Coupling	17.10	
	16MOD-0040	For Schedule 60, Add	1.92	
	16MOD-0041	For Schedule 80, Add	3.05	
16131-1329	EA	2-1/2" PVC Schedule 40 Bell End And Plug, Direct Burial, Glued Coupling	18.96	
	16MOD-0040	For Schedule 60, Add	2.12	
	16MOD-0041	For Schedule 80, Add	3.36	
16131-1330	EA	3" PVC Schedule 40 Bell End And Plug, Direct Burial, Glued Coupling	20.31	
	16MOD-0040	For Schedule 60, Add	2.28	
	16MOD-0041	For Schedule 80, Add	3.61	
16131-1331	EA	3-1/2" PVC Schedule 40 Bell End And Plug, Direct Burial, Glued Coupling	24.22	
	16MOD-0040	For Schedule 60, Add	2.77	
	16MOD-0041	For Schedule 80, Add	4.37	
16131-1332	EA	4" PVC Schedule 40 Bell End And Plug, Direct Burial, Glued Coupling	26.63	
	16MOD-0040	For Schedule 60, Add	2.89	
	16MOD-0041	For Schedule 80, Add	4.61	
16131-1333	EA	5" PVC Schedule 40 Bell End And Plug, Direct Burial, Glued Coupling	34.90	
	16MOD-0040	For Schedule 60, Add	4.07	
	16MOD-0041	For Schedule 80, Add	6.39	
16131-1334	EA	6" PVC Schedule 40 Bell End And Plug, Direct Burial, Glued Coupling	41.36	
	16MOD-0040	For Schedule 60, Add	4.68	
	16MOD-0041	For Schedule 80, Add	7.41	
16131-1335		Terminal Adapter <small>(16131-1285)</small>		
16131-1336	EA	1/2" Terminal Adapter, Direct Burial, Glued Coupling	7.25	
16131-1337	EA	3/4" Terminal Adapter, Direct Burial, Glued Coupling	8.79	
16131-1338	EA	1" Terminal Adapter, Direct Burial, Glued Coupling	9.78	
16131-1339	EA	1-1/4" Terminal Adapter, Direct Burial, Glued Coupling	10.99	
16131-1340		PVC Thinwall Type A Rigid Concrete Encased Only <small>(16131-1284)</small>		
		Note: Glued couplings type EB underground duct 1-1/2" - 6".		
16131-1341	LF	1" PVC Schedule 40-A Conduit With Coupling, Direct Burial, Concrete Encased-Only	3.09	
16131-1342	EA	1" PVC Sweep, Direct Burial, Concrete Encased-Only	19.95	
16131-1343	EA	1" PVC Adapter, Direct Burial, Concrete Encased-Only	13.16	
16131-1344	LF	2" PVC Schedule 40-EB Conduit With Coupling, Direct Burial, Concrete Encased-Only	4.20	
16131-1345	EA	2" PVC Thinwall Sweep, Direct Burial, Concrete Encased-Only	36.33	
16131-1346	EA	2" PVC Adapter, Direct Burial, Concrete Encased-Only	17.21	
16131-1347	LF	3" PVC Schedule 40-EB Conduit With Coupling, Direct Burial, Concrete Encased-Only	6.88	
16131-1348	EA	3" PVC Thinwall Sweep, Direct Burial, Concrete Encased-Only	45.94	
16131-1349	EA	3" PVC Adapter, Direct Burial, Concrete Encased-Only	22.40	
16131-1350	LF	4" PVC Schedule 40-EB Conduit With Coupling, Direct Burial, Concrete Encased-Only	9.82	
16131-1351	EA	4" PVC Thinwall Sweep, Direct Burial, Concrete Encased-Only	63.01	
16131-1352	EA	4" PVC Adapter, Direct Burial, Concrete Encased-Only	31.62	
16131-1353		RGS PVC 20 Mil Coated Conduit <small>(16131-1284)</small>		
		Note: Direct burial.		
16131-1354	LF	1/2" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated	5.21	
	16MOD-0042	For 40 Mil PVC Exterior Coating, Add	0.54	
16131-1355	LF	3/4" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated	6.47	
	16MOD-0042	For 40 Mil PVC Exterior Coating, Add	0.63	
16131-1356	LF	1" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated	7.80	
	16MOD-0042	For 40 Mil PVC Exterior Coating, Add	0.81	
16131-1357	LF	1-1/4" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated	9.35	
	16MOD-0042	For 40 Mil PVC Exterior Coating, Add	1.04	
16131-1358	LF	1-1/2" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated	10.83	
	16MOD-0042	For 40 Mil PVC Exterior Coating, Add	1.25	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16131-1359	LF		2" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated13.41		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	1.63	
16131-1360	LF		3" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated24.35		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	3.12	
16131-1361	LF		4" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated34.76		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	4.50	
16131-1362	LF		5" RGS PVC Coated Conduit With Coupling, Direct Burial, 20 Mil Coated55.53		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	7.97	
16131-1363	EA		1/2" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated27.60		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	2.19	
16131-1364	EA		3/4" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated32.18		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	2.27	
16131-1365	EA		1" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated37.75		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	2.60	
16131-1366	EA		1-1/4" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated44.22		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	3.26	
16131-1367	EA		1-1/2" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated50.70		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	3.93	
16131-1368	EA		2" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated69.10		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	5.49	
16131-1369	EA		3" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated135.37		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	16.52	
16131-1370	EA		4" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated183.39		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	22.91	
16131-1371	EA		5" RGS PVC Coated Elbow, Direct Burial, 20 Mil Coated358.73		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	55.07	
16131-1372	EA		1/2" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated51.39		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	7.78	
16131-1373	EA		3/4" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated58.12		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	8.64	
16131-1374	EA		1" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated70.61		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	10.79	
16131-1375	EA		1-1/4" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated97.65		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	16.02	
16131-1376	EA		1-1/2" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated124.70		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	21.26	
16131-1377	EA		2" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated153.81		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	26.59	
16131-1378	EA		3" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated303.75		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	55.80	
16131-1379	EA		4" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated484.59		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	90.18	
16131-1380	EA		5" RGS PVC Coated Adapter Union, Direct Burial, 20 Mil Coated882.53		
			16MOD-0042 For 40 Mil PVC Exterior Coating, Add	168.17	

16131-1381 Type II Plastic Duct And Fittings (16131-1284)

16131-1382	LF		1-1/2" Plastic Duct With Coupling, Direct Burial In Plastic Duct Bank3.70		
16131-1383	EA		1-1/2" Plastic Duct Sweep, Direct Burial In Plastic Duct Bank29.48		
16131-1384	EA		1-1/2" Plastic Duct Adapter, Female, Direct Burial In Plastic Duct Bank15.44		
16131-1385	EA		1-1/2" Plastic Duct Adapter, Male, Direct Burial In Plastic Duct Bank18.06		
16131-1386	EA		1-1/2" Plastic Duct Bell End And Plug, Direct Burial In Plastic Duct Bank10.95		
16131-1387	LF		2" Plastic Duct With Couplings, Direct Burial In Plastic Duct Bank4.23		
16131-1388	EA		2" Plastic Duct Sweep, Direct Burial In Plastic Duct Bank37.95		
16131-1389	EA		2" Plastic Duct Adapter, Female, Direct Burial In Plastic Duct Bank17.83		
16131-1390	EA		2" Plastic Duct Adapter, Male, Direct Burial In Plastic Duct Bank20.94		
16131-1391	EA		2" Plastic Duct Bell End And Plug, Direct Burial In Plastic Duct Bank21.94		
16131-1392	LF		3" Plastic Duct With Couplings, Direct Burial In Plastic Duct Bank7.01		
16131-1393	EA		3" Plastic Duct Sweep, Direct Burial In Plastic Duct Bank49.66		
16131-1394	EA		3" Plastic Duct Adapter, Female, Direct Burial In Plastic Duct Bank24.82		
16131-1395	EA		3" Plastic Duct Adapter, Male, Direct Burial In Plastic Duct Bank28.18		
16131-1396	EA		3" Plastic Duct Bell End And Plug, Direct Burial In Plastic Duct Bank26.18		
16131-1397	LF		3-1/2" Plastic Duct With Couplings, Direct Burial In Plastic Duct Bank9.02		
16131-1398	EA		3-1/2" Plastic Duct Sweep, Direct Burial In Plastic Duct Bank55.91		
16131-1399	EA		3-1/2" Plastic Duct Adapter, Female, Direct Burial In Plastic Duct Bank26.61		
16131-1400	EA		3-1/2" Plastic Duct Adapter, Male, Direct Burial In Plastic Duct Bank30.63		
16131-1401	EA		3-1/2" Plastic Duct Bell End And Plug, Direct Burial In Plastic Duct Bank26.64		
16131-1402	LF		4" Plastic Duct With Couplings, Direct Burial In Plastic Duct Bank9.93		
16131-1403	EA		4" Plastic Duct Sweep, Direct Burial In Plastic Duct Bank60.95		
16131-1404	EA		4" Plastic Duct Adapter, Female, Direct Burial In Plastic Duct Bank28.85		
16131-1405	EA		4" Plastic Duct Adapter, Male, Direct Burial In Plastic Duct Bank33.67		
16131-1406	EA		4" Plastic Duct Bell End And Plug, Direct Burial In Plastic Duct Bank28.90		
16131-1407	LF		5" Plastic Duct With Couplings, Direct Burial In Plastic Duct Bank12.91		
16131-1408	EA		5" Plastic Duct Sweep, Direct Burial In Plastic Duct Bank79.01		
16131-1409	EA		5" Plastic Duct Adapter, Female, Direct Burial In Plastic Duct Bank40.53		
16131-1410	EA		5" Plastic Duct Adapter, Male, Direct Burial In Plastic Duct Bank45.37		
16131-1411	EA		5" Plastic Duct Bell End And Plug, Direct Burial In Plastic Duct Bank36.54		
16131-1412	LF		6" Plastic Duct With Couplings, Direct Burial In Plastic Duct Bank17.40		
16131-1413	EA		6" Plastic Duct Sweep, Direct Burial In Plastic Duct Bank119.12		
16131-1414	EA		6" Plastic Duct Adapter, Female, Direct Burial In Plastic Duct Bank48.58		
16131-1415	EA		6" Plastic Duct Adapter, Male, Direct Burial In Plastic Duct Bank54.26		
16131-1416	EA		6" Plastic Duct Bell End And Plug, Direct Burial In Plastic Duct Bank43.93		

16131-1417 Fiberglass Reinforced Epoxy (FRE) Conduit Direct Burial (16131-1284)
Note: Tunnel or encased application.

16000 Electrical**16100 Basic Materials And Methods****16131 Conduit**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1418		Fiberglass Reinforced Epoxy Conduit <small>(16131-1417)</small>		
16131-1419	LF	1/2" FRE Conduit.....	3.51	0.91
		16MOD-0043 For Work In Restricted Working Space, Add	0.52	
16131-1420	LF	3/4" FRE Conduit.....	3.87	0.91
		16MOD-0043 For Work In Restricted Working Space, Add	0.56	
16131-1421	LF	1" FRE Conduit.....	4.93	1.40
		16MOD-0043 For Work In Restricted Working Space, Add	0.84	
16131-1422	LF	1-1/4" FRE Conduit.....	5.67	1.70
		16MOD-0043 For Work In Restricted Working Space, Add	1.03	
16131-1423	LF	1-1/2" FRE Conduit.....	6.02	1.76
		16MOD-0043 For Work In Restricted Working Space, Add	1.08	
16131-1424	LF	2" FRE Conduit.....	6.40	1.95
		16MOD-0043 For Work In Restricted Working Space, Add	1.17	
16131-1425	LF	2-1/2" FRE Conduit.....	7.99	2.50
		16MOD-0043 For Work In Restricted Working Space, Add	1.50	
16131-1426	LF	3" FRE Conduit.....	10.11	3.23
		16MOD-0043 For Work In Restricted Working Space, Add	1.96	
16131-1427	LF	4" FRE Conduit.....	13.60	4.57
		16MOD-0043 For Work In Restricted Working Space, Add	2.74	
16131-1428	LF	5" FRE Conduit.....	17.30	5.85
		16MOD-0043 For Work In Restricted Working Space, Add	3.51	
16131-1429	LF	6" FRE Conduit.....	22.67	7.86
		16MOD-0043 For Work In Restricted Working Space, Add	4.70	
16131-1430		Fiberglass Reinforced Epoxy Elbows <small>(16131-1417)</small>		
16131-1431	EA	1/2" FRE Elbow.....	42.99	4.99
		16MOD-0043 For Work In Restricted Working Space, Add	2.97	
16131-1432	EA	3/4" FRE Elbow.....	49.41	6.21
		16MOD-0043 For Work In Restricted Working Space, Add	3.71	
16131-1433	EA	1" FRE Elbow.....	55.89	9.20
		16MOD-0043 For Work In Restricted Working Space, Add	5.54	
16131-1434	EA	1-1/4" FRE Elbow.....	60.86	11.57
		16MOD-0043 For Work In Restricted Working Space, Add	6.92	
16131-1435	EA	1-1/2" FRE Elbow.....	63.19	12.49
		16MOD-0043 For Work In Restricted Working Space, Add	7.51	
16131-1436	EA	2" FRE Elbow.....	74.19	15.41
		16MOD-0043 For Work In Restricted Working Space, Add	9.23	
16131-1437	EA	2-1/2" FRE Elbow.....	86.95	17.49
		16MOD-0043 For Work In Restricted Working Space, Add	10.49	
16131-1438	EA	3" FRE Elbow.....	101.59	19.61
		16MOD-0043 For Work In Restricted Working Space, Add	11.77	
16131-1439	EA	4" FRE Elbow.....	130.24	26.13
		16MOD-0043 For Work In Restricted Working Space, Add	15.68	
16131-1440	EA	5" FRE Elbow.....	160.19	31.37
		16MOD-0043 For Work In Restricted Working Space, Add	18.82	
16131-1441	EA	6" FRE Elbow.....	214.12	46.11
		16MOD-0043 For Work In Restricted Working Space, Add	27.69	
16131-1442		Fiberglass Reinforced Epoxy Tees <small>(16131-1417)</small>		
16131-1443	EA	1/2" FRE Tee.....	39.37	7.30
		16MOD-0043 For Work In Restricted Working Space, Add	4.39	
16131-1444	EA	3/4" FRE Tee.....	47.80	9.14
		16MOD-0043 For Work In Restricted Working Space, Add	5.48	
16131-1445	EA	1" FRE Tee.....	72.41	13.71
		16MOD-0043 For Work In Restricted Working Space, Add	8.23	
16131-1446	EA	1-1/4" FRE Tee.....	90.31	17.36
		16MOD-0043 For Work In Restricted Working Space, Add	10.42	
16131-1447	EA	1-1/2" FRE Tee.....	109.25	18.88
		16MOD-0043 For Work In Restricted Working Space, Add	11.33	
16131-1448	EA	2" FRE Tee.....	152.81	23.45
		16MOD-0043 For Work In Restricted Working Space, Add	14.08	
16131-1449	EA	2-1/2" FRE Tee.....	250.93	26.19
		16MOD-0043 For Work In Restricted Working Space, Add	15.72	
16131-1450	EA	3" FRE Tee.....	323.21	29.24
		16MOD-0043 For Work In Restricted Working Space, Add	17.55	
16131-1451	EA	4" FRE Tee.....	450.34	36.54
		16MOD-0043 For Work In Restricted Working Space, Add	21.93	
16131-1452	EA	5" FRE Tee.....	541.42	45.68
		16MOD-0043 For Work In Restricted Working Space, Add	27.42	
16131-1453	EA	6" FRE Tee.....	646.67	68.53
		16MOD-0043 For Work In Restricted Working Space, Add	41.12	
16131-1454		Fiberglass Reinforced Epoxy Double Bell Couplings <small>(16131-1417)</small>		
16131-1455	EA	1/2" FRE Double Bell Coupling.....	23.60	4.99
		16MOD-0043 For Work In Restricted Working Space, Add	2.97	
16131-1456	EA	3/4" FRE Double Bell Coupling.....	27.63	6.21
		16MOD-0043 For Work In Restricted Working Space, Add	3.71	
16131-1457	EA	1" FRE Double Bell Coupling.....	33.89	9.20
		16MOD-0043 For Work In Restricted Working Space, Add	5.54	
16131-1458	EA	1-1/4" FRE Double Bell Coupling.....	38.62	11.57
		16MOD-0043 For Work In Restricted Working Space, Add	6.92	
16131-1459	EA	1-1/2" FRE Double Bell Coupling.....	40.90	12.49
		16MOD-0043 For Work In Restricted Working Space, Add	7.51	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1460	EA	2" FRE Double Bell Coupling	49.65	15.41
	16MOD-0043	For Work In Restricted Working Space, Add	9.23	
16131-1461	EA	2-1/2" FRE Double Bell Coupling	57.71	17.49
	16MOD-0043	For Work In Restricted Working Space, Add	10.49	
16131-1462	EA	3" FRE Double Bell Coupling	66.51	19.61
	16MOD-0043	For Work In Restricted Working Space, Add	11.77	
16131-1463	EA	4" FRE Double Bell Coupling	86.38	26.13
	16MOD-0043	For Work In Restricted Working Space, Add	15.68	
16131-1464	EA	5" FRE Double Bell Coupling	105.36	31.37
	16MOD-0043	For Work In Restricted Working Space, Add	18.82	
16131-1465	EA	6" FRE Double Bell Coupling	145.58	46.11
	16MOD-0043	For Work In Restricted Working Space, Add	27.69	
16131-1466		Fiberglass Reinforced Epoxy Sleeve Couplings (16131-1417)		
16131-1467	EA	1/2" FRE Sleeve Coupling	19.51	4.99
	16MOD-0043	For Work In Restricted Working Space, Add	2.97	
16131-1468	EA	3/4" FRE Sleeve Coupling	23.04	6.21
	16MOD-0043	For Work In Restricted Working Space, Add	3.71	
16131-1469	EA	1" FRE Sleeve Coupling	29.27	9.20
	16MOD-0043	For Work In Restricted Working Space, Add	5.54	
16131-1470	EA	1-1/4" FRE Sleeve Coupling	33.92	11.57
	16MOD-0043	For Work In Restricted Working Space, Add	6.92	
16131-1471	EA	1-1/2" FRE Sleeve Coupling	36.13	12.49
	16MOD-0043	For Work In Restricted Working Space, Add	7.51	
16131-1472	EA	2" FRE Sleeve Coupling	43.98	15.41
	16MOD-0043	For Work In Restricted Working Space, Add	9.23	
16131-1473	EA	2-1/2" FRE Sleeve Coupling	50.84	17.49
	16MOD-0043	For Work In Restricted Working Space, Add	10.49	
16131-1474	EA	3" FRE Sleeve Coupling	58.25	19.61
	16MOD-0043	For Work In Restricted Working Space, Add	11.76	
16131-1475	EA	4" FRE Sleeve Coupling	76.07	26.13
	16MOD-0043	For Work In Restricted Working Space, Add	15.68	
16131-1476	EA	5" FRE Sleeve Coupling	92.46	31.37
	16MOD-0043	For Work In Restricted Working Space, Add	18.82	
16131-1477	EA	6" FRE Sleeve Coupling	129.48	46.11
	16MOD-0043	For Work In Restricted Working Space, Add	27.69	
16131-1478		Fiberglass Reinforced Epoxy Expansion Joints (16131-1417)		
16131-1479	EA	1/2" FRE Expansion Joint	20.49	4.99
	16MOD-0043	For Work In Restricted Working Space, Add	2.97	
16131-1480	EA	3/4" FRE Expansion Joint	24.11	6.21
	16MOD-0043	For Work In Restricted Working Space, Add	3.71	
16131-1481	EA	1" FRE Expansion Joint	30.35	9.20
	16MOD-0043	For Work In Restricted Working Space, Add	5.54	
16131-1482	EA	1-1/4" FRE Expansion Joint	35.02	11.57
	16MOD-0043	For Work In Restricted Working Space, Add	6.92	
16131-1483	EA	1-1/2" FRE Expansion Joint	37.26	12.49
	16MOD-0043	For Work In Restricted Working Space, Add	7.51	
16131-1484	EA	2" FRE Expansion Joint	45.30	15.41
	16MOD-0043	For Work In Restricted Working Space, Add	9.23	
16131-1485	EA	2-1/2" FRE Expansion Joint	52.42	17.49
	16MOD-0043	For Work In Restricted Working Space, Add	10.49	
16131-1486	EA	3" FRE Expansion Joint	60.18	19.61
	16MOD-0043	For Work In Restricted Working Space, Add	11.77	
16131-1487	EA	4" FRE Expansion Joint	78.48	26.13
	16MOD-0043	For Work In Restricted Working Space, Add	15.68	
16131-1488	EA	5" FRE Expansion Joint	95.48	31.37
	16MOD-0043	For Work In Restricted Working Space, Add	18.82	
16131-1489	EA	6" FRE Expansion Joint	133.18	46.11
	16MOD-0043	For Work In Restricted Working Space, Add	27.68	
16131-1490		Fiberglass Reinforced Epoxy O-Ring Expansion Joints (16131-1417)		
16131-1491	EA	1/2" FRE O-Ring Expansion Joint	24.79	4.99
	16MOD-0043	For Work In Restricted Working Space, Add	2.97	
16131-1492	EA	3/4" FRE O-Ring Expansion Joint	28.93	6.21
	16MOD-0043	For Work In Restricted Working Space, Add	3.71	
16131-1493	EA	1" FRE O-Ring Expansion Joint	35.19	9.20
	16MOD-0043	For Work In Restricted Working Space, Add	5.54	
16131-1494	EA	1-1/4" FRE O-Ring Expansion Joint	39.91	11.57
	16MOD-0043	For Work In Restricted Working Space, Add	6.92	
16131-1495	EA	1-1/2" FRE O-Ring Expansion Joint	42.19	12.49
	16MOD-0043	For Work In Restricted Working Space, Add	7.51	
16131-1496	EA	2" FRE O-Ring Expansion Joint	50.95	15.41
	16MOD-0043	For Work In Restricted Working Space, Add	9.23	
16131-1497	EA	2-1/2" FRE O-Ring Expansion Joint	59.20	17.49
	16MOD-0043	For Work In Restricted Working Space, Add	10.49	
16131-1498	EA	3" FRE O-Ring Expansion Joint	68.30	19.61
	16MOD-0043	For Work In Restricted Working Space, Add	11.77	
16131-1499	EA	4" FRE O-Ring Expansion Joint	88.63	26.13
	16MOD-0043	For Work In Restricted Working Space, Add	15.68	
16131-1500	EA	5" FRE O-Ring Expansion Joint	108.21	31.37
	16MOD-0043	For Work In Restricted Working Space, Add	18.82	
16131-1501	EA	6" FRE O-Ring Expansion Joint	149.15	46.11
	16MOD-0043	For Work In Restricted Working Space, Add	27.69	

16000 Electrical**16100 Basic Materials And Methods****16131 Conduit**

MINOR

CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

MINOR	CSI UOM DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1502	Fiberglass Reinforced Epoxy Adapters (16131-1417)		
16131-1503	EA 1/2" FRE Adapter 44.41	44.41	4.51
	16MOD-0043 For Work In Restricted Working Space, Add 2.70	2.70	
16131-1504	EA 3/4" FRE Adapter 50.44	50.44	5.54
	16MOD-0043 For Work In Restricted Working Space, Add 3.33	3.33	
16131-1505	EA 1" FRE Adapter 52.90	52.90	6.21
	16MOD-0043 For Work In Restricted Working Space, Add 3.71	3.71	
16131-1506	EA 1-1/4" FRE Adapter 55.58	55.58	6.88
	16MOD-0043 For Work In Restricted Working Space, Add 4.13	4.13	
16131-1507	EA 1-1/2" FRE Adapter 57.12	57.12	7.30
	16MOD-0043 For Work In Restricted Working Space, Add 4.40	4.40	
16131-1508	EA 2" FRE Adapter 62.02	62.02	7.80
	16MOD-0043 For Work In Restricted Working Space, Add 4.66	4.66	
16131-1509	EA 2-1/2" FRE Adapter 73.14	73.14	8.65
	16MOD-0043 For Work In Restricted Working Space, Add 5.20	5.20	
16131-1510	EA 3" FRE Adapter 85.39	85.39	9.20
	16MOD-0043 For Work In Restricted Working Space, Add 5.54	5.54	
16131-1511	EA 4" FRE Adapter 108.55	108.55	12.43
	16MOD-0043 For Work In Restricted Working Space, Add 7.47	7.47	
16131-1512	EA 5" FRE Adapter 135.36	135.36	15.41
	16MOD-0043 For Work In Restricted Working Space, Add 9.23	9.23	
16131-1513	EA 6" FRE Adapter 167.30	167.30	18.64
	16MOD-0043 For Work In Restricted Working Space, Add 11.21	11.21	
16131-1514	Fiberglass Reinforced Epoxy Expansion/Deflection Joints (16131-1417)		
16131-1515	EA 1/2" FRE Expansion/Deflection Joint 26.87	26.87	2.25
	16MOD-0043 For Work In Restricted Working Space, Add 1.35	1.35	
16131-1516	EA 3/4" FRE Expansion/Deflection Joint 30.04	30.04	2.62
	16MOD-0043 For Work In Restricted Working Space, Add 1.55	1.55	
16131-1517	EA 1" FRE Expansion/Deflection Joint 36.89	36.89	3.11
	16MOD-0043 For Work In Restricted Working Space, Add 1.85	1.85	
16131-1518	EA 1-1/4" FRE Expansion/Deflection Joint 48.23	48.23	3.41
	16MOD-0043 For Work In Restricted Working Space, Add 2.05	2.05	
16131-1519	EA 1-1/2" FRE Expansion/Deflection Joint 64.36	64.36	3.78
	16MOD-0043 For Work In Restricted Working Space, Add 2.28	2.28	
16131-1520	EA 2" FRE Expansion/Deflection Joint 92.78	92.78	4.33
	16MOD-0043 For Work In Restricted Working Space, Add 2.60	2.60	
16131-1521	EA 2-1/2" FRE Expansion/Deflection Joint 141.99	141.99	4.81
	16MOD-0043 For Work In Restricted Working Space, Add 2.89	2.89	
16131-1522	EA 3" FRE Expansion/Deflection Joint 175.24	175.24	5.54
	16MOD-0043 For Work In Restricted Working Space, Add 3.33	3.33	
16131-1523	EA 4" FRE Expansion/Deflection Joint 251.93	251.93	6.21
	16MOD-0043 For Work In Restricted Working Space, Add 3.71	3.71	
16131-1524	EA 5" FRE Expansion/Deflection Joint 298.21	298.21	6.82
	16MOD-0043 For Work In Restricted Working Space, Add 4.09	4.09	
16131-1525	EA 6" FRE Expansion/Deflection Joint 497.92	497.92	7.38
	16MOD-0043 For Work In Restricted Working Space, Add 4.44	4.44	
16131-1526	Fiberglass Reinforced Epoxy Radius End Bells (16131-1417)		
16131-1527	EA 1/2" FRE Radius End Bell 16.73	16.73	4.51
	16MOD-0043 For Work In Restricted Working Space, Add 2.70	2.70	
16131-1528	EA 3/4" FRE Radius End Bell 19.70	19.70	5.54
	16MOD-0043 For Work In Restricted Working Space, Add 3.33	3.33	
16131-1529	EA 1" FRE Radius End Bell 21.04	21.04	6.21
	16MOD-0043 For Work In Restricted Working Space, Add 3.71	3.71	
16131-1530	EA 1-1/4" FRE Radius End Bell 22.54	22.54	6.88
	16MOD-0043 For Work In Restricted Working Space, Add 4.13	4.13	
16131-1531	EA 1-1/2" FRE Radius End Bell 23.53	23.53	7.30
	16MOD-0043 For Work In Restricted Working Space, Add 4.40	4.40	
16131-1532	EA 2" FRE Radius End Bell 24.44	24.44	7.80
	16MOD-0043 For Work In Restricted Working Space, Add 4.66	4.66	
16131-1533	EA 2-1/2" FRE Radius End Bell 28.02	28.02	8.65
	16MOD-0043 For Work In Restricted Working Space, Add 5.20	5.20	
16131-1534	EA 3" FRE Radius End Bell 31.31	31.31	9.20
	16MOD-0043 For Work In Restricted Working Space, Add 5.54	5.54	
16131-1535	EA 4" FRE Radius End Bell 40.94	40.94	12.43
	16MOD-0043 For Work In Restricted Working Space, Add 7.47	7.47	
16131-1536	EA 5" FRE Radius End Bell 50.83	50.83	15.41
	16MOD-0043 For Work In Restricted Working Space, Add 9.23	9.23	
16131-1537	EA 6" FRE Radius End Bell 62.43	62.43	18.64
	16MOD-0043 For Work In Restricted Working Space, Add 11.21	11.21	
16131-1538	Fiberglass Reinforced Epoxy LB, LR Or LL Fittings (16131-1417)		
16131-1539	EA 1/2" FRE LB, LR Or LL Fitting 29.55	29.55	4.87
	16MOD-0043 For Work In Restricted Working Space, Add 2.93	2.93	
16131-1540	EA 3/4" FRE LB, LR Or LL Fitting 35.79	35.79	6.09
	16MOD-0043 For Work In Restricted Working Space, Add 3.65	3.65	
16131-1541	EA 1" FRE LB, LR Or LL Fitting 54.28	54.28	9.14
	16MOD-0043 For Work In Restricted Working Space, Add 5.48	5.48	
16131-1542	EA 1-1/4" FRE LB, LR Or LL Fitting 67.62	67.62	11.57
	16MOD-0043 For Work In Restricted Working Space, Add 6.95	6.95	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16131-1543	EA		1-1/2" FRE LB, LR Or LL Fitting	82.16	12.49
			16MOD-0043 For Work In Restricted Working Space, Add	7.49	
16131-1544	EA		2" FRE LB, LR Or LL Fitting	115.78	15.53
			16MOD-0043 For Work In Restricted Working Space, Add	9.32	
16131-1545	EA		2-1/2" FRE LB, LR Or LL Fitting	193.55	17.36
			16MOD-0043 For Work In Restricted Working Space, Add	10.42	
16131-1546	EA		3" FRE LB, LR Or LL Fitting	250.77	19.49
			16MOD-0043 For Work In Restricted Working Space, Add	11.70	
16131-1547	EA		4" FRE LB, LR Or LL Fitting	354.17	26.19
			16MOD-0043 For Work In Restricted Working Space, Add	15.72	
16131-1548	EA		5" FRE LB, LR Or LL Fitting	422.77	31.37
			16MOD-0043 For Work In Restricted Working Space, Add	18.83	
16131-1549	EA		6" FRE LB, LR Or LL Fitting	502.92	46.29
			16MOD-0043 For Work In Restricted Working Space, Add	27.78	

16131-1550

Spacers (16131-1284)

Note: For concrete encasement applications. See CSI section 16131-1284 for conduit.

16131-1551	EA		1" Base Spacers, Average 4" Wide, Direct Burial	5.99	
16131-1552	EA		1" Intermediate Spacers, Average 4" Wide, Direct Burial	6.87	
16131-1553	EA		1-1/4" Base Spacer, Average 4" Wide, Direct Burial	7.61	
16131-1554	EA		1-1/4" Intermediate Spacers, Average 4" Wide, Direct Burial	8.20	
16131-1555	EA		1-1/2" Base Spacer, Average 4" Wide, Direct Burial	7.67	
16131-1556	EA		1-1/2" Intermediate Spacers, Average 4" Wide, Direct Burial	8.24	
16131-1557	EA		2" Base Spacer, Average 4" Wide, Direct Burial	9.54	
16131-1558	EA		2" Intermediate Spacers, Average 4" Wide, Direct Burial	8.86	
16131-1559	EA		2-1/2" Base Spacer, Average 4" Wide, Direct Burial	10.54	
16131-1560	EA		2-1/2" Intermediate Spacers, Average 4" Wide, Direct Burial	10.19	
16131-1561	EA		3" Base Spacer, Average 4" Wide, Direct Burial	12.07	
16131-1562	EA		3" Intermediate Spacers, Average 4" Wide, Direct Burial	11.53	
16131-1563	EA		3-1/2" Base Spacer, Average 4" Wide, Direct Burial	13.07	
16131-1564	EA		3-1/2" Intermediate Spacers, Average 4" Wide, Direct Burial	12.50	
16131-1565	EA		4" Base Spacer, Average 4" Wide, Direct Burial	13.48	
16131-1566	EA		4" Intermediate Spacers, Average 4" Wide, Direct Burial	12.85	
16131-1567	EA		5" Base Spacer, Average 4" Wide, Direct Burial	14.90	
16131-1568	EA		5" Intermediate Spacers, Average 4" Wide, Direct Burial	14.17	
16131-1569	EA		6" Base Spacer, Average 4" Wide, Direct Burial	16.77	
16131-1570	EA		6" Intermediate Spacers, Average 4" Wide, Direct Burial	16.16	

16131-1571

Conduit Bending (16131)

16131-1572

Field Bend Metallic Conduit (16131-1571)

Note: For EMT, RGS, IMC and aluminum conduits.

16131-1573	EA		1-1/4" Metallic Conduits Field Bending	10.83	
16131-1574	EA		1-1/2" Metallic Conduits Field Bending	14.43	
16131-1575	EA		2" Metallic Conduits Field Bending	18.04	
16131-1576	EA		2-1/2" Metallic Conduits Field Bending	25.25	
16131-1577	EA		3" Metallic Conduits Field Bending	32.47	
16131-1578	EA		3-1/2" Metallic Conduits Field Bending	39.68	
16131-1579	EA		4" Metallic Conduits Field Bending	46.90	
16131-1580	EA		5" Metallic Conduits Field Bending	57.72	
16131-1581	EA		6" Metallic Conduits Field Bending	68.54	

16131-1582

Field Bend Plastic Conduit (16131-1571)

Note: For PVC conduits.

16131-1583	EA		1/2" Plastic Conduits Field Bending	10.83	
16131-1584	EA		3/4" Plastic Conduits Field Bending	14.43	
16131-1585	EA		1" Plastic Conduits Field Bending	16.60	
16131-1586	EA		1-1/4" Plastic Conduits Field Bending	18.04	
16131-1587	EA		1-1/2" Plastic Conduits Field Bending	21.64	
16131-1588	EA		2" Plastic Conduits Field Bending	28.86	
16131-1589	EA		2-1/2" Plastic Conduits Field Bending	36.08	
16131-1590	EA		3" Plastic Conduits Field Bending	43.29	
16131-1591	EA		3-1/2" Plastic Conduits Field Bending	50.51	
16131-1592	EA		4" Plastic Conduits Field Bending	57.72	
16131-1593	EA		5" Plastic Conduits Field Bending	64.94	
16131-1594	EA		6" Plastic Conduits Field Bending	72.15	

16131-1595

Duct Bank (16131)

Note: Installation of single or multiple configuration underground utility raceways to have 3" concrete leveling base and encased in concrete envelope. Based on 100' run, minimum 30" bury depth. Labor units include material handling, unloading at job site, layout of job, measuring, cutting and fabrication, installation in trench using the appropriate supports, cleaning to remove any obstructions and installation of nylon pull string. Excludes trenching, concrete, backfilling, grading and seeding. Duct Banks are to be installed according to the appropriate sections of the accompanying specifications. Individual rows to be stacked for larger duct bank configurations.

16131-1596

Rigid Galvanized Steel Conduit (GRC Or RGS) Duct Bank (16131-1595)

Note: Includes appropriate spacers and fittings.

16131-1597	LF		2 At 2", Rigid Galvanized Conduit Duct Bank	17.27	
16131-1598	LF		4 At 2", Rigid Galvanized Conduit Duct Bank	34.55	
16131-1599	LF		2 At 3", Rigid Galvanized Conduit Duct Bank	35.44	
16131-1600	LF		4 At 3", Rigid Galvanized Conduit Duct Bank	71.08	
16131-1601	LF		2 At 4", Rigid Galvanized Conduit Duct Bank	52.14	
16131-1602	LF		4 At 4", Rigid Galvanized Conduit Duct Bank	104.89	

16000 Electrical**16100 Basic Materials And Methods****16131 Conduit**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1603	LF	6 At 4", Rigid Galvanized Conduit Duct Bank.....	157.77	
16131-1604	LF	2 At 5", Rigid Galvanized Conduit Duct Bank.....	96.91	
16131-1605	LF	4 At 5", Rigid Galvanized Conduit Duct Bank.....	193.23	
16131-1606	LF	6 At 5", Rigid Galvanized Conduit Duct Bank.....	297.80	
16131-1607	LF	2 At 6", Rigid Galvanized Conduit Duct Bank.....	137.83	
16131-1608	LF	4 At 6", Rigid Galvanized Conduit Duct Bank.....	276.64	
16131-1609	LF	6 At 6", Rigid Galvanized Conduit Duct Bank.....	411.35	
16131-1610		PVC, Type EB Duct Bank System (16131-1595)		
		Note: Includes appropriate spacers and fittings.		
16131-1611	LF	1 At 2", PVC, Type EB Duct Bank.....	4.12	
16131-1612	LF	2 At 2", PVC, Type EB Duct Bank.....	9.07	
16131-1613	LF	4 At 2", PVC, Type EB Duct Bank.....	17.39	
16131-1614	LF	1 At 3", PVC, Type EB Duct Bank.....	5.46	
16131-1615	LF	2 At 3", PVC, Type EB Duct Bank.....	10.87	
16131-1616	LF	4 At 3", PVC, Type EB Duct Bank.....	22.10	
16131-1617	LF	1 At 4", PVC, Type EB Duct Bank.....	7.24	
16131-1618	LF	2 At 4", PVC, Type EB Duct Bank.....	14.49	
16131-1619	LF	4 At 4", PVC, Type EB Duct Bank.....	29.01	
16131-1620	LF	6 At 4", PVC, Type EB Duct Bank.....	43.50	
16131-1621	LF	1 At 5", PVC, Type EB Duct Bank.....	9.09	
16131-1622	LF	2 At 5", PVC, Type EB Duct Bank.....	18.17	
16131-1623	LF	4 At 5", PVC, Type EB Duct Bank.....	35.13	
16131-1624	LF	6 At 5", PVC, Type EB Duct Bank.....	49.70	
16131-1625	LF	1 At 6", PVC, Type EB Duct Bank.....	16.29	
16131-1626	LF	2 At 6", PVC, Type EB Duct Bank.....	24.55	
16131-1627	LF	4 At 6", PVC, Type EB Duct Bank.....	49.23	
16131-1628	LF	6 At 6", PVC, Type EB Duct Bank.....	79.82	
16131-1629		PVC, Type DB Duct Bank System (16131-1595)		
		Note: Includes appropriate spacers and fittings.		
16131-1630	LF	1 At 2", PVC, Type DB Duct Bank.....	4.57	
16131-1631	LF	2 At 2", PVC, Type DB Duct Bank.....	10.02	
16131-1632	LF	4 At 2", PVC, Type DB Duct Bank.....	19.16	
16131-1633	LF	1 At 3", PVC, Type DB Duct Bank.....	5.64	
16131-1634	LF	2 At 3", PVC, Type DB Duct Bank.....	11.27	
16131-1635	LF	4 At 3", PVC, Type DB Duct Bank.....	22.47	
16131-1636	LF	1 At 4", PVC, Type DB Duct Bank.....	7.39	
16131-1637	LF	2 At 4", PVC, Type DB Duct Bank.....	14.79	
16131-1638	LF	4 At 4", PVC, Type DB Duct Bank.....	29.62	
16131-1639	LF	6 At 4", PVC, Type DB Duct Bank.....	44.40	
16131-1640	LF	1 At 5", PVC, Type DB Duct Bank.....	9.32	
16131-1641	LF	2 At 5", PVC, Type DB Duct Bank.....	18.62	
16131-1642	LF	4 At 5", PVC, Type DB Duct Bank.....	36.04	
16131-1643	LF	6 At 5", PVC, Type DB Duct Bank.....	51.06	
16131-1644	LF	1 At 6", PVC, Type DB Duct Bank.....	16.60	
16131-1645	LF	2 At 6", PVC, Type DB Duct Bank.....	25.20	
16131-1646	LF	4 At 6", PVC, Type DB Duct Bank.....	50.53	
16131-1647	LF	6 At 6", PVC, Type DB Duct Bank.....	81.78	
16131-1648		Male Or Female Adapters (16131-1595)		
16131-1649	EA	2" Adapter.....	22.59	
16131-1650	EA	3" Adapter.....	32.65	
16131-1651	EA	4" Adapter.....	42.22	
16131-1652	EA	5" Adapter.....	64.90	
16131-1653	EA	6" Adapter.....	80.20	
16131-1654		Explosion Proof Conduit Fittings (16131)		
		Note: For use with RGS, EMT and IMC conduit.		
16131-1655		Explosion Proof Malleable Iron Unions And Couplings (16131-1654)		
16131-1656		Explosion Proof Malleable Iron Unions (16131-1655)		
16131-1657	EA	1/2" Explosion Proof Malleable Iron Union.....	28.01	4.97
16131-1658	EA	3/4" Explosion Proof Malleable Iron Union.....	35.12	5.50
16131-1659	EA	1" Explosion Proof Malleable Iron Union.....	57.04	7.34
16131-1660	EA	1-1/4" Explosion Proof Malleable Iron Union.....	78.58	8.12
16131-1661	EA	1-1/2" Explosion Proof Malleable Iron Union.....	99.64	9.96
16131-1662	EA	2" Explosion Proof Malleable Iron Union.....	124.89	11.53
16131-1663	EA	2-1/2" Explosion Proof Malleable Iron Union.....	176.76	16.47
16131-1664	EA	3" Explosion Proof Malleable Iron Union.....	248.33	19.61
16131-1665	EA	3-1/2" Explosion Proof Malleable Iron Union.....	388.11	23.53
16131-1666	EA	4" Explosion Proof Malleable Iron Union.....	424.60	30.07
16131-1667		Explosion Proof Malleable Iron Couplings-Hub Boxes (16131-1655)		
16131-1668	EA	2 Hub Explosion Proof Malleable Iron Box For 1/2" Conduit.....	56.00	15.72
16131-1669	EA	2 Hub Explosion Proof Malleable Iron Box For 3/4" Conduit.....	67.63	17.82
16131-1670	EA	3 Hub Explosion Proof Malleable Iron Box For 1/2" Conduit.....	73.56	19.65
16131-1671	EA	3 Hub Explosion Proof Malleable Iron Box For 3/4" Conduit.....	87.71	23.58
16131-1672	EA	1/2" X 12" Explosion Proof Flexible Coupling.....	293.46	6.03
16131-1673	EA	3/4" X 15" Explosion Proof Flexible Coupling.....	410.82	6.81



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1674	EA		2 Hub Explosion Proof Malleable Iron Box For 1" Conduit	74.77	19.65
16131-1675	EA		3 Hub Explosion Proof Malleable Iron Box For 1" Conduit	98.61	26.98
16131-1676			Explosion Proof Malleable Iron Horizontal/Vertical Seal Offs <small>(16131-1655)</small>		
16131-1677	EA		1/2" Explosion Proof Malleable Iron Seal Off	56.08	13.09
16131-1678	EA		3/4" Explosion Proof Malleable Iron Seal Off	64.05	14.67
16131-1679	EA		1" Explosion Proof Malleable Iron Seal Off	75.31	15.98
16131-1680	EA		1-1/4" Explosion Proof Malleable Iron Seal Off	91.81	19.65
16131-1681	EA		1-1/2" Explosion Proof Malleable Iron Seal Off	122.34	23.05
16131-1682	EA		2" Explosion Proof Malleable Iron Seal Off	149.55	26.20
16131-1683	EA		2-1/2" Explosion Proof Malleable Iron Seal Off	227.28	39.21
16131-1684	EA		3" Explosion Proof Malleable Iron Seal Off	282.13	49.15
16131-1685	EA		3-1/2" Explosion Proof Malleable Iron Seal Off	600.68	54.11
16131-1686	EA		4" Explosion Proof Malleable Iron Seal Off	812.34	58.83
16131-1687			Flexible Conduit <small>(16131)</small>		
16131-1688			Liquid Tight Flexible Conduit And Connectors <small>(16131-1687)</small>		
			Note: Steel inner core with PVC cover.		
16131-1689			Liquid Tight Flexible Conduit <small>(16131-1688)</small>		
16131-1690	LF		3/8" Liquid Tight Flex Conduit	2.25	0.71
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.27	
	16MOD-0050		For Work In Restricted Working Space, Add	0.54	
16131-1691	LF		1/2" Liquid Tight Flex Conduit	2.32	0.71
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.27	
	16MOD-0050		For Work In Restricted Working Space, Add	0.54	
16131-1692	LF		3/4" Liquid Tight Flex Conduit	3.09	0.95
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.36	
	16MOD-0050		For Work In Restricted Working Space, Add	0.72	
16131-1693	LF		1" Liquid Tight Flex Conduit	3.45	0.95
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.36	
	16MOD-0050		For Work In Restricted Working Space, Add	0.72	
16131-1694	LF		1-1/4" Liquid Tight Flex Conduit	4.43	1.19
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.45	
	16MOD-0050		For Work In Restricted Working Space, Add	0.90	
16131-1695	LF		1-1/2" Liquid Tight Flex Conduit	5.61	1.43
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.54	
	16MOD-0050		For Work In Restricted Working Space, Add	1.07	
16131-1696	LF		2" Liquid Tight Flex Conduit	7.40	1.92
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.72	
	16MOD-0050		For Work In Restricted Working Space, Add	1.43	
16131-1697	LF		2-1/2" Liquid Tight Flex Conduit	9.71	2.15
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.81	
	16MOD-0050		For Work In Restricted Working Space, Add	1.61	
16131-1698	LF		3" Liquid Tight Flex Conduit	13.85	2.63
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	0.99	
	16MOD-0050		For Work In Restricted Working Space, Add	1.97	
16131-1699	LF		4" Liquid Tight Flex Conduit	18.76	3.35
	16MOD-0044		For Installation In Concrete (Excludes Concrete), Add	1.26	
	16MOD-0050		For Work In Restricted Working Space, Add	2.51	
16131-1700			Straight Connector <small>(16131-1688)</small>		
16131-1701	EA		3/8" Straight Liquid Tight Connector	6.06	1.92
	16MOD-0050		For Work In Restricted Working Space, Add	1.43	
16131-1702	EA		1/2" Straight Liquid Tight Connector	6.06	1.92
	16MOD-0050		For Work In Restricted Working Space, Add	1.43	
16131-1703	EA		3/4" Straight Liquid Tight Connector	7.22	2.15
	16MOD-0050		For Work In Restricted Working Space, Add	1.61	
16131-1704	EA		1" Straight Liquid Tight Connector	9.26	2.39
	16MOD-0050		For Work In Restricted Working Space, Add	1.79	
16131-1705	EA		1-1/4" Straight Liquid Tight Connector	11.53	2.63
	16MOD-0050		For Work In Restricted Working Space, Add	1.97	
16131-1706	EA		1-1/2" Straight Liquid Tight Connector	14.25	2.87
	16MOD-0050		For Work In Restricted Working Space, Add	2.15	
16131-1707	EA		2" Straight Liquid Tight Connector	19.16	3.35
	16MOD-0050		For Work In Restricted Working Space, Add	2.51	
16131-1708	EA		2-1/2" Straight Liquid Tight Connector	59.73	4.30
	16MOD-0050		For Work In Restricted Working Space, Add	3.23	
16131-1709	EA		3" Straight Liquid Tight Connector	76.22	4.54
	16MOD-0050		For Work In Restricted Working Space, Add	3.41	
16131-1710	EA		4" Straight Liquid Tight Connector	94.19	6.69
	16MOD-0050		For Work In Restricted Working Space, Add	5.02	
16131-1711			90 Degree Angle Connector <small>(16131-1688)</small>		
16131-1712	EA		3/8" 90 Degree Angle Liquid Tight Connector	8.71	2.63
	16MOD-0050		For Work In Restricted Working Space, Add	1.97	
16131-1713	EA		1/2" 90 Degree Angle Liquid Tight Connector	8.99	2.63
	16MOD-0050		For Work In Restricted Working Space, Add	1.97	
16131-1714	EA		3/4" 90 Degree Angle Liquid Tight Connector	10.08	2.87
	16MOD-0050		For Work In Restricted Working Space, Add	2.15	
16131-1715	EA		1" 90 Degree Angle Liquid Tight Connector	13.66	3.35
	16MOD-0050		For Work In Restricted Working Space, Add	2.51	

16000 Electrical**16100 Basic Materials And Methods****16131 Conduit**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1716	EA	1-1/4" 90 Degree Angle Liquid Tight Connector	16.70	3.58
	16MOD-0050	For Work In Restricted Working Space, Add	2.69	
16131-1717	EA	1-1/2" 90 Degree Angle Liquid Tight Connector	19.84	3.82
	16MOD-0050	For Work In Restricted Working Space, Add	2.87	
16131-1718	EA	2" 90 Degree Angle Liquid Tight Connector	25.65	4.30
	16MOD-0050	For Work In Restricted Working Space, Add	3.23	
16131-1719	EA	2-1/2" 90 Degree Angle Liquid Tight Connector	82.28	4.54
	16MOD-0050	For Work In Restricted Working Space, Add	3.41	
16131-1720	EA	3" 90 Degree Angle Liquid Tight Connector	97.12	5.26
	16MOD-0050	For Work In Restricted Working Space, Add	3.94	
16131-1721	EA	4" 90 Degree Angle Liquid Tight Connector	135.24	8.37
	16MOD-0050	For Work In Restricted Working Space, Add	6.28	
16131-1722		45 Degree Angle Connector <small>(16131-1688)</small>		
16131-1723	EA	3/8" 45 Degree Angle Liquid Tight Connector	8.62	2.63
	16MOD-0050	For Work In Restricted Working Space, Add	1.97	
16131-1724	EA	1/2" 45 Degree Angle Liquid Tight Connector	8.69	2.63
	16MOD-0050	For Work In Restricted Working Space, Add	1.97	
16131-1725	EA	3/4" 45 Degree Angle Liquid Tight Connector	10.08	2.87
	16MOD-0050	For Work In Restricted Working Space, Add	2.15	
16131-1726	EA	1" 45 Degree Angle Liquid Tight Connector	14.42	3.35
	16MOD-0050	For Work In Restricted Working Space, Add	2.51	
16131-1727	EA	1-1/4" 45 Degree Angle Liquid Tight Connector	16.21	3.58
	16MOD-0050	For Work In Restricted Working Space, Add	2.69	
16131-1728	EA	1-1/2" 45 Degree Angle Liquid Tight Connector	18.02	3.82
	16MOD-0050	For Work In Restricted Working Space, Add	2.87	
16131-1729		Flexible Metallic Conduit And Connectors <small>(16131-1687)</small>		
16131-1730		Flexible Steel Conduit <small>(16131-1729)</small>		
16131-1731	LF	3/8" Flexible Metallic Conduit	2.40	0.78
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.08	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.29	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.19	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.48	
	16MOD-0050	For Work In Restricted Working Space, Add	0.58	
16131-1732	LF	1/2" Flexible Metallic Conduit	2.50	0.78
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.09	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.30	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.20	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.49	
	16MOD-0050	For Work In Restricted Working Space, Add	0.59	
16131-1733	LF	3/4" Flexible Metallic Conduit	2.85	1.04
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.12	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.32	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.21	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.53	
	16MOD-0050	For Work In Restricted Working Space, Add	0.64	
16131-1734	LF	1" Flexible Metallic Conduit	3.63	1.04
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.22	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.34	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.23	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.57	
	16MOD-0050	For Work In Restricted Working Space, Add	0.69	
16131-1735	LF	1-1/4" Flexible Metallic Conduit	4.17	1.30
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.29	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.36	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.24	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.61	
	16MOD-0050	For Work In Restricted Working Space, Add	0.73	
16131-1736	LF	1-1/2" Flexible Metallic Conduit	5.59	1.56
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.51	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.38	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.25	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.63	
	16MOD-0050	For Work In Restricted Working Space, Add	0.76	
16131-1737	LF	2" Flexible Metallic Conduit	6.39	2.10
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.62	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.39	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.26	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.66	
	16MOD-0050	For Work In Restricted Working Space, Add	0.79	
16131-1738	LF	2-1/2" Flexible Steel Conduit	7.83	2.36
	16MOD-0045	For Flexible Aluminum Conduit, Add	0.75	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.49	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.33	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.82	
	16MOD-0050	For Work In Restricted Working Space, Add	0.98	
16131-1739	LF	3" Flexible Metallic Conduit	11.84	2.88
	16MOD-0045	For Flexible Aluminum Conduit, Add	1.31	
	16MOD-0046	For Installation In Concrete (Excludes Concrete), Add	0.59	
	16MOD-0047	For Installation In Metal Stud Wall, Add	0.39	
	16MOD-0048	For Installation In Wood Stud Wall (Includes Drilling), Add	0.98	
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1740	LF	3-1/2" Flexible Metallic Conduit.....	14.56	3.14
		16MOD-0045 For Flexible Aluminum Conduit, Add	1.65	
		16MOD-0046 For Installation In Concrete (Excludes Concrete), Add	0.69	
		16MOD-0047 For Installation In Metal Stud Wall, Add	0.46	
		16MOD-0048 For Installation In Wood Stud Wall (Includes Drilling), Add	1.14	
		16MOD-0050 For Work In Restricted Working Space, Add	1.37	
16131-1741	LF	4" Flexible Metallic Conduit.....	16.74	3.66
		16MOD-0045 For Flexible Aluminum Conduit, Add	1.90	
		16MOD-0046 For Installation In Concrete (Excludes Concrete), Add	0.78	
		16MOD-0047 For Installation In Metal Stud Wall, Add	0.52	
		16MOD-0048 For Installation In Wood Stud Wall (Includes Drilling), Add	1.31	
		16MOD-0050 For Work In Restricted Working Space, Add	1.57	
16131-1742		Plain Squeeze Type Straight Connector (16131-1729)		
16131-1743	EA	3/8" Flexible Straight Connectors, Plain.....	4.16	2.10
		16MOD-0050 For Work In Restricted Working Space, Add	0.88	
16131-1744	EA	1/2" Flexible Straight Connectors, Plain.....	5.20	2.36
		16MOD-0050 For Work In Restricted Working Space, Add	0.98	
16131-1745	EA	3/4" Flexible Straight Connectors, Plain.....	5.95	2.88
		16MOD-0050 For Work In Restricted Working Space, Add	1.18	
16131-1746	EA	1" Flexible Straight Connectors, Plain.....	9.68	3.14
		16MOD-0050 For Work In Restricted Working Space, Add	1.57	
16131-1747	EA	1-1/4" Flexible Straight Connectors, Plain.....	13.84	3.66
		16MOD-0050 For Work In Restricted Working Space, Add	1.96	
16131-1748	EA	1-1/2" Flexible Straight Connectors, Plain.....	18.31	4.44
		16MOD-0050 For Work In Restricted Working Space, Add	2.45	
16131-1749	EA	2" Flexible Straight Connectors, Plain.....	24.23	4.44
		16MOD-0050 For Work In Restricted Working Space, Add	2.94	
16131-1750	EA	2-1/2" Flexible Straight Connectors, Plain.....	39.77	5.49
		16MOD-0050 For Work In Restricted Working Space, Add	3.43	
16131-1751	EA	3" Flexible Straight Connectors, Plain.....	52.35	6.02
		16MOD-0050 For Work In Restricted Working Space, Add	3.92	
16131-1752	EA	3-1/2" Flexible Straight Connectors, Plain.....	166.61	7.06
		16MOD-0050 For Work In Restricted Working Space, Add	4.41	
16131-1753	EA	4" Flexible Straight Connectors, Plain.....	208.52	8.62
		16MOD-0050 For Work In Restricted Working Space, Add	4.90	
16131-1754		Insulated Throat Squeeze Type Straight Connector (16131-1729)		
16131-1755	EA	1/2" Flexible Straight Connectors, Insulated.....	5.86	2.36
		16MOD-0050 For Work In Restricted Working Space, Add	0.98	
16131-1756	EA	3/4" Flexible Straight Connectors, Insulated.....	6.83	2.88
		16MOD-0050 For Work In Restricted Working Space, Add	1.18	
16131-1757	EA	1" Flexible Straight Connectors, Insulated.....	10.87	3.14
		16MOD-0050 For Work In Restricted Working Space, Add	1.57	
16131-1758	EA	1-1/4" Flexible Straight Connectors, Insulated.....	16.02	3.66
		16MOD-0050 For Work In Restricted Working Space, Add	1.96	
16131-1759	EA	1-1/2" Flexible Straight Connectors, Insulated.....	22.19	3.92
		16MOD-0050 For Work In Restricted Working Space, Add	2.45	
16131-1760	EA	2" Flexible Straight Connectors, Insulated.....	31.08	4.44
		16MOD-0050 For Work In Restricted Working Space, Add	2.94	
16131-1761	EA	2-1/2" Flexible Straight Connectors, Insulated.....	54.42	5.49
		16MOD-0050 For Work In Restricted Working Space, Add	3.43	
16131-1762	EA	3" Flexible Straight Connectors, Insulated.....	69.62	6.02
		16MOD-0050 For Work In Restricted Working Space, Add	3.92	
16131-1763	EA	3-1/2" Flexible Straight Connectors, Insulated.....	193.22	7.06
		16MOD-0050 For Work In Restricted Working Space, Add	4.41	
16131-1764	EA	4" Flexible Straight Connectors, Insulated.....	248.54	8.62
		16MOD-0050 For Work In Restricted Working Space, Add	4.90	
16131-1765		Plain Squeeze Type 90 Degree Connector (16131-1729)		
16131-1766	EA	3/8" Flexible 90 Degree Connector, Plain.....	5.87	2.62
		16MOD-0050 For Work In Restricted Working Space, Add	1.18	
16131-1767	EA	1/2" Flexible 90 Degree Connector, Plain.....	7.83	2.88
		16MOD-0050 For Work In Restricted Working Space, Add	1.37	
16131-1768	EA	3/4" Flexible 90 Degree Connector, Plain.....	10.32	3.14
		16MOD-0050 For Work In Restricted Working Space, Add	1.57	
16131-1769	EA	1" Flexible 90 Degree Connector, Plain.....	14.59	3.66
		16MOD-0050 For Work In Restricted Working Space, Add	1.96	
16131-1770	EA	1-1/4" Flexible 90 Degree Connector, Plain.....	23.13	3.92
		16MOD-0050 For Work In Restricted Working Space, Add	2.35	
16131-1771	EA	1-1/2" Flexible 90 Degree Connector, Plain.....	36.52	4.57
		16MOD-0050 For Work In Restricted Working Space, Add	2.94	
16131-1772	EA	2" Flexible 90 Degree Connector, Plain.....	44.15	5.62
		16MOD-0050 For Work In Restricted Working Space, Add	3.33	
16131-1773	EA	2-1/2" Flexible 90 Degree Connector, Plain.....	99.18	6.02
		16MOD-0050 For Work In Restricted Working Space, Add	3.92	
16131-1774	EA	3" Flexible 90 Degree Connector, Plain.....	127.75	7.06
		16MOD-0050 For Work In Restricted Working Space, Add	4.41	
16131-1775	EA	3-1/2" Flexible 90 Degree Connector, Plain.....	273.42	8.62
		16MOD-0050 For Work In Restricted Working Space, Add	4.90	
16131-1776	EA	4" Flexible 90 Degree Connector, Plain.....	490.04	9.81
		16MOD-0050 For Work In Restricted Working Space, Add	5.88	
16131-1777		Insulated Throat Squeeze Type 90 Degree Connector (16131-1729)		

16000 Electrical**16100 Basic Materials And Methods****16131 Conduit**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1778	EA	1/2" Flexible 90 Degree Connector, Insulated	8.75	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.37	
16131-1779	EA	3/4" Flexible 90 Degree Connector, Insulated	11.46	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1780	EA	1" Flexible 90 Degree Connector, Insulated	14.59	3.66
	16MOD-0050	For Work In Restricted Working Space, Add	1.96	
16131-1781	EA	1-1/4" Flexible 90 Degree Connector, Insulated	27.17	3.92
	16MOD-0050	For Work In Restricted Working Space, Add	2.35	
16131-1782	EA	1-1/2" Flexible 90 Degree Connector, Insulated	43.86	4.57
	16MOD-0050	For Work In Restricted Working Space, Add	2.94	
16131-1783	EA	2" Flexible 90 Degree Connector, Insulated	56.07	5.62
	16MOD-0050	For Work In Restricted Working Space, Add	3.33	
16131-1784	EA	2-1/2" Flexible 90 Degree Connector, Insulated	136.47	6.02
	16MOD-0050	For Work In Restricted Working Space, Add	3.92	
16131-1785	EA	3" Flexible 90 Degree Connector, Insulated	168.15	7.06
	16MOD-0050	For Work In Restricted Working Space, Add	4.41	
16131-1786	EA	3-1/2" Flexible 90 Degree Connector, Insulated	456.55	8.62
	16MOD-0050	For Work In Restricted Working Space, Add	4.90	
16131-1787	EA	4" Flexible 90 Degree Connector, Insulated	681.85	9.81
	16MOD-0050	For Work In Restricted Working Space, Add	5.88	
16131-1788		Plain Squeeze Type 45 Degree Connector (16131-1729)		
16131-1789	EA	3/8" Flexible 45 Degree Connector, Plain	6.61	2.62
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1790	EA	1/2" Flexible 45 Degree Connector, Plain	9.02	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.37	
16131-1791	EA	3/4" Flexible 45 Degree Connector, Plain	11.65	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1792		Insulated Squeeze Type 45 Degree Connector (16131-1729)		
16131-1793	EA	3/8" Flexible 45 Degree Connector, Insulated	7.12	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1794	EA	1/2" Flexible 45 Degree Connector, Insulated	9.86	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.37	
16131-1795	EA	3/4" Flexible 45 Degree Connector, Insulated	12.84	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1796		Plain Screw-In Connector (16131-1729)		
16131-1797	EA	3/8" Flexible Steel Screw-in Connector, Plain	3.39	2.10
	16MOD-0050	For Work In Restricted Working Space, Add	0.88	
16131-1798	EA	1/2" Flexible Steel Screw-in Connector, Plain	3.64	2.36
	16MOD-0050	For Work In Restricted Working Space, Add	0.98	
16131-1799	EA	3/4" Flexible Steel Screw-in Connector, Plain	4.68	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1800	EA	1" Flexible Steel Screw-in Connector, Plain	6.74	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1801	EA	1-1/4" Flexible Steel Screw-in Connector, Plain	10.10	3.66
	16MOD-0050	For Work In Restricted Working Space, Add	1.96	
16131-1802	EA	1-1/2" Flexible Steel Screw-in Connector, Plain	12.32	3.92
	16MOD-0050	For Work In Restricted Working Space, Add	2.45	
16131-1803	EA	2" Flexible Steel Screw-in Connector, Plain	18.42	4.44
	16MOD-0050	For Work In Restricted Working Space, Add	2.94	
16131-1804		Insulated Screw-In Connector (16131-1729)		
16131-1805	EA	3/8" Flexible Steel Screw-in Connector, Insulated	3.61	2.10
	16MOD-0050	For Work In Restricted Working Space, Add	0.88	
16131-1806	EA	1/2" Flexible Steel Screw-in Connector, Insulated	3.82	2.36
	16MOD-0050	For Work In Restricted Working Space, Add	0.98	
16131-1807	EA	3/4" Flexible Steel Screw-in Connector, Insulated	5.13	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1808	EA	1" Flexible Steel Screw-in Connector, Insulated	7.43	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1809	EA	1-1/4" Flexible Steel Screw-in Connector, Insulated	11.08	3.66
	16MOD-0050	For Work In Restricted Working Space, Add	1.96	
16131-1810	EA	1-1/2" Flexible Steel Screw-in Connector, Insulated	13.49	3.92
	16MOD-0050	For Work In Restricted Working Space, Add	2.45	
16131-1811	EA	2" Flexible Steel Screw-in Connector, Insulated	19.46	4.44
	16MOD-0050	For Work In Restricted Working Space, Add	2.94	
16131-1812		Screw-In Coupling (16131-1729)		
16131-1813	EA	1/2" Flexible Steel Screw-in Coupling	4.07	2.36
	16MOD-0050	For Work In Restricted Working Space, Add	0.98	
16131-1814	EA	3/4" Flexible Steel Screw-in Coupling	5.39	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1815		Flexible To EMT Coupling (16131-1729)		
16131-1816	EA	3/8" Flexible Steel To EMT Coupling	5.68	2.10
	16MOD-0050	For Work In Restricted Working Space, Add	0.88	
16131-1817	EA	1/2" Flexible Steel To EMT Coupling	7.84	2.36
	16MOD-0050	For Work In Restricted Working Space, Add	0.98	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1818	EA	3/4" Flexible Steel To EMT Coupling.....	10.41	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1819		Die Cast Squeeze Type Straight Connector (16131-1729)		
16131-1820	EA	3/8" Flexible Straight Connector, Die Cast.....	3.53	2.10
	16MOD-0050	For Work In Restricted Working Space, Add	0.88	
16131-1821	EA	1/2" Flexible Straight Connector, Die Cast.....	4.00	2.36
	16MOD-0050	For Work In Restricted Working Space, Add	0.98	
16131-1822	EA	3/4" Flexible Straight Connector, Die Cast.....	4.98	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1823	EA	1" Flexible Straight Connector, Die Cast.....	7.59	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1824	EA	1-1/4" Flexible Straight Connector, Die Cast.....	10.31	3.66
	16MOD-0050	For Work In Restricted Working Space, Add	1.96	
16131-1825	EA	1-1/2" Flexible Straight Connector, Die Cast.....	14.09	3.92
	16MOD-0050	For Work In Restricted Working Space, Add	2.45	
16131-1826	EA	2" Flexible Straight Connector, Die Cast.....	18.33	4.44
	16MOD-0050	For Work In Restricted Working Space, Add	2.94	
16131-1827		Die Cast Squeeze Type 90 Degree Connector (16131-1729)		
16131-1828	EA	3/8" Flexible 90 Degree Connector, Die Cast.....	4.67	2.62
	16MOD-0050	For Work In Restricted Working Space, Add	1.18	
16131-1829	EA	1/2" Flexible 90 Degree Connector, Die Cast.....	5.82	2.88
	16MOD-0050	For Work In Restricted Working Space, Add	1.37	
16131-1830	EA	3/4" Flexible 90 Degree Connector, Die Cast.....	7.11	3.14
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1831	EA	1" Flexible 90 Degree Connector, Die Cast.....	11.54	3.66
	16MOD-0050	For Work In Restricted Working Space, Add	1.96	
16131-1832	EA	1-1/4" Flexible 90 Degree Connector, Die Cast.....	16.57	3.92
	16MOD-0050	For Work In Restricted Working Space, Add	2.35	
16131-1833	EA	1-1/2" Flexible 90 Degree Connector, Die Cast.....	26.09	4.57
	16MOD-0050	For Work In Restricted Working Space, Add	2.94	
16131-1834	EA	2" Flexible 90 Degree Connector, Die Cast.....	31.28	5.62
	16MOD-0050	For Work In Restricted Working Space, Add	3.33	
16131-1835		Non-Metallic Liquid Tight Flexible Conduit And Connectors (16131-1687)		
		Note: Carlon - CARFLEX.		
16131-1836		Non-Metallic Liquid Tight Flexible Conduit (16131-1635)		
16131-1837	LF	3/8" Non-Metallic Liquid Tight Flex Conduit.....	2.39	0.71
	16MOD-0050	For Work In Restricted Working Space, Add	0.54	
16131-1838	LF	1/2" Non-Metallic Liquid Tight Flex Conduit.....	2.44	0.71
	16MOD-0050	For Work In Restricted Working Space, Add	0.54	
16131-1839	LF	3/4" Non-Metallic Liquid Tight Flex Conduit.....	3.28	0.95
	16MOD-0050	For Work In Restricted Working Space, Add	0.72	
16131-1840	LF	1" Non-Metallic Liquid Tight Flex Conduit.....	4.18	0.95
	16MOD-0050	For Work In Restricted Working Space, Add	0.72	
16131-1841	LF	1-1/4" Non-Metallic Liquid Tight Flex Conduit.....	5.32	1.19
	16MOD-0050	For Work In Restricted Working Space, Add	0.90	
16131-1842	LF	1-1/2" Non-Metallic Liquid Tight Flex Conduit.....	6.83	1.43
	16MOD-0050	For Work In Restricted Working Space, Add	1.07	
16131-1843	LF	2" Non-Metallic Liquid Tight Flex Conduit.....	8.74	1.92
	16MOD-0050	For Work In Restricted Working Space, Add	1.43	
16131-1844		Straight Connector (16131-1835)		
16131-1845	EA	3/8" Non-Metallic Straight Connector.....	6.96	1.92
	16MOD-0050	For Work In Restricted Working Space, Add	1.43	
16131-1846	EA	1/2" Non-Metallic Straight Connector.....	6.96	1.92
	16MOD-0050	For Work In Restricted Working Space, Add	1.43	
16131-1847	EA	3/4" Non-Metallic Straight Connector.....	8.61	2.15
	16MOD-0050	For Work In Restricted Working Space, Add	1.61	
16131-1848	EA	1" Non-Metallic Straight Connector.....	10.83	2.39
	16MOD-0050	For Work In Restricted Working Space, Add	1.79	
16131-1849	EA	1-1/4" Non-Metallic Straight Connector.....	15.28	2.63
	16MOD-0050	For Work In Restricted Working Space, Add	1.97	
16131-1850	EA	1-1/2" Non-Metallic Straight Connector.....	19.29	2.87
	16MOD-0050	For Work In Restricted Working Space, Add	2.15	
16131-1851	EA	2" Non-Metallic Straight Connector.....	30.61	3.35
	16MOD-0050	For Work In Restricted Working Space, Add	2.51	
16131-1852		90 Degree Angle Connector (16131-1835)		
16131-1853	EA	3/8" Non-Metallic 90 Degree Angle Connector.....	10.12	2.63
	16MOD-0050	For Work In Restricted Working Space, Add	1.97	
16131-1854	EA	1/2" Non-Metallic 90 Degree Angle Connector.....	10.12	2.63
	16MOD-0050	For Work In Restricted Working Space, Add	1.97	
16131-1855	EA	3/4" Non-Metallic 90 Degree Angle Connector.....	12.63	2.87
	16MOD-0050	For Work In Restricted Working Space, Add	2.15	
16131-1856	EA	1" Non-Metallic 90 Degree Angle Connector.....	18.23	3.35
	16MOD-0050	For Work In Restricted Working Space, Add	2.51	
16131-1857	EA	1-1/4" Non-Metallic 90 Degree Angle Connector.....	18.77	3.58
	16MOD-0050	For Work In Restricted Working Space, Add	2.69	
16131-1858	EA	1-1/2" Non-Metallic 90 Degree Angle Connector.....	30.60	3.82
	16MOD-0050	For Work In Restricted Working Space, Add	2.87	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16131-1859	EA	2" Non-Metallic 90 Degree Angle Connector.....	41.54	4.30
	16MOD-0050	For Work In Restricted Working Space, Add	3.23	
16131-1860		45 Degree Angle Connector (16131-1835)		
16131-1861	EA	3/8" Non-Metallic 45 Degree Angle Connector.....	10.12	2.63
	16MOD-0050	For Work In Restricted Working Space, Add	1.97	
16131-1862	EA	1/2" Non-Metallic 45 Degree Angle Connector.....	10.12	2.63
	16MOD-0050	For Work In Restricted Working Space, Add	1.97	
16131-1863	EA	3/4" Non-Metallic 45 Degree Angle Connector.....	12.63	2.87
	16MOD-0050	For Work In Restricted Working Space, Add	2.75	
16131-1864	EA	1" Non-Metallic 45 Degree Angle Connector.....	18.23	3.35
	16MOD-0050	For Work In Restricted Working Space, Add	2.51	
16131-1865	EA	1-1/4" Non-Metallic 45 Degree Angle Connector.....	18.77	3.58
	16MOD-0050	For Work In Restricted Working Space, Add	2.69	
16131-1866	EA	1-1/2" Non-Metallic 45 Degree Angle Connector.....	30.60	3.82
	16MOD-0050	For Work In Restricted Working Space, Add	2.87	
16131-1867	EA	2" Non-Metallic 45 Degree Angle Connector.....	41.54	4.30
	16MOD-0050	For Work In Restricted Working Space, Add	3.23	
16131-1868		Blue ENT Electrical Non-Metallic Tubing (16131-1687)		
		Note: Carlon - FLEX-PLUS.		
16131-1869		Blue ENT Electrical Non-Metallic Tubing (16131-1868)		
16131-1870	LF	1/2" Blue ENT Electrical Non-Metallic Tubing.....	2.21	0.78
	16MOD-0050	For Work In Restricted Working Space, Add	0.59	
16131-1871	LF	3/4" Blue ENT Electrical Non-Metallic Tubing.....	2.95	1.04
	16MOD-0050	For Work In Restricted Working Space, Add	0.79	
16131-1872	LF	1" Blue ENT Electrical Non-Metallic Tubing.....	3.15	1.04
	16MOD-0050	For Work In Restricted Working Space, Add	0.79	
16131-1873		Terminal Adapter (16131-1868)		
16131-1874	EA	1/2" Quick Connect Terminal Adapter For Blue ENT Electrical Non-Metallic Tubing.....	5.61	2.10
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1875	EA	3/4" Quick Connect Terminal Adapter For Blue ENT Electrical Non-Metallic Tubing.....	6.60	2.36
	16MOD-0050	For Work In Restricted Working Space, Add	1.77	
16131-1876	EA	1" Quick Connect Terminal Adapter For Blue ENT Electrical Non-Metallic Tubing.....	7.45	2.62
	16MOD-0050	For Work In Restricted Working Space, Add	1.96	
16131-1877		Coupling (16131-1868)		
16131-1878	EA	1/2" Quick Connect Coupling For Blue ENT Electrical Non-Metallic Tubing.....	5.56	2.10
	16MOD-0050	For Work In Restricted Working Space, Add	1.57	
16131-1879	EA	3/4" Quick Connect Coupling For Blue ENT Electrical Non-Metallic Tubing.....	6.33	2.36
	16MOD-0050	For Work In Restricted Working Space, Add	1.77	
16131-1880	EA	1" Quick Connect Coupling For Blue ENT Electrical Non-Metallic Tubing.....	7.20	2.62
	16MOD-0050	For Work In Restricted Working Space, Add	1.96	
16134 Boxes (16100)				
16134-0001		Metal Device, Fixture And Junction Boxes (16134)		
		Note: Thin wall metal.		
16134-0002		Surface Mount Metal Device, Fixture And Junction Boxes (16134-0001)		
		Note: Thin wall metal.		
16134-0003	EA	4" Square Steel Box X 1-1/2" Deep With Cover.....	18.63	8.17
16134-0004	EA	4" Square Steel Box X 2-1/8" Deep With Cover.....	20.12	8.17
16134-0005	EA	4-11/16" Square Steel Box X 2-1/8" Deep With Cover.....	20.52	8.17
16134-0006	EA	4" Steel Octagon Box, 1-1/2" Deep With Cover.....	21.62	8.17
16134-0007	EA	4" Steel Octagon Box, 2-1/8" Deep With Cover.....	21.78	8.17
16134-0008		Flush Mount Metal Device, Fixture And Junction Boxes (16134-0001)		
		Note: Thin wall metal.		
16134-0009	EA	3" x 2" x 2-1/2" Steel Box With Cover, Drywall Only, Flush Mount.....	11.62	4.90
16134-0010	EA	3"-1/2" x 3-3/4" Steel Masonry Box With Cover, 1 Gang, Flush Mount.....	14.95	4.90
16134-0011	EA	3"-1/2" x 3-3/4" Steel Masonry Box With Cover, 2 Gang, Flush Mount.....	19.31	6.54
16134-0012	EA	3"-1/2" x 3-3/4" Steel Masonry Box With Cover, 3 Gang, Flush Mount.....	26.92	9.81
16134-0013	EA	3"-1/2" x 3-3/4" Steel Masonry Box With Cover, 4 Gang, Flush Mount.....	33.91	13.07
16134-0014	EA	4" Square Steel Box With Cover, 1-1/2" Deep, Flush Mount.....	25.78	8.17
16134-0015	EA	4" Square Steel Box With Cover, 2-1/8" Deep, Flush Mount.....	27.83	8.17
16134-0016	EA	4-11/16" Square Steel Box With Cover, 2-1/8" Deep, Flush Mount.....	27.83	8.17
16134-0017		Replacement Covers For Junction Boxes (16134-0001)		
16134-0018	EA	4" Square Steel Blank Cover.....	5.45	2.29
16134-0019	EA	4" Square Steel 1/2" Raised Device Cover.....	6.50	2.29
16134-0020	EA	4-11/16" Square Steel Blank Cover.....	6.63	2.62
16134-0021	EA	4-11/16" Square Steel 1/2" Raised Cover.....	10.10	2.62
16134-0022	EA	4" Steel Octagon Blank Cover.....	7.03	2.62
16134-0023		Sectional Box (16134)		
		Note: Includes box, receptacle and plastic cover.		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16134-0024		2" Deep Sectional Box (16134-0023)		
16134-0025	EA	2" Deep Sectional Box, With 15 A Single Receptacle - Complete.....	31.28	14.05
16134-0026	EA	2" Deep Sectional Box, With 15 A Duplex Receptacle - Complete.....	31.41	14.05
16134-0027	EA	2" Deep Sectional Box, With 20 A Single Receptacle - Complete.....	32.29	14.05
16134-0028	EA	2" Deep Sectional Box, With 20 A Duplex Receptacle - Complete.....	33.69	14.05
16134-0029	EA	2" Deep Two Gang Sectional Box, With 15 A Single Receptacle - Complete.....	45.64	20.59
16134-0030	EA	2" Deep Two Gang Sectional Box, With 15 A Duplex Receptacle - Complete.....	45.89	20.59
16134-0031	EA	2" Deep Two Gang Sectional Box, With 20 A Single Receptacle - Complete.....	47.67	20.59
16134-0032	EA	2" Deep Two Gang Sectional Box, With 20 A Duplex Receptacle - Complete.....	50.46	20.59
16134-0033		2-1/2" Deep Sectional Box (16134-0023)		
16134-0034	EA	2-1/2" Deep Sectional Box, With 15 A Single Receptacle - Complete.....	32.92	14.70
16134-0035	EA	2-1/2" Deep Sectional Box, With 15 A Duplex Receptacle - Complete.....	33.05	14.70
16134-0036	EA	2-1/2" Deep Sectional Box, With 20 A Single Receptacle - Complete.....	33.94	14.70
16134-0037	EA	2-1/2" Deep Sectional Box, With 20 A Duplex Receptacle - Complete.....	35.33	14.70
16134-0038	EA	2-1/2" Deep Two Gang Sectional Box, With 15 A Single Receptacle - Complete.....	47.93	21.57
16134-0039	EA	2-1/2" Deep Two Gang Sectional Box, With 15 A Duplex Receptacle - Complete.....	48.18	21.57
16134-0040	EA	2-1/2" Deep Two Gang Sectional Box, With 20 A Single Receptacle - Complete.....	49.95	21.57
16134-0041	EA	2-1/2" Deep Two Gang Sectional Box, With 20 A Duplex Receptacle - Complete.....	52.75	21.57
16134-0042		Cast Boxes (16134)		
		Note: For flush or surface mount.		
16134-0043		Less Than 1-5/8" Single Gang Cast Boxes (16134-0042)		
16134-0044	EA	1/2", 1 Gang Type FS, Cast Box, Up To 1-5/8" Deep.....	36.94	9.81
16134-0045	EA	3/4", 1 Gang Type FS, Cast Box, Up To 1-5/8" Deep.....	41.13	11.44
16134-0046	EA	1", 1 Gang Type FS, Cast Box, Up To 1-5/8" Deep.....	45.95	13.07
16134-0047	EA	1/2", 1 Gang Type FSA, Cast Box, Up To 1-5/8" Deep.....	35.73	9.81
16134-0048	EA	1", 1 Gang Type FSA, Cast Box, Up To 1-5/8" Deep.....	43.88	11.44
16134-0049	EA	1/2", 1 Gang Type FSC, Cast Box, Up To 1-5/8" Deep.....	45.23	13.07
16134-0050	EA	3/4", 1 Gang Type FSC, Cast Box, Up To 1-5/8" Deep.....	50.39	14.70
16134-0051	EA	1", 1 Gang Type FSC, Cast Box, Up To 1-5/8" Deep.....	62.09	17.97
16134-0052	EA	1/2", 1 Gang Type FSL, Cast Box, Up To 1-5/8" Deep.....	43.41	13.07
16134-0053	EA	3/4", 1 Gang Type FSL, Cast Box, Up To 1-5/8" Deep.....	46.68	14.70
16134-0054	EA	1/2", 1 Gang Type FSR, Cast Box, Up To 1-5/8" Deep.....	43.41	13.07
16134-0055	EA	3/4", 1 Gang Type FSR, Cast Box, Up To 1-5/8" Deep.....	46.68	14.70
16134-0056	EA	1/2", 1 Gang Type FSS, Cast Box, Up To 1-5/8" Deep.....	50.41	13.07
16134-0057	EA	3/4", 1 Gang Type FSS, Cast Box, Up To 1-5/8" Deep.....	55.17	14.70
16134-0058	EA	1/2", 1 Gang Type FSCA, Cast Box, Up To 1-5/8" Deep.....	51.46	13.07
16134-0059	EA	3/4", 1 Gang Type FSCA, Cast Box, Up To 1-5/8" Deep.....	58.57	14.70
16134-0060	EA	1/2", 1 Gang Type FSCC, Cast Box, Up To 1-5/8" Deep.....	63.51	21.24
16134-0061	EA	3/4", 1 Gang Type FSCC, Cast Box, Up To 1-5/8" Deep.....	76.71	22.87
16134-0062	EA	1/2", 1 Gang Type FSCT, Cast Box, Up To 1-5/8" Deep.....	65.92	21.24
16134-0063	EA	3/4", 1 Gang Type FSCT, Cast Box, Up To 1-5/8" Deep.....	74.95	22.87
16134-0064	EA	1/2", 1 Gang Type FST, Cast Box, Up To 1-5/8" Deep.....	72.89	21.24
16134-0065	EA	3/4", 1 Gang Type FST, Cast Box, Up To 1-5/8" Deep.....	79.94	22.87
16134-0066	EA	1/2", 1 Gang Type FSX, Cast Box, Up To 1-5/8" Deep.....	71.66	21.24
16134-0067	EA	3/4", 1 Gang Type FSX, Cast Box, Up To 1-5/8" Deep.....	81.62	22.87
16134-0068	EA	1/2", 1 Gang Type FSCD, Cast Box, Up To 1-5/8" Deep.....	84.51	26.14
16134-0069		1-5/8" To 2-1/2" Deep Single Gang Cast Boxes (16134-0042)		
16134-0070	EA	1/2", 1 Gang, Type FD, Cast Box, 1-5/8" To 2-1/2" Deep.....	39.70	9.81
16134-0071	EA	3/4", 1 Gang, Type FD, Cast Box, 1-5/8" To 2-1/2" Deep.....	44.78	11.44
16134-0072	EA	1", 1 Gang, Type FD, Cast Box, 1-5/8" To 2-1/2" Deep.....	49.58	13.07
16134-0073	EA	1/2", 1 Gang, Type FDA, Cast Box, 1-5/8" To 2-1/2" Deep.....	43.05	9.81
16134-0074	EA	3/4", 1 Gang, Type FDA, Cast Box, 1-5/8" To 2-1/2" Deep.....	48.17	11.44
16134-0075	EA	1/2", 1 Gang, Type FDC, Cast Box, 1-5/8" To 2-1/2" Deep.....	49.00	13.07
16134-0076	EA	3/4", 1 Gang, Type FDC, Cast Box, 1-5/8" To 2-1/2" Deep.....	54.06	14.70
16134-0077	EA	1", 1 Gang, Type FDC, Cast Box, 1-5/8" To 2-1/2" Deep.....	65.14	17.97
16134-0078	EA	1/2", 1 Gang, Type FDL, Cast Box, 1-5/8" To 2-1/2" Deep.....	57.13	13.07
16134-0079	EA	3/4", 1 Gang, Type FDL, Cast Box, 1-5/8" To 2-1/2" Deep.....	62.88	14.70
16134-0080	EA	1/2", 1 Gang, Type FDR / FDS, Cast Box, 1-5/8" To 2-1/2" Deep.....	56.02	13.07
16134-0081	EA	3/4", 1 Gang, Type FDR / FDS, Cast Box, 1-5/8" To 2-1/2" Deep.....	58.13	14.70
16134-0082	EA	1/2", 1 Gang, Type FDLA, Cast Box, 1-5/8" To 2-1/2" Deep.....	70.61	13.07
16134-0083	EA	3/4", 1 Gang, Type FDLA, Cast Box, 1-5/8" To 2-1/2" Deep.....	60.84	14.70
16134-0084	EA	1/2", 1 Gang, Type FDD, Cast Box, 1-5/8" To 2-1/2" Deep.....	52.23	13.07
16134-0085	EA	3/4", 1 Gang, Type FDD, Cast Box, 1-5/8" To 2-1/2" Deep.....	57.28	14.70
16134-0086	EA	1", 1 Gang, Type FDD, Cast Box, 1-5/8" To 2-1/2" Deep.....	66.37	17.97
16134-0087	EA	1/2", 1 Gang, Type FDCC, Cast Box, 1-5/8" To 2-1/2" Deep.....	70.05	19.61
16134-0088	EA	3/4", 1 Gang, Type FDCC, Cast Box, 1-5/8" To 2-1/2" Deep.....	79.56	22.87
16134-0089	EA	1/2", 1 Gang, Type FDCT, Cast Box, 1-5/8" To 2-1/2" Deep.....	67.46	19.61
16134-0090	EA	3/4", 1 Gang, Type FDCT, Cast Box, 1-5/8" To 2-1/2" Deep.....	78.35	22.87
16134-0091	EA	1", 1 Gang, Type FDCT, Cast Box, 1-5/8" To 2-1/2" Deep.....	91.32	26.14
16134-0092	EA	1/2", 1 Gang, Type FDT, Cast Box, 1-5/8" To 2-1/2" Deep.....	67.46	19.61
16134-0093	EA	3/4", 1 Gang, Type FDT, Cast Box, 1-5/8" To 2-1/2" Deep.....	79.73	22.87
16134-0094	EA	1", 1 Gang, Type FDT, Cast Box, 1-5/8" To 2-1/2" Deep.....	91.32	26.14
16134-0095	EA	1/2", 1 Gang, Type FDX, Cast Box, 1-5/8" To 2-1/2" Deep.....	78.71	22.87
16134-0096	EA	3/4", 1 Gang, Type FDX, Cast Box, 1-5/8" To 2-1/2" Deep.....	92.27	26.14
16134-0097	EA	1", 1 Gang, Type FDX, Cast Box, 1-5/8" To 2-1/2" Deep.....	103.53	29.41

16000 Electrical**16100 Basic Materials And Methods****16134 Boxes**

MINOR

CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

MINOR	CSI UOM DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16134-0098	Less Than 1-5/8" Deep Two Gang Cast Boxes (16134-0042)		
16134-0099	EA 1/2", 2 Gang, Type FS, Cast Box, Up To 1-5/8" Deep.....	50.66	9.81
16134-0100	EA 3/4", 2 Gang, Type FS, Cast Box, Up To 1-5/8" Deep.....	54.81	11.44
16134-0101	EA 1", 2 Gang, Type FS, Cast Box, Up To 1-5/8" Deep.....	61.03	13.07
16134-0102	EA 1/2", 2 Gang, Type FSC, Cast Box, Up To 1-5/8" Deep.....	60.39	13.07
16134-0103	EA 3/4", 2 Gang, Type FSC, Cast Box, Up To 1-5/8" Deep.....	65.78	14.70
16134-0104	EA 1", 2 Gang, Type FSC, Cast Box, Up To 1-5/8" Deep.....	76.85	17.97
16134-0105	EA 3/4", 2 Gang, Type FSS, Cast Box, Up To 1-5/8" Deep.....	65.28	14.70
16134-0106	EA 3/4", 2 Gang, Type FSD, Cast Box, Up To 1-5/8" Deep.....	69.39	14.70
16134-0107	EA 1/2", 2 Gang, Type FS, Tandem, Cast Box, Up To 1-5/8" Deep.....	66.12	13.07
16134-0108	EA 3/4", 2 Gang, Type FS, Tandem, Cast Box, Up To 1-5/8" Deep.....	71.09	14.70
16134-0109	EA 1/2", 2 Gang, Type FSC, Tandem, Cast Box, Up To 1-5/8" Deep.....	74.52	16.34
16134-0110	EA 3/4", 2 Gang, Type FSC, Tandem, Cast Box, Up To 1-5/8" Deep.....	87.19	21.24
16134-0111	EA 3/4", 3 Gang, Type FS, Cast Box, Up To 1-5/8" Deep.....	70.43	11.11
16134-0112	EA 1", 3 Gang, Type FS, Cast Box, Up To 1-5/8" Deep.....	79.29	13.07
16134-0113	1-5/8" To 2-1/2" Deep Two Gang Cast Boxes (16134-0042)		
16134-0114	EA 1/2", 2 Gang, Type FD, Cast Box, 1-5/8" To 2-1/2" Deep.....	57.34	9.81
16134-0115	EA 3/4", 2 Gang, Type FD, Cast Box, 1-5/8" To 2-1/2" Deep.....	59.99	11.44
16134-0116	EA 1", 2 Gang, Type FD, Cast Box, 1-5/8" To 2-1/2" Deep.....	66.12	13.07
16134-0117	EA 1/2", 2 Gang, Type FDC, Cast Box, 1-5/8" To 2-1/2" Deep.....	59.27	9.81
16134-0118	EA 3/4", 2 Gang, Type FDC, Cast Box, 1-5/8" To 2-1/2" Deep.....	62.11	11.44
16134-0119	EA 1", 2 Gang, Type FDC, Cast Box, 1-5/8" To 2-1/2" Deep.....	76.30	13.07
16134-0120	EA 3/4", 2 Gang, Type FDS, Cast Box, 1-5/8" To 2-1/2" Deep.....	73.19	14.70
16134-0121	EA 3/4", 3 Gang, Type FD, Cast Box, 1-5/8" To 2-1/2" Deep.....	110.48	22.87
16134-0122	Cast Weatherproof Covers (16134-0042)		
16134-0123	EA Blank Cover - Stamped, 1 Gang.....	2.08	
16134-0124	EA Blank Cover - Cast, 1 Gang.....	6.77	
16134-0125	EA Toggle Switch - Stamped, 1 Gang.....	2.62	
16134-0126	EA Toggle Switch, Guarded - Cast, 1 Gang.....	5.20	
16134-0127	EA Single Receptacle - Stamped, 1 Gang.....	2.62	
16134-0128	EA Single Receptacle With Hinge Lid - Stamped, 1 Gang.....	9.76	
16134-0129	EA Single Receptacle With Hinge Lid - Cast, 1 Gang.....	19.62	
16134-0130	EA Duplex Receptacle - Stamped, 1 Gang.....	2.62	
16134-0131	EA Duplex Receptacle With Hinge Lid - Cast, 1 Gang.....	20.92	
16134-0132	EA Weatherproof Receptacle With Screw Cover, With 15 A 125 V Ground Receptacle, 1 Gang.....	43.20	
16134-0133	EA 3 Despaired Devices - Stamped, 1 Gang.....	4.62	
16134-0134	EA Pilot Light With Jewel - Stamped, 1 Gang.....	17.18	
16134-0135	EA Pilot Light With Jewel - Cast, 1 Gang.....	18.25	
16134-0136	EA Weatherproof Toggle Switch, Rod Operated, 1 Gang.....	23.39	
16134-0137	EA Toggle Switch - Rocker Type, 1 Gang.....	23.39	
16134-0138	EA Blank Cover - Stamped, 2 Gang.....	3.08	
16134-0139	EA Blank Cover - Cast, 2 Gang.....	9.31	
16134-0140	EA Toggle Switch - Stamped, 2 Gang.....	4.32	
16134-0141	EA Toggle Switch - Cast, 2 Gang.....	9.56	
16134-0142	EA Toggle Switch And Duplex Receptacle - Stamped, 2 Gang.....	7.05	
16134-0143	EA Toggle Switch And Single Receptacle - Stamped, 2 Gang.....	7.47	
16134-0144	EA Two Duplex Receptacles - Stamped, 2 Gang.....	4.15	
16134-0145	EA Weatherproof Toggle Switch - Rod Operated, 2 Gang.....	41.73	
16134-0146	EA Toggle Switch - Rocker Type, 2 Gang.....	42.81	
16134-0147	EA Blank Cover - Stamped, 3 Gang.....	5.25	
16134-0148	EA Weatherproof Toggle Switch - Rod Operated, 3 Gang.....	58.99	
16134-0149	EA Toggle Switch - Stamped, 4 Gang.....	8.04	
16134-0150	Explosion Proof GRSS Conduit Outlet Boxes (16134-0042)		
	Note: With multiple hubs.		
16134-0151	EA 1/2", 7 Hubs, Explosion Proof Conduit Outlet Box With Cover Cast Aluminum, Type GRSS.....	90.87	26.14
16134-0152	EA 3/4", 7 Hubs, Explosion Proof Conduit Outlet Box With Cover Cast Aluminum, Type GRSS.....	97.40	29.41
16134-0153	EA 1", 7 Hubs, Explosion Proof Conduit Outlet Box With Cover Cast Aluminum, Type GRSS.....	104.65	32.68
16134-0154	EA 1/2", 13 Hubs, Explosion Proof Conduit Outlet Box With Cover Cast Aluminum, Type GRSSA.....	98.11	29.41
16134-0155	EA 3/4", 13 Hubs, Explosion Proof Conduit Outlet Box With Cover Cast Aluminum, Type GRSSA.....	109.71	32.68
16134-0156	Cast Outlet Floor Boxes (16134-0042)		
16134-0157	EA Floor Box, Embedded, Single Gang Cast Outlet Boxes.....	190.85	39.21
16134-0158	EA Floor Box, Two Gang, Embedded Cast Outlet Boxes.....	318.03	45.75
16134-0159	EA Floor Box, Multi Use, Embedded Cast Outlet Boxes.....	408.42	52.29
16134-0160	Box Extensions (16134)		
16134-0161	Extension Rings (16134-0160)		
	Note: For single gang boxes.		
16134-0162	EA 1-1/2" Box Extension Ring.....	10.95	4.91
16134-0163	EA 1-7/8" Box Extension Ring.....	12.25	5.57
16134-0164	Concrete Rings (16134-0160)		
16134-0165	4" Octagonal Concrete Rings With Plates (16134-0164)		
	Note: To be placed in concrete slabs or walls.		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16134-0166	EA	4" Octagonal Concrete Rings x 2" Depth, Outlet Box With Plates.....	40.35	16.99
16134-0167	EA	4" Octagonal Concrete Rings x 2-1/2" Depth, Outlet Box With Plates	42.80	18.17
16134-0168	EA	4" Octagonal Concrete Rings x 3" Depth, Outlet Box With Plates.....	45.77	19.48
16134-0169	EA	4" Octagonal Concrete Rings x 3-1/2" Depth, Outlet Box With Plates	51.34	20.98
16134-0170	EA	4" Octagonal Concrete Rings x 4" Depth, Outlet Box With Plates.....	57.62	22.67
16134-0171	EA	4" Octagonal Concrete Rings x 5" Depth, Outlet Box With Plates.....	63.49	24.77
16134-0172	EA	4" Octagonal Concrete Rings x 6" Depth, Outlet Box With Plates.....	65.66	27.26
16134-0173		Tile Rings (16134-0160)		
16134-0174	EA	3/4", 4" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.29	1.63
16134-0175	EA	1", 4" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.29	1.63
16134-0176	EA	1-1/4", 4" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.63	1.63
16134-0177	EA	1-1/2", 4" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.63	1.63
16134-0178	EA	3/4", 4" Square Cut Tile Ring, 2 Gang, Flush Mount.....	9.93	1.97
16134-0179	EA	1", 4" Square Cut Tile Ring, 2 Gang, Flush Mount.....	9.93	1.97
16134-0180	EA	1-1/4", 4" Square Cut Tile Ring, 2 Gang, Flush Mount.....	10.63	2.62
16134-0181	EA	1-1/2", 4" Square Cut Tile Ring, 2 Gang, Flush Mount.....	10.63	2.62
16134-0182	EA	3/4", 4-11/16" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.46	1.63
16134-0183	EA	1", 4-11/16" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.46	1.63
16134-0184	EA	1-1/4", 4-11/16" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.84	1.63
16134-0185	EA	1-1/2", 4-11/16" Square Cut Tile Ring, 1 Gang, Flush Mount.....	8.84	1.63
16134-0186	EA	3/4", 4-11/16" Square Cut Tile Ring, 2 Gang, Flush Mount.....	10.14	1.97
16134-0187	EA	1", 4-11/16" Square Cut Tile Ring, 2 Gang, Flush Mount.....	10.14	1.97
16134-0188	EA	1-1/4", 4-11/16" Square Cut Tile Ring, 2 Gang, Flush Mount.....	10.91	2.62
16134-0189	EA	1-1/2", 4-11/16" Square Cut Tile Ring, 2 Gang, Flush Mount.....	10.91	2.62
16134-0190		Plaster Rings (16134-0160)		
16134-0191	EA	3/4" x 4" Round Plaster Ring.....	7.44	1.62
16134-0192	EA	1" x 4" Round Plaster Ring.....	7.63	1.62
16134-0193		PVC Boxes (16134)		
16134-0194	EA	1/2", 1 Gang, FSE Type, PVC Box.....	26.61	11.44
16134-0195	EA	3/4", 1 Gang, FSE Type, PVC Box.....	30.02	13.07
16134-0196	EA	1/2", 2 Gang, FSE Type, PVC Box.....	31.92	13.07
16134-0197	EA	3/4", 2 Gang, FSE Type, PVC Box.....	31.92	13.07
16134-0198	EA	1", 2 Gang, FSE Type, PVC Box.....	35.19	14.70
16134-0199	EA	1/2", 1 Gang, FSC Type, PVC Box.....	29.95	13.07
16134-0200	EA	3/4", 1 Gang, FSC Type, PVC Box.....	33.29	14.70
16134-0201	EA	1/2", 2 Gang, FSC Type, PVC Box.....	38.46	16.34
16134-0202	EA	3/4", 2 Gang, FSC Type, PVC Box.....	38.46	16.34
16134-0203	EA	1", 2 Gang, FSC Type, PVC Box.....	44.99	19.61
16134-0204	EA	1/2", 1 Gang, FSS Type, PVC Box.....	33.22	14.70
16134-0205	EA	3/4", 1 Gang, FSS Type, PVC Box.....	36.56	16.34
16134-0206	EA	1/2", 2 Gang, FSS Type, PVC Box.....	41.72	17.97
16134-0207	EA	3/4", 2 Gang, FSS Type, PVC Box.....	41.72	17.97
16134-0208	EA	1", 2 Gang, FSS Type, PVC Box.....	48.26	21.24
16134-0209	EA	1/2", 1 Gang, FSCC Type, PVC Box.....	36.69	16.34
16134-0210	EA	3/4", 1 Gang, FSCC Type, PVC Box.....	40.01	17.97
16134-0211	EA	1/2", 2 Gang, FSCC Type, PVC Box.....	45.06	19.61
16134-0212	EA	3/4", 2 Gang, FSCC Type, PVC Box.....	45.06	19.61
16134-0213	EA	1", 2 Gang, FSCC Type, PVC Box.....	51.60	22.87
16134-0214	EA	1/2" FS Type Surface Mounted PVC Box With Weatherproof Cover	59.72	23.53
16134-0215	EA	3/4" FS Type Surface Mounted PVC Box With Weatherproof Cover	65.92	26.20
16134-0216	EA	1" FS Type Surface Mounted PVC Box With Weatherproof Cover	73.34	29.41
16134-0217	EA	Rubber box for two single or two duplex receptacles with non-metallic cover plates for and compression type grip for lead-in cable.....	82.37	32.68
16134-0218		Outlet Boxes (16134)		
Note: Boxes with blank cover plates used for termination and/or splicing.				
16134-0219		4" Square Box With Cover (16134-0218)		
16134-0220	EA	4" Square Box x 1-1/2" Depth, With Cover, Concealed Outlet Boxes	22.16	10.46
16134-0221	EA	4" Square Box x 2-1/8" Depth, With Cover, Concealed Outlet Boxes	26.76	11.76
16134-0222	EA	4" Square Box x 1-1/2" Depth, With Cover, Concealed Outlet Box With 1 Gang Plate.....	22.60	10.46
16134-0223	EA	4" Square Box x 1-1/2" Depth, With Cover, Concealed Outlet Box With 2 Gang Plate.....	22.88	10.46
16134-0224	EA	4" Square Box x 2-1/8" Depth, With Cover, Concealed Outlet Box With 1 Gang Plate.....	26.01	11.76
16134-0225	EA	4" Square Box x 2-1/8" Depth, With Cover, Concealed Outlet Box With 2 Gang Plate.....	26.29	11.76
16134-0226	EA	4-11/16" Junction Box, Plaster Ring And Cover Plate (Computer).....	31.43	13.07
16134-0227		4-1/2" Solid Gang Box With Cover (16134-0218)		
Note: 3/4" Knock out.				
16134-0228	EA	1 Gang 4-1/2" x 1-5/8" Box, Concealed With Cover, 3/4" Knock Out, Solid Outlet Box	28.54	13.60
16134-0229	EA	2 Gang 4-1/2" x 1-5/8" Box, Concealed With Cover, 3/4" Knock Out, Solid Outlet Box	36.41	15.16
16134-0230	EA	4 Gang 4-1/2" x 1-5/8" Box, Concealed With Cover, 3/4" Knock Out, Solid Outlet Box	71.27	28.69
16134-0231	EA	6 Gang 4-1/2" x 1-5/8" Box, Concealed With Cover, 3/4" Knock Out, Solid Outlet Box	110.07	45.36
16134-0232	EA	9 Gang 4-1/2" x 1-5/8" Box, Concealed With Cover, 3/4" Knock Out, Solid Outlet Box	161.46	68.10
16134-0233	EA	1 Gang, Weatherproof, 4-1/2" x 2-5/8" Box, Concealed With Cover, 3/4" Knock Out, Solid Outlet Box.....	48.45	16.02
16134-0234	EA	Floor Box With Receptacle Plate; Hubbell SS-309-D, SC-3090.....	124.26	40.93

16000 Electrical**16100 Basic Materials And Methods****16134 Boxes**

MINOR CSI UOM DESCRIPTION		TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16134-0235 Switch Boxes (16134-0218)			
16134-0236	EA 2-3/4" Deep Switch Boxes With Conduit Knock Out.....	21.52	9.81
16134-0237	EA 3-1/2" Deep Switch Boxes With Conduit Knock Out.....	22.57	9.81
16134-0238	EA 2-1/2" Deep Switch Boxes With Non-Metallic Clamps.....	21.58	9.81
16134-0239	EA 3-1/2" Deep Switch Boxes With Non-Metallic Clamps.....	22.63	9.81
16134-0240 Raised Surface Square Covers, 1/2" Deep (16134-0218)			
16134-0241	EA 4-11/16" One Toggle Switch Cover	9.54	3.27
16134-0242	EA 4-11/16" Two Toggle Switch Cover	9.54	3.27
16134-0243	EA 4-11/16" One Duplex Flush Receptacle Cover.....	9.55	3.27
16134-0244	EA 4-11/16" Two Duplex Flush Receptacle Cover.....	9.54	3.27
16134-0245	EA 4-11/16" One Toggle Switch, One Duplex Flush Cover.....	9.55	3.27
16134-0246	EA 4-11/16" One Single Flush Receptacle 1-13/32" Cover.....	9.55	3.27
16134-0247	EA 4-11/16" 30 A Twist Lock Receptacle 1-3/4" Depth Cover	9.61	3.27
16134-0248	EA 4-11/16" 20 A Flush Receptacle 1-19/32" Depth Cover	9.61	3.27
16134-0249	EA 4-11/16" 30-50-60 A Flush Receptacle 2-1/2" Depth Cover	9.61	3.27
16134-0250	EA 4-11/16" 30-50 A Single Receptacle 2-5/32" Depth Cover	9.61	3.27
16134-0251	EA 4-11/16" Blank Cover	9.60	3.27
16134-0252	EA 4" Blank Cover	7.94	3.27
16134-0253	EA 4" One Toggle Switch Cover	7.64	3.27
16134-0254	EA 4" Two Toggle Switch Cover	7.68	3.27
16134-0255	EA 4" One Duplex Flush Receptacle Cover	7.59	3.27
16134-0256	EA 4" Two Duplex Flush Receptacle Cover	7.70	3.27
16134-0257	EA 4" One Toggle Switch, One Duplex Flush Cover.....	7.70	3.27
16134-0258	EA 4" One Toggle Switch, One Single Flush Receptacle 1-13/32" Depth Cover	7.78	3.27
16134-0259	EA 4" One Single Flush Receptacle 1-13/32" Depth Cover	7.71	3.27
16134-0260	EA 4" Two Single Flush Receptacle 1-13/32" Depth Cover	7.94	3.27
16134-0261	EA 4" 20 A Twist Lock Receptacle 1-19/32" Depth Cover	7.92	3.27
16134-0262	EA 4" 30-50 A Single Receptacle 2-9/64" Depth Cover	7.92	3.27
16134-0263	EA 4" One Single Flush Receptacle 2-1/2" Depth Cover	7.99	3.27
16134-0264 Poke Thru Units (16134-0218)			
Note: Excludes concrete drilling.			
16134-0265	EA Single 20 Amp Duplex Receptacle RC3 Power And Communications Poke Thru Unit.....	345.37	24.51
Note: Tile or carpet with brushed aluminum flange with black nonmetallic cover. Excludes communication jacks. Wiremold RC3ATCAL.			
16134-0266	EA Retrofit Kit Upgrades Existing RC3 Series Power And Communications Poke Thru Unit To Meet Scrub Water Requirements.....	220.29	
Note: Includes 20 Amp duplex receptacle. Tile or carpet with brushed aluminum flange with black nonmetallic cover. Wiremold RC3KTCAL.			
16134-0267	EA Replacement 20 Amp Duplex Receptacle For RC3 Series Power And Communications Poke Thru Unit	28.59	6.54
Note: Wiremold RC37REC.			
16134-0268	EA Abandonment Plate For RC3 Series Power And Communications Poke Thru Unit	36.71	3.27
Note: Wiremold RC3APTGBK.			
16134-0269	EA Four 20 Amp Receptacles RC4 Power And Communications Poke Thru Unit.....	391.35	26.14
Note: Tile or carpet with brushed aluminum flange with black nonmetallic cover. Excludes communication jacks. Wiremold RC4ATCAL.			
16134-0270	EA Retrofit Kit Upgrades Existing RC4 Series Power And Communications Poke Thru Unit To Meet Scrub Water Requirements.....	205.78	
Note: Includes two 20 Amp duplex receptacles. Tile or carpet with brushed aluminum flange with black nonmetallic cover. Excludes communication jacks. Wiremold RC4KTCAL.			
16134-0271	EA Replacement Two 20 Amp Duplex Receptacles For RC4 Series Power And Communications Poke Thru Unit.....	49.67	9.81
Note: Wiremold RC4REC2.			
16134-0272	EA Abandonment Plate For RC4 Series Power And Communications Poke Thru Unit	36.71	3.27
Note: Wiremold RC4APTGBK.			
16134-0273	EA Abandonment Plug For RC4 Series Power And Communications Poke Thru Unit	108.36	6.54
Note: Wiremold ABPLUG4.			
16134-0274	EA Four Jack RC9AMD Communications Poke Thru Unit.....	308.65	22.87
Note: Tile or carpet with brushed aluminum flange with black nonmetallic cover. Includes bezels to accept four Ortronics TracJack inserts and two Ortronics Series II inserts. Excludes communication jacks. Wiremold RC9AMDTCAL.			
16134-0275	EA Abandonment Plate For RC9 Series Communications Poke Thru Unit.....	25.05	3.27
Note: Wiremold RC9APTGBK.			
16134-0276	EA Eight Jack AMD8 Communications Poke Thru Unit	307.18	22.87
Note: Tile or carpet with brushed aluminum flange with black nonmetallic cover. Includes bezels to accept eight Ortronics TracJack inserts and four Ortronics Series II inserts. Excludes communication jacks. Wiremold AMD8ATCAL.			
16134-0277	EA Communication Conduit Adapter For Poke Thru Units.....	35.43	3.27
Note: Includes two conduit connections for communication systems. Wiremold COM75.			
16134-0278 Junction And Pull Boxes (16134)			
See CSI section 16135-0000 for galvanized pull/junction boxes with screw covers.			
16134-0279 Cast Iron Pull Boxes With Cover (16134-0278)			
Note: For underground use.			
16134-0280	EA 6" x 6" x 6" Cast Iron Pull Box With Cover.....	88.18	32.68
16134-0281	EA 8" x 6" x 6" Cast Iron Pull Box With Cover.....	114.09	40.72
16134-0282	EA 8" x 8" x 6" Cast Iron Pull Box With Cover.....	128.13	43.52
16134-0283	EA 10" x 8" x 6" Cast Iron Pull Box With Cover.....	153.30	52.29
16134-0284	EA 10" x 10" x 6" Cast Iron Pull Box With Cover.....	170.01	58.83
16134-0285	EA 12" x 10" x 6" Cast Iron Pull Box With Cover.....	199.19	60.78
16134-0286	EA 12" x 12" x 6" Cast Iron Pull Box With Cover.....	209.77	65.36
16134-0287	EA 16" x 12" x 6" Cast Iron Pull Box With Cover.....	269.59	71.24
16134-0288	EA 16" x 16" x 6" Cast Iron Pull Box With Cover.....	347.34	79.74



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16134-0289	EA		20" x 20" x 6" Cast Iron Pull Box With Cover.....	513.22	85.94
16134-0290	EA		24" x 18" x 8" Cast Iron Pull Box With Cover.....	494.31	91.50
16134-0291	EA		24" x 24" x 10" Cast Iron Pull Box With Cover.....	831.81	98.04
16134-0292	EA		12" x 12" x 12" Cast Iron Pull Box With Cover.....	347.83	87.12
16134-0293	EA		12" x 18" x 12" Cast Iron Pull Box With Cover.....	466.22	90.85
16134-0294	EA		18" x 18" x 12" Cast Iron Pull Box With Cover.....	643.19	94.77
16134-0295	EA		24" x 24" x 12" Cast Iron Pull Box With Cover.....	950.65	102.28
16134-0296	EA		36" x 36" x 12" Cast Iron Pull Box With Cover.....	1,831.89	107.84

16134-0297 Explosion Proof Junction Boxes (16134-0278)
 Note: Cast iron, explosion-proof and dust-ignition-proof. Nominal inside dimensions.

16134-0298 4" Deep Explosion Proof Junction Boxes (16134-0297)

16134-0299	EA		4" x 4" x 4" Explosion Proof Junction Box	731.09	36.76
16134-0300	EA		6" x 6" x 4" Explosion Proof Junction Box	999.34	42.16
16134-0301	EA		8" x 4" x 4" Explosion Proof Junction Box	1,182.91	42.16
16134-0302	EA		8" x 6" x 4" Explosion Proof Junction Box	1,231.02	45.10
16134-0303	EA		8" x 8" x 4" Explosion Proof Junction Box	1,805.35	45.10
16134-0304	EA		10" x 8" x 4" Explosion Proof Junction Box	2,041.74	48.04
16134-0305	EA		10" x 10" x 4" Explosion Proof Junction Box	2,459.34	50.97
16134-0306	EA		12" x 12" x 4" Explosion Proof Junction Box	2,935.37	56.37
16134-0307	EA		18" x 12" x 4" Explosion Proof Junction Box	4,299.44	110.29

16134-0308 6" Deep Explosion Proof Junction Boxes (16134-0297)

16134-0309	EA		6" x 6" x 6" Explosion Proof Junction Box	1,155.35	42.16
16134-0310	EA		8" x 6" x 6" Explosion Proof Junction Box	1,525.64	50.97
16134-0311	EA		8" x 8" x 6" Explosion Proof Junction Box	1,982.15	50.97
16134-0312	EA		10" x 8" x 6" Explosion Proof Junction Box	2,143.50	56.37
16134-0313	EA		10" x 10" x 6" Explosion Proof Junction Box	2,750.16	59.31
16134-0314	EA		12" x 12" x 6" Explosion Proof Junction Box	3,383.14	64.70
16134-0315	EA		14" x 8" x 6" Explosion Proof Junction Box	3,440.48	73.53
16134-0316	EA		18" x 12" x 6" Explosion Proof Junction Box	4,421.54	110.29
16134-0317	EA		18" x 18" x 6" Explosion Proof Junction Box	7,510.81	122.55

16134-0318 8" Deep Explosion Proof Junction Boxes (16134-0297)

16134-0319	EA		8" x 8" x 8" Explosion Proof Junction Box	2,167.03	59.31
16134-0320	EA		10" x 8" x 8" Explosion Proof Junction Box	2,383.08	64.70
16134-0321	EA		10" x 10" x 8" Explosion Proof Junction Box	3,198.57	67.64
16134-0322	EA		12" x 12" x 8" Explosion Proof Junction Box	3,521.57	73.53
16134-0323	EA		14" x 8" x 8" Explosion Proof Junction Box	3,828.14	84.80
16134-0324	EA		18" x 12" x 8" Explosion Proof Junction Box	4,854.18	127.45
16134-0325	EA		18" x 18" x 8" Explosion Proof Junction Box	8,175.15	142.15

16134-0326 10" Deep Explosion Proof Junction Boxes (16134-0297)

16134-0327	EA		12" x 12" x 10" Explosion Proof Junction Box	4,382.32	86.93
16134-0328	EA		18" x 12" x 10" Explosion Proof Junction Box	5,111.49	140.19
16134-0329	EA		18" x 18" x 10" Explosion Proof Junction Box	8,624.19	156.86

16134-0330 12" Deep Explosion Proof Junction Boxes (16134-0297)

16134-0331	EA		12" x 12" x 12" Explosion Proof Junction Box	5,135.31	102.94
16134-0332	EA		18" x 12" x 12" Explosion Proof Junction Box	6,383.87	151.96
16134-0333	EA		18" x 18" x 12" Explosion Proof Junction Box	9,073.25	171.57

16134-0334 Walker Box Blanking Plate Or Equal (16134)

16134-0335	EA		Brass Carpet Plate With Plug Insert, 3 Part	29.36	9.81
Note: Includes demolition of floor outlet entirely to receive 3-part blanking plate assembly.					
16134-0336	EA		Stainless Steel Plate With Plug Insert, 3 Part	41.81	9.81
Note: Includes demolition of floor outlet entirely to receive 3-part blanking plate assembly.					
16134-0337	EA		Brass Carpet Plate With Plug Insert, 3 Part	16.29	3.27
16134-0338	EA		Stainless Steel Plate With Plug Insert, 3 Part	28.74	3.27
16134-0339	EA		Remove And Relocate Carpet Plate With Insert, Including Storage And Cleaning	9.81	4.90

16135 Enclosures (16100)
 Note: Can be used as enclosure or pull/junction boxes. See CSI section 16140-0000 for outlet boxes.

16135-0001 NEMA Type 1 Enclosures (16135)
 Note: Standard enclosures.

16135-0002 NEMA 1 Hinged Cover Enclosure, Galvanized Steel (16135-0001)

16135-0003 4" Depth (16135-0002)

16135-0004	EA		6" x 4" x 4" NEMA 1 Enclosure With Hinged Cover	43.08	13.07
16135-0005	EA		6" x 6" x 4" NEMA 1 Enclosure With Hinged Cover	48.44	14.38
16135-0006	EA		8" x 6" x 4" NEMA 1 Enclosure With Hinged Cover	53.87	15.68
16135-0007	EA		8" x 8" x 4" NEMA 1 Enclosure With Hinged Cover	62.90	18.30
16135-0008	EA		10" x 8" x 4" NEMA 1 Enclosure With Hinged Cover	68.68	19.61
16135-0009	EA		10" x 10" x 4" NEMA 1 Enclosure With Hinged Cover	74.92	20.92
16135-0010	EA		12" x 8" x 4" NEMA 1 Enclosure With Hinged Cover	74.68	20.92

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16135-0011	EA	12" x 10" x 4" NEMA 1 Enclosure With Hinged Cover.....	81.09	22.22
16135-0012	EA	12" x 12" x 4" NEMA 1 Enclosure With Hinged Cover.....	87.85	23.53
16135-0013	EA	16" x 12" x 4" NEMA 1 Enclosure With Hinged Cover.....	113.50	31.37
16135-0014	EA	18" x 12" x 4" NEMA 1 Enclosure With Hinged Cover.....	130.58	36.60
16135-0015		6" Depth (16135-0002)		
16135-0016	EA	6" x 6" x 6" NEMA 1 Enclosure With Hinged Cover.....	54.34	15.68
16135-0017	EA	8" x 8" x 6" NEMA 1 Enclosure With Hinged Cover.....	66.34	18.30
16135-0018	EA	10" x 8" x 6" NEMA 1 Enclosure With Hinged Cover.....	79.01	22.22
16135-0019	EA	10" x 10" x 6" NEMA 1 Enclosure With Hinged Cover.....	85.60	23.53
16135-0020	EA	12" x 10" x 6" NEMA 1 Enclosure With Hinged Cover.....	92.33	24.84
16135-0021	EA	12" x 12" x 6" NEMA 1 Enclosure With Hinged Cover.....	99.39	26.14
16135-0022	EA	16" x 12" x 6" NEMA 1 Enclosure With Hinged Cover.....	125.82	33.99
16135-0023	EA	16" x 16" x 6" NEMA 1 Enclosure With Hinged Cover.....	152.25	41.83
16135-0024	EA	18" x 12" x 6" NEMA 1 Enclosure With Hinged Cover.....	146.73	40.53
16135-0025	EA	18" x 18" x 6" NEMA 1 Enclosure With Hinged Cover.....	191.32	52.29
16135-0026	EA	24" x 18" x 6" NEMA 1 Enclosure With Hinged Cover.....	248.99	60.13
16135-0027	EA	24" x 24" x 6" NEMA 1 Enclosure With Hinged Cover.....	286.15	65.36
16135-0028	EA	30" x 24" x 6" NEMA 1 Enclosure With Hinged Cover.....	320.27	69.28
16135-0029	EA	36" x 24" x 6" NEMA 1 Enclosure With Hinged Cover.....	351.11	71.89
16135-0030		NEMA 1 Screw Cover Enclosure, Galvanized Steel (16135-0001)		
16135-0031		3" Depth (16135-0030)		
16135-0032	EA	4" x 4" x 3" NEMA 1 Enclosure With Screw Cover.....	31.32	9.15
16135-0033	EA	6" x 6" x 3" NEMA 1 Enclosure With Screw Cover.....	44.77	13.07
16135-0034	EA	8" x 6" x 3" NEMA 1 Enclosure With Screw Cover.....	50.18	14.38
16135-0035		4" Depth (16135-0030)		
16135-0036	EA	4" x 4" x 4" NEMA 1 Enclosure With Screw Cover.....	34.74	10.46
16135-0037	EA	6" x 4" x 4" NEMA 1 Enclosure With Screw Cover.....	42.94	13.07
16135-0038	EA	6" x 6" x 4" NEMA 1 Enclosure With Screw Cover.....	48.23	14.38
16135-0039	EA	8" x 6" x 4" NEMA 1 Enclosure With Screw Cover.....	53.65	15.68
16135-0040	EA	8" x 8" x 4" NEMA 1 Enclosure With Screw Cover.....	62.60	18.30
16135-0041	EA	10" x 8" x 4" NEMA 1 Enclosure With Screw Cover.....	68.35	19.61
16135-0042	EA	10" x 10" x 4" NEMA 1 Enclosure With Screw Cover.....	74.47	20.92
16135-0043	EA	12" x 8" x 4" NEMA 1 Enclosure With Screw Cover.....	74.18	20.92
16135-0044	EA	12" x 10" x 4" NEMA 1 Enclosure With Screw Cover.....	80.64	22.22
16135-0045	EA	12" x 12" x 4" NEMA 1 Enclosure With Screw Cover.....	87.33	23.53
16135-0046	EA	16" x 12" x 4" NEMA 1 Enclosure With Screw Cover.....	113.50	31.37
16135-0047	EA	18" x 12" x 4" NEMA 1 Enclosure With Screw Cover.....	129.86	36.60
16135-0048	EA	18" x 18" x 4" NEMA 1 Enclosure With Screw Cover.....	168.63	47.05
16135-0049	EA	24" x 24" x 4" NEMA 1 Enclosure With Screw Cover.....	254.56	58.83
16135-0050		6" Depth (16135-0030)		
16135-0051	EA	6" x 6" x 6" NEMA 1 Enclosure With Screw Cover.....	54.05	15.68
16135-0052	EA	8" x 6" x 6" NEMA 1 Enclosure With Screw Cover.....	60.01	16.99
16135-0053	EA	8" x 8" x 6" NEMA 1 Enclosure With Screw Cover.....	69.14	19.61
16135-0054	EA	10" x 8" x 6" NEMA 1 Enclosure With Screw Cover.....	78.55	22.22
16135-0055	EA	10" x 10" x 6" NEMA 1 Enclosure With Screw Cover.....	85.12	23.53
16135-0056	EA	12" x 10" x 6" NEMA 1 Enclosure With Screw Cover.....	91.77	24.84
16135-0057	EA	12" x 12" x 6" NEMA 1 Enclosure With Screw Cover.....	98.76	26.14
16135-0058	EA	16" x 12" x 6" NEMA 1 Enclosure With Screw Cover.....	125.82	33.99
16135-0059	EA	16" x 16" x 6" NEMA 1 Enclosure With Screw Cover.....	154.52	41.83
16135-0060	EA	18" x 12" x 6" NEMA 1 Enclosure With Screw Cover.....	145.92	40.53
16135-0061	EA	18" x 18" x 6" NEMA 1 Enclosure With Screw Cover.....	190.21	52.29
16135-0062	EA	24" x 18" x 6" NEMA 1 Enclosure With Screw Cover.....	243.86	60.13
16135-0063	EA	24" x 24" x 6" NEMA 1 Enclosure With Screw Cover.....	283.80	65.36
16135-0064	EA	30" x 24" x 6" NEMA 1 Enclosure With Screw Cover.....	307.98	69.28
16135-0065	EA	36" x 24" x 6" NEMA 1 Enclosure With Screw Cover.....	341.60	71.89
16135-0066		8" Depth (16135-0030)		
16135-0067	EA	8" x 8" x 8" NEMA 1 Enclosure With Screw Cover.....	78.55	22.22
16135-0068	EA	12" x 12" x 8" NEMA 1 Enclosure With Screw Cover.....	109.04	28.76
16135-0069	EA	16" x 12" x 8" NEMA 1 Enclosure With Screw Cover.....	138.57	36.60
16135-0070	EA	18" x 12" x 8" NEMA 1 Enclosure With Screw Cover.....	163.14	44.45
16135-0071	EA	24" x 12" x 8" NEMA 1 Enclosure With Screw Cover.....	223.74	62.75
16135-0072	EA	24" x 18" x 8" NEMA 1 Enclosure With Screw Cover.....	266.95	66.67
16135-0073	EA	24" x 24" x 8" NEMA 1 Enclosure With Screw Cover.....	313.16	71.89
16135-0074	EA	30" x 24" x 8" NEMA 1 Enclosure With Screw Cover.....	334.05	75.82
16135-0075	EA	30" x 30" x 8" NEMA 1 Enclosure With Screw Cover.....	352.44	78.43
16135-0076	EA	36" x 24" x 8" NEMA 1 Enclosure With Screw Cover.....	364.30	78.43
16135-0077		10" Depth (16135-0030)		
16135-0078	EA	18" x 12" x 10" NEMA 1 Enclosure With Screw Cover.....	186.08	49.67
16135-0079	EA	18" x 18" x 10" NEMA 1 Enclosure With Screw Cover.....	246.49	64.05
16135-0080	EA	24" x 12" x 10" NEMA 1 Enclosure With Screw Cover.....	245.70	67.97
16135-0081	EA	24" x 18" x 10" NEMA 1 Enclosure With Screw Cover.....	336.96	73.20



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16135-0082	EA	24" x 24" x 10" NEMA 1 Enclosure With Screw Cover	391.69	81.04
16135-0083	EA	30" x 24" x 10" NEMA 1 Enclosure With Screw Cover	442.32	83.66
16135-0084	EA	36" x 24" x 10" NEMA 1 Enclosure With Screw Cover	473.87	87.58
16135-0085		12" Depth <small>(16135-0030)</small>		
16135-0086	EA	18" x 18" x 12" NEMA 1 Enclosure With Screw Cover	272.30	70.59
16135-0087	EA	24" x 12" x 12" NEMA 1 Enclosure With Screw Cover	266.09	74.51
16135-0088	EA	24" x 18" x 12" NEMA 1 Enclosure With Screw Cover	369.81	81.04
16135-0089	EA	24" x 24" x 12" NEMA 1 Enclosure With Screw Cover	427.04	88.88
16135-0090	EA	30" x 24" x 12" NEMA 1 Enclosure With Screw Cover	487.62	92.80
16135-0091	EA	36" x 24" x 12" NEMA 1 Enclosure With Screw Cover	515.72	96.73
16135-0092		NEMA Type 12/13 Enclosures <small>(16135)</small>		
		Note: Dust-tight enclosures.		
16135-0093		NEMA 12 Hinged Cover Enclosure, Galvanized Steel <small>(16135-0092)</small>		
16135-0094		4" Depth <small>(16135-0093)</small>		
16135-0095	EA	4" x 4" x 4" NEMA 12 Enclosure With Hinged Cover	65.46	10.46
16135-0096	EA	6" x 6" x 4" NEMA 12 Enclosure With Hinged Cover	84.84	14.38
16135-0097	EA	8" x 8" x 4" NEMA 12 Enclosure With Hinged Cover	104.71	18.30
16135-0098	EA	10" x 8" x 4" NEMA 12 Enclosure With Hinged Cover	113.47	19.61
16135-0099	EA	12" x 6" x 4" NEMA 12 Enclosure With Hinged Cover	127.95	20.92
16135-0100	EA	12" x 10" x 4" NEMA 12 Enclosure With Hinged Cover	137.99	22.22
16135-0101		6" Depth <small>(16135-0093)</small>		
16135-0102	EA	6" x 6" x 6" NEMA 12 Enclosure With Hinged Cover	94.34	15.68
16135-0103	EA	8" x 6" x 6" NEMA 12 Enclosure With Hinged Cover	104.09	16.99
16135-0104		NEMA 12 Screw Cover Enclosure, Galvanized Steel <small>(16135-0092)</small>		
16135-0105		4" Depth <small>(16135-0104)</small>		
16135-0106	EA	4" x 4" x 4" NEMA 12 Enclosure With Screw Cover	70.21	10.46
16135-0107	EA	6" x 6" x 4" NEMA 12 Enclosure With Screw Cover	86.59	14.38
16135-0108	EA	8" x 6" x 4" NEMA 12 Enclosure With Screw Cover	97.18	15.68
16135-0109	EA	8" x 8" x 4" NEMA 12 Enclosure With Screw Cover	111.64	18.30
16135-0110	EA	10" x 8" x 4" NEMA 12 Enclosure With Screw Cover	115.84	19.61
16135-0111	EA	10" x 10" x 4" NEMA 12 Enclosure With Screw Cover	133.92	20.92
16135-0112	EA	12" x 10" x 4" NEMA 12 Enclosure With Screw Cover	143.50	22.22
16135-0113	EA	12" x 12" x 4" NEMA 12 Enclosure With Screw Cover	161.02	23.53
16135-0114		6" Depth <small>(16135-0104)</small>		
16135-0115	EA	6" x 6" x 6" NEMA 12 Enclosure With Screw Cover	103.08	15.68
16135-0116	EA	8" x 6" x 6" NEMA 12 Enclosure With Screw Cover	115.57	16.99
16135-0117	EA	8" x 8" x 6" NEMA 12 Enclosure With Screw Cover	127.38	19.61
16135-0118	EA	10" x 10" x 6" NEMA 12 Enclosure With Screw Cover	151.10	23.53
16135-0119	EA	12" x 12" x 6" NEMA 12 Enclosure With Screw Cover	164.85	26.14
16135-0120	EA	16" x 14" x 6" NEMA 12 Enclosure With Screw Cover	225.93	33.99
16135-0121	EA	18" x 18" x 6" NEMA 12 Enclosure With Screw Cover	349.62	52.29
16135-0122	EA	24" x 16" x 6" NEMA 12 Enclosure With Screw Cover	447.19	60.13
16135-0123	EA	24" x 24" x 6" NEMA 12 Enclosure With Screw Cover	501.04	65.36
16135-0124		8" Depth <small>(16135-0104)</small>		
16135-0125	EA	24" x 18" x 8" NEMA 12 Enclosure With Screw Cover	471.40	66.67
16135-0126	EA	24" x 24" x 8" NEMA 12 Enclosure With Screw Cover	536.90	71.89
16135-0127	EA	30" x 24" x 8" NEMA 12 Enclosure With Screw Cover	586.04	75.82
16135-0128	EA	30" x 30" x 8" NEMA 12 Enclosure With Screw Cover	639.49	78.43
16135-0129	EA	36" x 24" x 8" NEMA 12 Enclosure With Screw Cover	632.08	78.43
16135-0130		NEMA 12 Cabinet Enclosure, Double Door, Galvanized Steel, Floor Mounted <small>(16135-0092)</small>		
16135-0131	EA	60" x 48" x 8" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	1,806.53	106.21
16135-0132	EA	60" x 48" x 10" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	1,834.76	117.64
16135-0133	EA	60" x 48" x 12" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	2,018.38	184.96
16135-0134	EA	60" x 60" x 10" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	2,095.23	125.82
16135-0135	EA	60" x 60" x 12" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	2,239.57	196.08
16135-0136	EA	72" x 60" x 10" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	2,422.89	156.86
16135-0137	EA	72" x 60" x 12" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	2,529.75	209.14
16135-0138	EA	72" x 72" x 10" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	2,715.56	184.96
16135-0139	EA	72" x 72" x 12" NEMA 12 Floor Mounted Cabinet Enclosure With Double Door	2,769.28	209.14
16135-0140		NEMA Type 3R Enclosures <small>(16135)</small>		
		Note: Rain-tight enclosures.		
16135-0141		NEMA 3R Hinged Cover Enclosure, Galvanized Steel <small>(16135-0140)</small>		
16135-0142		4" Depth <small>(16135-0141)</small>		
16135-0143	EA	6" x 4" x 4" NEMA 3R Enclosure With Hinged Cover	52.98	13.07

16000 Electrical**16100 Basic Materials And Methods****16135 Enclosures**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16135-0144	EA	6" x 6" x 4" NEMA 3R Enclosure With Hinged Cover	58.48	14.38
16135-0145	EA	8" x 6" x 4" NEMA 3R Enclosure With Hinged Cover	82.31	14.38
16135-0146		6" Depth <small>(16135-0144)</small>		
16135-0147	EA	8" x 8" x 6" NEMA 3R Enclosure With Hinged Cover	107.71	19.61
16135-0148	EA	10" x 8" x 6" NEMA 3R Enclosure With Hinged Cover	120.42	22.22
16135-0149	EA	12" x 10" x 6" NEMA 3R Enclosure With Hinged Cover	141.07	24.84
16135-0150	EA	12" x 12" x 6" NEMA 3R Enclosure With Hinged Cover	152.38	26.14
16135-0151	EA	16" x 12" x 6" NEMA 3R Enclosure With Hinged Cover	198.38	33.99
16135-0152	EA	16" x 16" x 6" NEMA 3R Enclosure With Hinged Cover	237.44	41.83
16135-0153	EA	18" x 18" x 6" NEMA 3R Enclosure With Hinged Cover	271.99	52.29
16135-0154		8" Depth <small>(16135-0144)</small>		
16135-0155	EA	24" x 20" x 8" NEMA 3R Enclosure With Hinged Cover	410.87	66.67
16135-0156	EA	24" x 24" x 8" NEMA 3R Enclosure With Hinged Cover	455.32	71.89
16135-0157	EA	30" x 24" x 8" NEMA 3R Enclosure With Hinged Cover	511.66	75.82
16135-0158	EA	30" x 30" x 8" NEMA 3R Enclosure With Hinged Cover	537.93	78.43
16135-0159		10" Depth <small>(16135-0144)</small>		
16135-0160	EA	12" x 48" x 10" NEMA 3R Enclosure With Hinged Cover	509.18	81.04
16135-0161	EA	12" x 54" x 10" NEMA 3R Enclosure With Hinged Cover	575.18	91.50
16135-0162	EA	12" x 60" x 10" NEMA 3R Enclosure With Hinged Cover	636.81	101.31
16135-0163	EA	12" x 66" x 10" NEMA 3R Enclosure With Hinged Cover	701.49	111.76
16135-0164	EA	12" x 72" x 10" NEMA 3R Enclosure With Hinged Cover	763.77	121.56
16135-0165	EA	18" x 18" x 10" NEMA 3R Enclosure With Hinged Cover	333.45	64.05
16135-0166	EA	24" x 24" x 10" NEMA 3R Enclosure With Hinged Cover	509.18	81.04
16135-0167	EA	30" x 24" x 10" NEMA 3R Enclosure With Hinged Cover	600.74	83.66
16135-0168	EA	36" x 36" x 10" NEMA 3R Enclosure With Hinged Cover	757.95	91.50
16135-0169		12" Depth <small>(16135-0144)</small>		
16135-0170	EA	12" x 48" x 12" NEMA 3R Enclosure With Hinged Cover	491.44	64.70
16135-0171	EA	12" x 54" x 12" NEMA 3R Enclosure With Hinged Cover	551.11	72.55
16135-0172	EA	12" x 60" x 12" NEMA 3R Enclosure With Hinged Cover	610.11	80.39
16135-0173	EA	12" x 66" x 12" NEMA 3R Enclosure With Hinged Cover	674.70	88.88
16135-0174	EA	12" x 72" x 12" NEMA 3R Enclosure With Hinged Cover	734.37	96.73
16135-0175	EA	18" x 24" x 12" NEMA 3R Enclosure With Hinged Cover	367.18	48.37
16135-0176	EA	18" x 32" x 12" NEMA 3R Enclosure With Hinged Cover	491.44	64.70
16135-0177	EA	18" x 36" x 12" NEMA 3R Enclosure With Hinged Cover	551.11	72.55
16135-0178	EA	18" x 42" x 12" NEMA 3R Enclosure With Hinged Cover	645.20	84.96
16135-0179	EA	18" x 48" x 12" NEMA 3R Enclosure With Hinged Cover	734.37	96.73
16135-0180	EA	30" x 30" x 12" NEMA 3R Enclosure With Hinged Cover	698.58	95.42
16135-0181	EA	36" x 24" x 12" NEMA 3R Enclosure With Hinged Cover	734.37	96.73
16135-0182	EA	36" x 30" x 12" NEMA 3R Enclosure With Hinged Cover	773.12	99.34
16135-0183	EA	36" x 36" x 12" NEMA 3R Enclosure With Hinged Cover	860.12	104.58
16135-0184	EA	42" x 30" x 12" NEMA 3R Enclosure With Hinged Cover	932.24	109.80
16135-0185		NEMA 3R Screw Cover Enclosure, Galvanized Steel <small>(16135-0140)</small>		
16135-0186		4" Depth <small>(16135-0185)</small>		
16135-0187	EA	4" x 4" x 4" NEMA 3R Enclosure With Screw Cover	42.02	10.46
16135-0188	EA	6" x 4" x 4" NEMA 3R Enclosure With Screw Cover	50.55	13.07
16135-0189	EA	6" x 6" x 4" NEMA 3R Enclosure With Screw Cover	55.84	14.38
16135-0190	EA	8" x 6" x 4" NEMA 3R Enclosure With Screw Cover	62.06	15.68
16135-0191	EA	8" x 8" x 4" NEMA 3R Enclosure With Screw Cover	72.03	18.30
16135-0192	EA	10" x 8" x 4" NEMA 3R Enclosure With Screw Cover	78.70	19.61
16135-0193	EA	10" x 10" x 4" NEMA 3R Enclosure With Screw Cover	86.02	20.92
16135-0194	EA	12" x 8" x 4" NEMA 3R Enclosure With Screw Cover	85.59	20.92
16135-0195	EA	12" x 10" x 4" NEMA 3R Enclosure With Screw Cover	93.92	22.22
16135-0196	EA	12" x 12" x 4" NEMA 3R Enclosure With Screw Cover	101.24	23.53
16135-0197	EA	18" x 12" x 4" NEMA 3R Enclosure With Screw Cover	152.33	36.60
16135-0198	EA	18" x 18" x 4" NEMA 3R Enclosure With Screw Cover	204.21	47.05
16135-0199		6" Depth <small>(16135-0185)</small>		
16135-0200	EA	6" x 6" x 6" NEMA 3R Enclosure With Screw Cover	57.73	15.68
16135-0201	EA	8" x 8" x 6" NEMA 3R Enclosure With Screw Cover	79.87	19.61
16135-0202	EA	10" x 8" x 6" NEMA 3R Enclosure With Screw Cover	90.48	22.22
16135-0203	EA	10" x 10" x 6" NEMA 3R Enclosure With Screw Cover	98.40	23.53
16135-0204	EA	12" x 8" x 6" NEMA 3R Enclosure With Screw Cover	97.76	23.53
16135-0205	EA	12" x 10" x 6" NEMA 3R Enclosure With Screw Cover	106.19	24.84
16135-0206	EA	12" x 12" x 6" NEMA 3R Enclosure With Screw Cover	114.71	26.14
16135-0207	EA	16" x 12" x 6" NEMA 3R Enclosure With Screw Cover	149.79	33.99
16135-0208	EA	18" x 12" x 6" NEMA 3R Enclosure With Screw Cover	171.61	40.53
16135-0209	EA	18" x 18" x 6" NEMA 3R Enclosure With Screw Cover	230.05	52.29
16135-0210	EA	24" x 12" x 6" NEMA 3R Enclosure With Screw Cover	239.18	56.21
16135-0211	EA	24" x 18" x 6" NEMA 3R Enclosure With Screw Cover	275.87	60.13
16135-0212	EA	24" x 24" x 6" NEMA 3R Enclosure With Screw Cover	312.16	65.36



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16135-0213		8" Depth <small>(16135-0185)</small>		
16135-0214	EA	12" x 12" x 8" NEMA 3R Enclosure With Screw Cover	128.70	28.76
16135-0215	EA	18" x 12" x 8" NEMA 3R Enclosure With Screw Cover	184.71	44.45
16135-0216	EA	18" x 18" x 8" NEMA 3R Enclosure With Screw Cover	254.74	57.51
16135-0217	EA	24" x 18" x 8" NEMA 3R Enclosure With Screw Cover	305.17	66.67
16135-0218	EA	24" x 24" x 8" NEMA 3R Enclosure With Screw Cover	347.41	71.89
16135-0219	EA	30" x 24" x 8" NEMA 3R Enclosure With Screw Cover	388.41	75.82
16135-0220		10" Depth <small>(16135-0185)</small>		
16135-0221	EA	18" x 18" x 10" NEMA 3R Enclosure With Screw Cover	280.66	64.05
16135-0222	EA	24" x 24" x 10" NEMA 3R Enclosure With Screw Cover	380.82	81.04
16135-0223	EA	30" x 24" x 10" NEMA 3R Enclosure With Screw Cover	420.98	83.66
16135-0224		12" Depth <small>(16135-0185)</small>		
16135-0225	EA	24" x 24" x 12" NEMA 3R Enclosure With Screw Cover	421.09	88.88
16135-0226	EA	30" x 30" x 12" NEMA 3R Enclosure With Screw Cover	602.90	96.73
16135-0227	EA	36" x 30" x 12" NEMA 3R Enclosure With Screw Cover	623.48	99.34
16135-0228	EA	36" x 36" x 12" NEMA 3R Enclosure With Screw Cover	736.22	104.58
16135-0229		NEMA Type 4 Or 4X Enclosures <small>(16135)</small>		
		Note: Water-tight enclosures.		
16135-0230		NEMA 4 Hinge Cover Enclosure, Steel <small>(16135-0229)</small>		
16135-0231	EA	4" x 4" x 3" NEMA 4 Steel Enclosure With Hinged Cover	76.76	9.15
16135-0232	EA	6" x 4" x 3" NEMA 4 Steel Enclosure With Hinged Cover	89.04	11.11
16135-0233	EA	8" x 6" x 3.5" NEMA 4 Steel Enclosure With Hinged Cover	111.02	14.38
16135-0234	EA	6" x 6" x 4" NEMA 4 Steel Enclosure With Hinged Cover	104.89	14.38
16135-0235	EA	10" x 8" x 4" NEMA 4 Steel Enclosure With Hinged Cover	139.79	19.61
16135-0236	EA	12" x 10" x 5" NEMA 4 Steel Enclosure With Hinged Cover	175.11	23.53
16135-0237	EA	10" x 8" x 6" NEMA 4 Steel Enclosure With Hinged Cover	161.25	22.22
16135-0238	EA	12" x 12" x 6" NEMA 4 Steel Enclosure With Hinged Cover	187.73	26.14
16135-0239	EA	14" x 12" x 6" NEMA 4 Steel Enclosure With Hinged Cover	221.63	30.07
16135-0240	EA	16" x 14" x 6" NEMA 4 Steel Enclosure With Hinged Cover	267.11	37.91
16135-0241		NEMA 4 Clamp Cover Enclosure, Steel <small>(16135-0229)</small>		
16135-0242	EA	4" x 4" x 3" NEMA 4 Steel Enclosure With Clamp Cover	69.64	9.15
16135-0243	EA	6" x 6" x 4" NEMA 4 Steel Enclosure With Clamp Cover	97.79	14.38
16135-0244	EA	6" x 4" x 3" NEMA 4 Aluminum Enclosure With Clamp Cover.....	161.07	10.46
16135-0245	EA	6" x 6" x 4" NEMA 4 Aluminum Enclosure With Clamp Cover.....	187.70	14.38
16135-0246	EA	10" x 8" x 4" NEMA 4 Aluminum Enclosure With Clamp Cover.....	236.44	19.61
16135-0247	EA	12" x 10" x 5" NEMA 4 Aluminum Enclosure With Clamp Cover.....	287.34	23.53
16135-0248	EA	14" x 12" x 6" NEMA 4 Aluminum Enclosure With Clamp Cover.....	353.12	30.07
16135-0249	EA	16" x 14" x 6" NEMA 4 Aluminum Enclosure With Clamp Cover.....	414.43	37.91
16135-0250		NEMA 4X Clamp Cover Enclosure, 304 Stainless Steel <small>(16135-0229)</small>		
16135-0251	EA	4" x 4" x 3" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	145.24	9.15
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	33.04	
16135-0252	EA	6" x 4" x 4" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	189.27	13.07
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	42.28	
16135-0253	EA	6" x 6" x 4" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	214.33	14.38
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	48.17	
16135-0254	EA	8" x 6" x 4" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	245.08	15.68
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	55.58	
16135-0255	EA	10" x 8" x 4" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	301.11	19.61
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	68.06	
16135-0256	EA	12" x 10" x 6" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	422.70	24.84
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	97.36	
16135-0257	EA	14" x 12" x 6" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	526.69	30.07
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	121.91	
16135-0258	EA	16" x 14" x 6" NEMA 4X 304 Stainless Steel Enclosure With Clamp Cover.....	635.45	37.91
		<i>16MOD-0051 For 316L Stainless Steel, Add</i>	145.98	
16135-0259		NEMA 4 Screw Cover Enclosure, Fiberglass <small>(16135-0229)</small>		
16135-0260	EA	6" x 6" x 4" NEMA 4 Fiberglass Enclosure With Screw Cover A664CHSCFG	77.75	12.55
16135-0261	EA	8" x 6" x 4" NEMA 4 Fiberglass Enclosure With Screw Cover A864CHSCFG	91.45	13.60
16135-0262	EA	10" x 8" x 6" NEMA 4 Fiberglass Enclosure With Screw Cover A1086CHSCFG	111.11	17.78
16135-0263	EA	12" x 10" x 6" NEMA 4 Fiberglass Enclosure With Screw Cover A12106CHSCFG	130.87	19.61
16135-0264	EA	14" x 12" x 8" NEMA 4 Fiberglass Enclosure With Screw Cover A14128CHSCFG	170.15	24.84
16135-0265	EA	16" x 14" x 8" NEMA 4 Fiberglass Enclosure With Screw Cover A16148CHSCFG	198.64	29.41
16135-0266	EA	18" x 16" x 10" NEMA 4 Fiberglass Enclosure With Screw Cover 181610CHSCFG.....	273.54	47.05
16135-0267		Breaker Enclosure <small>(16135)</small>		
16135-0268		100A, 3-Pole Breaker Enclosure <small>(16135-0267)</small>		
16135-0269	EA	NEMA 1, 100 A Breaker Enclosure	384.53	52.29
16135-0270	EA	NEMA 3R, 100 A Breaker Enclosure	453.53	52.29
16135-0271	EA	NEMA 4/4X, 100 A Breaker Enclosure.....	686.59	71.89
16135-0272	EA	NEMA 7, 100 A Breaker Enclosure	815.33	78.43

16000 Electrical**16100 Basic Materials And Methods****16135 Enclosures**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16135-0273	EA	NEMA 9, 100 A Breaker Enclosure	633.31	78.43
16135-0274	EA	NEMA 12, 100 A Breaker Enclosure	448.72	71.89
16135-0275		225A, 3-Pole Breaker Enclosure (16135-0267)		
16135-0276	EA	NEMA 1, 225 A Breaker Enclosure	754.94	71.89
16135-0277	EA	NEMA 3R, 225 A Breaker Enclosure	866.67	71.89
16135-0278	EA	NEMA 4/4X, 225 A Breaker Enclosure	1,360.62	91.50
16135-0279	EA	NEMA 7, 225 A Breaker Enclosure	1,637.73	111.11
16135-0280	EA	NEMA 9, 225 A Breaker Enclosure	1,294.43	91.50
16135-0281	EA	NEMA 12, 225 A Breaker Enclosure	854.61	91.50
16135-0282		400A, 3-Pole Breaker Enclosure (16135-0267)		
16135-0283	EA	NEMA 1, 400 A Breaker Enclosure	1,357.42	143.79
16135-0284	EA	NEMA 3R, 400 A Breaker Enclosure	1,647.94	143.79
16135-0285	EA	NEMA 4/4X, 400 A Breaker Enclosure	2,560.94	183.00
16135-0286	EA	NEMA 7, 400 A Breaker Enclosure	3,280.27	241.70
16135-0287	EA	NEMA 12, 400 A Breaker Enclosure	1,558.03	183.00
16135-0288		800A, 3-Pole Breaker Enclosure (16135-0267)		
16135-0289	EA	NEMA 1, 800 A Breaker Enclosure	2,825.43	274.50
16135-0290	EA	NEMA 3R, 800 A Breaker Enclosure	3,169.79	274.50
16135-0291	EA	NEMA 4/4X, 800 A Breaker Enclosure	4,993.11	352.93
16135-0292	EA	NEMA 7, 800 A Breaker Enclosure	5,961.30	373.06
16135-0293	EA	NEMA 12, 800 A Breaker Enclosure	3,218.78	352.93

16139 Cable Trays (16100)

Note: Excludes supporting hangers.

16139-0001		Ladder Bottom Galvanized Steel Cable Tray (16139)		
		Note: 4-5/8" Height.		
16139-0002		Straight Cable Tray Sections (16139-0001)		
16139-0003		4" Rung Spacing Straight Steel Cable Tray Sections (16139-0002)		
16139-0004	LF	6" Steel Cable Tray, 4" Rung Spacing, Straight Section	20.27	6.28
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.50	
16139-0005	LF	9" Steel Cable Tray, 4" Rung Spacing, Straight Section	21.88	6.73
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.63	
16139-0006	LF	12" Steel Cable Tray, 4" Rung Spacing, Straight Section	23.90	7.25
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.78	
16139-0007	LF	18" Steel Cable Tray, 4" Rung Spacing, Straight Section	26.51	7.71
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.01	
16139-0008	LF	24" Steel Cable Tray, 4" Rung Spacing, Straight Section	28.97	7.97
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.24	
16139-0009	LF	30" Steel Cable Tray, 4" Rung Spacing, Straight Section	35.17	9.22
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.75	
16139-0010	LF	36" Steel Cable Tray, 4" Rung Spacing, Straight Section	39.52	10.52
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-3.08	
16139-0011		6" Rung Spacing Straight Steel Cable Tray Sections (16139-0002)		
16139-0012	LF	6" Steel Cable Tray, 6" Rung Spacing, Straight Section	19.18	6.15
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.40	
16139-0013	LF	9" Steel Cable Tray, 6" Rung Spacing, Straight Section	20.72	6.54
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.53	
16139-0014	LF	12" Steel Cable Tray, 6" Rung Spacing, Straight Section	22.14	7.12
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.62	
16139-0015	LF	18" Steel Cable Tray, 6" Rung Spacing, Straight Section	24.20	7.51
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.80	
16139-0016	LF	24" Steel Cable Tray, 6" Rung Spacing, Straight Section	26.01	7.78
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.96	
16139-0017	LF	30" Steel Cable Tray, 6" Rung Spacing, Straight Section	30.52	8.96
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.31	
16139-0018	LF	36" Steel Cable Tray, 6" Rung Spacing, Straight Section	33.37	9.81
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.52	
16139-0019		9" Rung Spacing Straight Steel Cable Tray Sections (16139-0002)		
16139-0020	LF	6" Steel Cable Tray, 9" Rung Spacing, Straight Section	18.51	6.08
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.35	
16139-0021	LF	9" Steel Cable Tray, 9" Rung Spacing, Straight Section	19.07	6.28
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.38	
16139-0022	LF	12" Steel Cable Tray, 9" Rung Spacing, Straight Section	20.94	6.67
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.54	
16139-0023	LF	18" Steel Cable Tray, 9" Rung Spacing, Straight Section	22.86	6.99
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.70	
16139-0024	LF	24" Steel Cable Tray, 9" Rung Spacing, Straight Section	24.68	7.19
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.87	
16139-0025	LF	30" Steel Cable Tray, 9" Rung Spacing, Straight Section	26.90	7.84
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.04	
16139-0026	LF	36" Steel Cable Tray, 9" Rung Spacing, Straight Section	28.92	8.49
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.18	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16139-0027		12" Rung Spacing Straight Steel Cable Tray Sections <small>(16139-0002)</small>		
16139-0028	LF	6" Steel Cable Tray, 12" Rung Spacing, Straight Section	17.94	5.82
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.31	
16139-0029	LF	9" Steel Cable Tray, 12" Rung Spacing, Straight Section	18.31	5.95
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.34	
16139-0030	LF	12" Steel Cable Tray, 12" Rung Spacing, Straight Section	19.39	6.28
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.42	
16139-0031	LF	18" Steel Cable Tray, 12" Rung Spacing, Straight Section	20.52	6.60
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.50	
16139-0032	LF	24" Steel Cable Tray, 12" Rung Spacing, Straight Section	21.31	6.60
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.58	
16139-0033	LF	30" Steel Cable Tray, 12" Rung Spacing, Straight Section	23.50	7.12
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.76	
16139-0034	LF	36" Steel Cable Tray, 12" Rung Spacing, Straight Section	24.76	7.45
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.85	

16139-0035		18" Rung Spacing Straight Steel Cable Tray Sections <small>(16139-0002)</small>		
16139-0036	LF	6" Steel Cable Tray, 18" Rung Spacing, Straight Section	17.69	5.69
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.29	
16139-0037	LF	9" Steel Cable Tray, 18" Rung Spacing, Straight Section	18.00	5.82
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.31	
16139-0038	LF	12" Steel Cable Tray, 18" Rung Spacing, Straight Section	19.07	6.15
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.40	
16139-0039	LF	18" Steel Cable Tray, 18" Rung Spacing, Straight Section	20.02	6.41
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.47	
16139-0040	LF	24" Steel Cable Tray, 18" Rung Spacing, Straight Section	20.34	6.47
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.49	
16139-0041	LF	30" Steel Cable Tray, 18" Rung Spacing, Straight Section	21.62	6.93
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.58	
16139-0042	LF	36" Steel Cable Tray, 18" Rung Spacing, Straight Section	22.57	7.32
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.65	

16139-0043		4" Rung Tray Fittings <small>(16139-0001)</small>		
16139-0044		90 Degree, 12" Radius Horizontal Elbows <small>(16139-0043)</small>		
16139-0045	EA	6" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	162.18	65.56
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.76	
16139-0046	EA	9" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	181.60	74.64
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.94	
16139-0047	EA	12" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	199.74	82.54
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.10	
16139-0048	EA	18" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	249.31	101.18
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.50	
16139-0049	EA	24" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	284.38	116.14
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.76	
16139-0050	EA	30" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	337.22	130.71
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.83	
16139-0051	EA	36" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	388.53	149.40
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.40	

16139-0052		90 Degree, 24" Radius Horizontal Elbows <small>(16139-0043)</small>		
16139-0053	EA	6" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	222.89	68.16
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.61	
16139-0054	EA	9" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	243.24	78.36
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.79	
16139-0055	EA	12" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	262.08	87.12
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.95	
16139-0056	EA	18" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	306.43	108.24
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.63	
16139-0057	EA	24" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	344.54	125.56
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.99	
16139-0058	EA	30" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	384.59	142.48
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.58	
16139-0059	EA	36" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	449.91	165.03
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.24	

16139-0060		90 Degree, 36" Radius Horizontal Elbows <small>(16139-0043)</small>		
16139-0061	EA	6" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	239.79	71.24
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.04	
16139-0062	EA	9" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	265.18	82.48
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.65	
16139-0063	EA	12" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	287.51	92.28
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.06	
16139-0064	EA	18" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	346.58	116.14
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.98	
16139-0065	EA	24" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	395.36	136.34
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.17	
16139-0066	EA	30" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	463.16	156.86
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.24	
16139-0067	EA	36" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	527.36	184.31
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.38	

MINOR		TOTAL DIRECT		DEMOLITION	
CSI	UOM	DESCRIPTION	UNIT COST	UNIT COST	
16139-0068		45 Degree, 12" Radius Horizontal Elbows (16139-0043)			
16139-0069	EA	6" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	120.35		47.51
	16MOD-0052	For 60 Degree Bend, Deduct	-21.51		
	16MOD-0053	For 30 Degree Bend, Deduct	-38.49		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.08		
16139-0070	EA	9" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	137.81		56.99
	16MOD-0052	For 60 Degree Bend, Deduct	-23.64		
	16MOD-0053	For 30 Degree Bend, Deduct	-42.57		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.03		
16139-0071	EA	12" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	153.48		65.36
	16MOD-0052	For 60 Degree Bend, Deduct	-25.59		
	16MOD-0053	For 30 Degree Bend, Deduct	-46.29		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.90		
16139-0072	EA	18" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	184.72		82.61
	16MOD-0052	For 60 Degree Bend, Deduct	-29.30		
	16MOD-0053	For 30 Degree Bend, Deduct	-53.42		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.59		
16139-0073	EA	24" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	229.14		101.18
	16MOD-0052	For 60 Degree Bend, Deduct	-36.83		
	16MOD-0053	For 30 Degree Bend, Deduct	-67.01		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.48		
16139-0074	EA	30" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	270.93		116.14
	16MOD-0052	For 60 Degree Bend, Deduct	-44.88		
	16MOD-0053	For 30 Degree Bend, Deduct	-81.25		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.41		
16139-0075	EA	36" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	307.94		136.34
	16MOD-0052	For 60 Degree Bend, Deduct	-49.35		
	16MOD-0053	For 30 Degree Bend, Deduct	-89.83		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.43		
16139-0076		45 Degree, 24" Radius Horizontal Elbows (16139-0043)			
16139-0077	EA	6" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	133.76		49.02
	16MOD-0052	For 60 Degree Bend, Deduct	-25.36		
	16MOD-0053	For 30 Degree Bend, Deduct	-44.99		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.29		
16139-0078	EA	9" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	153.97		59.09
	16MOD-0052	For 60 Degree Bend, Deduct	-28.16		
	16MOD-0053	For 30 Degree Bend, Deduct	-50.21		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.47		
16139-0079	EA	12" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	175.90		68.23
	16MOD-0052	For 60 Degree Bend, Deduct	-31.90		
	16MOD-0053	For 30 Degree Bend, Deduct	-56.95		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.91		
16139-0080	EA	18" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	209.12		87.12
	16MOD-0052	For 60 Degree Bend, Deduct	-35.60		
	16MOD-0053	For 30 Degree Bend, Deduct	-64.18		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.65		
16139-0081	EA	24" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	257.68		108.24
	16MOD-0052	For 60 Degree Bend, Deduct	-43.55		
	16MOD-0053	For 30 Degree Bend, Deduct	-78.60		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.75		
16139-0082	EA	30" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	301.67		125.56
	16MOD-0052	For 60 Degree Bend, Deduct	-51.43		
	16MOD-0053	For 30 Degree Bend, Deduct	-92.70		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.71		
16139-0083	EA	36" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	354.99		149.47
	16MOD-0052	For 60 Degree Bend, Deduct	-59.86		
	16MOD-0053	For 30 Degree Bend, Deduct	-108.07		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.05		
16139-0084		45 Degree, 36" Radius Horizontal Elbows (16139-0043)			
16139-0085	EA	6" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	159.08		50.58
	16MOD-0052	For 60 Degree Bend, Deduct	-33.11		
	16MOD-0053	For 30 Degree Bend, Deduct	-58.00		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.69		
16139-0086	EA	9" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	181.39		61.43
	16MOD-0052	For 60 Degree Bend, Deduct	-36.31		
	16MOD-0053	For 30 Degree Bend, Deduct	-63.93		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.02		
16139-0087	EA	12" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	199.53		71.30
	16MOD-0052	For 60 Degree Bend, Deduct	-38.51		
	16MOD-0053	For 30 Degree Bend, Deduct	-68.15		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.01		
16139-0088	EA	18" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	241.28		92.28
	16MOD-0052	For 60 Degree Bend, Deduct	-44.23		
	16MOD-0053	For 30 Degree Bend, Deduct	-78.85		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.44		
16139-0089	EA	24" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	286.06		116.14
	16MOD-0052	For 60 Degree Bend, Deduct	-49.87		
	16MOD-0053	For 30 Degree Bend, Deduct	-89.57		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.93		
16139-0090	EA	30" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	346.61		136.34
	16MOD-0052	For 60 Degree Bend, Deduct	-62.11		
	16MOD-0053	For 30 Degree Bend, Deduct	-111.10		
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.30		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0091	EA	36" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	407.88	165.03
	16MOD-0052	For 60 Degree Bend, Deduct	-71.33	
	16MOD-0053	For 30 Degree Bend, Deduct	-128.06	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.03	
16139-0092		90 Degree, 12" Radius Vertical Risers (16139-0043)		
16139-0093	EA	6" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Steel Cable Tray	174.22	65.36
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.98	
16139-0094	EA	9" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Steel Cable Tray	191.23	74.64
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.90	
16139-0095	EA	12" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Steel Cable Tray	206.59	82.54
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.78	
16139-0096	EA	18" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Steel Cable Tray	240.67	101.18
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.64	
16139-0097	EA	24" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Steel Cable Tray	268.65	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.19	
16139-0098	EA	30" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Steel Cable Tray	298.91	130.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.00	
16139-0099	EA	36" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Steel Cable Tray	332.76	149.21
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.84	
16139-0100		90 Degree, 24" Radius Vertical Risers (16139-0043)		
16139-0101	EA	6" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Steel Cable Tray	205.93	68.16
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.91	
16139-0102	EA	9" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Steel Cable Tray	225.27	78.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.99	
16139-0103	EA	12" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Steel Cable Tray	243.56	87.12
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.09	
16139-0104	EA	18" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Steel Cable Tray	283.92	108.24
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.37	
16139-0105	EA	24" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	318.03	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.34	
16139-0106	EA	30" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Steel Cable Tray	352.32	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.36	
16139-0107	EA	36" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Steel Cable Tray	404.16	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.66	
16139-0108		90 Degree, 36" Radius Vertical Risers (16139-0043)		
16139-0109	EA	6" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Steel Cable Tray	243.33	71.24
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.40	
16139-0110	EA	9" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Steel Cable Tray	266.63	82.54
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.79	
16139-0111	EA	12" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Steel Cable Tray	284.45	92.28
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.75	
16139-0112	EA	18" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Steel Cable Tray	334.69	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.79	
16139-0113	EA	24" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Steel Cable Tray	369.84	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.62	
16139-0114	EA	30" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Steel Cable Tray	423.54	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.28	
16139-0115	EA	36" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Steel Cable Tray	479.74	184.31
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.62	
16139-0116		12" Radius Horizontal Tees (16139-0043)		
16139-0117	EA	6" Horizontal Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	313.80	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.92	
16139-0118	EA	9" Horizontal Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	339.64	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.60	
16139-0119	EA	12" Horizontal Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	356.13	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.74	
16139-0120	EA	18" Horizontal Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	397.24	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.65	
16139-0121	EA	24" Horizontal Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	449.45	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.43	
16139-0122	EA	30" Horizontal Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	498.16	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.43	
16139-0123	EA	36" Horizontal Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	563.81	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.96	
16139-0124		24" Radius Horizontal Tees (16139-0043)		
16139-0125	EA	6" Horizontal Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	391.16	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.75	
16139-0126	EA	9" Horizontal Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	420.79	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.63	
16139-0127	EA	12" Horizontal Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	439.39	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.87	
16139-0128	EA	18" Horizontal Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	434.48	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.94	
16139-0129	EA	24" Horizontal Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	535.97	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.26	
16139-0130	EA	30" Horizontal Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	576.30	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.21	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0131	EA	36" Horizontal Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	694.36	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.31	
16139-0132		36" Radius Horizontal Tees (16139-0043)		
16139-0133	EA	6" Horizontal Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	494.16	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.96	
16139-0134	EA	9" Horizontal Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	529.52	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.20	
16139-0135	EA	12" Horizontal Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	561.84	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.67	
16139-0136	EA	18" Horizontal Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	618.70	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.53	
16139-0137	EA	24" Horizontal Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	702.43	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.59	
16139-0138	EA	30" Horizontal Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	761.49	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-56.03	
16139-0139	EA	36" Horizontal Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	860.57	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-62.31	
16139-0140		12" Radius Vertical Tees (16139-0043)		
16139-0141	EA	6" Vertical Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	371.56	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.48	
16139-0142	EA	9" Vertical Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	380.74	120.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.01	
16139-0143	EA	12" Vertical Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	390.29	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.57	
16139-0144	EA	18" Vertical Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	411.45	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.78	
16139-0145	EA	24" Vertical Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	424.81	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.61	
16139-0146	EA	30" Vertical Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	461.24	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.05	
16139-0147	EA	36" Vertical Tee, 4" Rung Spacing, 12" Radius, Steel Cable Tray	497.84	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.27	
16139-0148		24" Radius Vertical Tees (16139-0043)		
16139-0149	EA	6" Vertical Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	530.78	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.62	
16139-0150	EA	9" Vertical Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	544.12	130.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.52	
16139-0151	EA	12" Vertical Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	558.19	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.46	
16139-0152	EA	18" Vertical Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	589.39	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.49	
16139-0153	EA	24" Vertical Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	611.10	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.04	
16139-0154	EA	30" Vertical Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	649.26	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.42	
16139-0155	EA	36" Vertical Tee, 4" Rung Spacing, 24" Radius, Steel Cable Tray	701.44	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-53.80	
16139-0156		36" Radius Vertical Tees (16139-0043)		
16139-0157	EA	6" Vertical Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	828.25	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-71.46	
16139-0158	EA	9" Vertical Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	846.29	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-72.75	
16139-0159	EA	12" Vertical Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	865.69	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-74.12	
16139-0160	EA	18" Vertical Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	899.48	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-76.19	
16139-0161	EA	24" Vertical Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	922.44	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-77.73	
16139-0162	EA	30" Vertical Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	982.42	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-81.90	
16139-0163	EA	36" Vertical Tee, 4" Rung Spacing, 36" Radius, Steel Cable Tray	1,036.49	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-85.00	
16139-0164		12" Radius Horizontal Crosses (16139-0043)		
16139-0165	EA	6" Horizontal Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray	391.00	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.03	
16139-0166	EA	9" Horizontal Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray	410.88	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.33	
16139-0167	EA	12" Horizontal Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray	438.52	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.34	
16139-0168	EA	18" Horizontal Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray	470.06	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.62	
16139-0169	EA	24" Horizontal Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray	529.47	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.53	
16139-0170	EA	30" Horizontal Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray	590.03	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.35	
16139-0171	EA	36" Horizontal Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray	644.41	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.32	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0172 24" Radius Horizontal Crosses (16139-0043)				
16139-0173	EA	6" Horizontal Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	541.55	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.64	
16139-0174	EA	9" Horizontal Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	566.84	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.30	
16139-0175	EA	12" Horizontal Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	593.73	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.03	
16139-0176	EA	18" Horizontal Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	632.50	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.83	
16139-0177	EA	24" Horizontal Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	705.29	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.41	
16139-0178	EA	30" Horizontal Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	758.85	261.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.10	
16139-0179	EA	36" Horizontal Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	849.64	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-61.21	
16139-0180 36" Radius Horizontal Crosses (16139-0043)				
16139-0181	EA	6" Horizontal Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	678.02	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.46	
16139-0182	EA	9" Horizontal Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	715.23	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.10	
16139-0183	EA	12" Horizontal Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	755.50	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-56.90	
16139-0184	EA	18" Horizontal Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	823.93	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-62.27	
16139-0185	EA	24" Horizontal Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	943.30	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-70.58	
16139-0186	EA	30" Horizontal Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,029.37	313.20
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-76.84	
16139-0187	EA	36" Horizontal Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,127.84	348.88
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-83.71	
16139-0188 12" Radius Vertical Crosses (16139-0043)				
16139-0189	EA	6" Vertical Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	449.30	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.86	
16139-0190	EA	9" Vertical Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	472.09	165.10
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.45	
16139-0191	EA	12" Vertical Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	505.20	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.01	
16139-0192	EA	18" Vertical Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	543.22	184.70
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.93	
16139-0193	EA	24" Vertical Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	610.96	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.68	
16139-0194	EA	30" Vertical Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	687.85	223.92
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.12	
16139-0195	EA	36" Vertical Cross, 4" Rung Spacing, 12" Radius, Steel Cable Tray.....	752.79	241.17
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.18	
16139-0196 24" Radius Vertical Crosses (16139-0043)				
16139-0197	EA	6" Vertical Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	654.64	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.95	
16139-0198	EA	9" Vertical Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	683.45	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.96	
16139-0199	EA	12" Vertical Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	713.85	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.05	
16139-0200	EA	18" Vertical Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	760.35	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.62	
16139-0201	EA	24" Vertical Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	841.57	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-64.03	
16139-0202	EA	30" Vertical Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	904.26	261.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-68.64	
16139-0203	EA	36" Vertical Cross, 4" Rung Spacing, 24" Radius, Steel Cable Tray.....	1,018.23	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-78.07	
16139-0204 36" Radius Vertical Crosses (16139-0043)				
16139-0205	EA	6" Vertical Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	836.08	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-67.27	
16139-0206	EA	9" Vertical Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	880.31	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-70.61	
16139-0207	EA	12" Vertical Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	927.61	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-74.11	
16139-0208	EA	18" Vertical Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,013.59	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-81.24	
16139-0209	EA	24" Vertical Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,154.04	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-91.65	
16139-0210	EA	30" Vertical Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,257.67	313.20
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-99.67	
16139-0211	EA	36" Vertical Cross, 4" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,373.70	348.88
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-108.30	

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16139-0212	6" Rung Tray Fittings <small>(16139-0001)</small>		
16139-0213	90 Degree, 12" Radius Horizontal Elbows <small>(16139-0212)</small>		
16139-0214	EA 6" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	154.61	65.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.00	
16139-0215	EA 9" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	173.43	74.64
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.12	
16139-0216	EA 12" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	190.86	82.54
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.21	
16139-0217	EA 18" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	237.79	101.18
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.35	
16139-0218	EA 24" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	271.41	116.14
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.46	
16139-0219	EA 30" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	320.17	130.71
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.12	
16139-0220	EA 36" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	368.60	149.40
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.41	
16139-0221	90 Degree, 24" Radius Horizontal Elbows <small>(16139-0212)</small>		
16139-0222	EA 6" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	207.28	68.16
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.05	
16139-0223	EA 9" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	227.15	78.36
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.18	
16139-0224	EA 12" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	245.39	87.12
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.28	
16139-0225	EA 18" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	288.42	108.24
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.82	
16139-0226	EA 24" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	325.21	125.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.06	
16139-0227	EA 30" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	363.57	142.48
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.48	
16139-0228	EA 36" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	424.93	165.03
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.74	
16139-0229	90 Degree, 36" Radius Horizontal Elbows <small>(16139-0212)</small>		
16139-0230	EA 6" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	222.50	71.24
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.31	
16139-0231	EA 9" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	246.93	82.48
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.82	
16139-0232	EA 12" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	268.42	92.28
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.15	
16139-0233	EA 18" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	324.73	116.14
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.79	
16139-0234	EA 24" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	371.35	136.34
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.77	
16139-0235	EA 30" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	434.34	156.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.36	
16139-0236	EA 36" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	495.89	184.31
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.23	
16139-0237	45 Degree, 12" Radius Horizontal Elbows <small>(16139-0212)</small>		
16139-0238	EA 6" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	114.46	47.51
	16MOD-0054 For 60 Degree Bend, Deduct	-19.57	
	16MOD-0055 For 30 Degree Bend, Deduct	-35.25	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.49	
16139-0239	EA 9" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	131.68	56.99
	16MOD-0054 For 60 Degree Bend, Deduct	-21.62	
	16MOD-0055 For 30 Degree Bend, Deduct	-39.20	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.42	
16139-0240	EA 12" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	147.12	65.36
	16MOD-0054 For 60 Degree Bend, Deduct	-23.50	
	16MOD-0055 For 30 Degree Bend, Deduct	-42.79	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.27	
16139-0241	EA 18" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	178.00	82.61
	16MOD-0054 For 60 Degree Bend, Deduct	-27.08	
	16MOD-0055 For 30 Degree Bend, Deduct	-49.72	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.92	
16139-0242	EA 24" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	220.49	101.18
	16MOD-0054 For 60 Degree Bend, Deduct	-33.98	
	16MOD-0055 For 30 Degree Bend, Deduct	-62.25	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.62	
16139-0243	EA 30" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	259.88	116.14
	16MOD-0054 For 60 Degree Bend, Deduct	-41.23	
	16MOD-0055 For 30 Degree Bend, Deduct	-75.17	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.31	
16139-0244	EA 36" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	296.42	136.34
	16MOD-0054 For 60 Degree Bend, Deduct	-45.55	
	16MOD-0055 For 30 Degree Bend, Deduct	-83.49	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.28	
16139-0245	45 Degree, 24" Radius Horizontal Elbows <small>(16139-0212)</small>		



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0246	EA		6" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	126.32	49.02
	16MOD-0054		For 60 Degree Bend, Deduct	-22.91	
	16MOD-0055		For 30 Degree Bend, Deduct	-40.90	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.55	
16139-0247	EA		9" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	146.04	59.09
	16MOD-0054		For 60 Degree Bend, Deduct	-25.54	
	16MOD-0055		For 30 Degree Bend, Deduct	-45.85	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.68	
16139-0248	EA		12" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	167.02	68.23
	16MOD-0054		For 60 Degree Bend, Deduct	-28.97	
	16MOD-0055		For 30 Degree Bend, Deduct	-52.07	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.02	
16139-0249	EA		18" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	200.00	87.12
	16MOD-0054		For 60 Degree Bend, Deduct	-32.59	
	16MOD-0055		For 30 Degree Bend, Deduct	-59.17	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.74	
16139-0250	EA		24" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	246.63	108.24
	16MOD-0054		For 60 Degree Bend, Deduct	-39.91	
	16MOD-0055		For 30 Degree Bend, Deduct	-72.52	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.65	
16139-0251	EA		30" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	288.46	125.56
	16MOD-0054		For 60 Degree Bend, Deduct	-47.07	
	16MOD-0055		For 30 Degree Bend, Deduct	-85.43	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.39	
16139-0252	EA		36" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	339.86	149.47
	16MOD-0054		For 60 Degree Bend, Deduct	-54.87	
	16MOD-0055		For 30 Degree Bend, Deduct	-99.75	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.53	
16139-0253			45 Degree, 36" Radius Horizontal Elbows (16139-0212)		
16139-0254	EA		6" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	148.39	50.58
	16MOD-0054		For 60 Degree Bend, Deduct	-29.59	
	16MOD-0055		For 30 Degree Bend, Deduct	-52.12	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.63	
16139-0255	EA		9" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	170.10	61.43
	16MOD-0054		For 60 Degree Bend, Deduct	-32.59	
	16MOD-0055		For 30 Degree Bend, Deduct	-57.72	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.89	
16139-0256	EA		12" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	188.01	71.30
	16MOD-0054		For 60 Degree Bend, Deduct	-34.71	
	16MOD-0055		For 30 Degree Bend, Deduct	-61.81	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.86	
16139-0257	EA		18" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	228.79	92.28
	16MOD-0054		For 60 Degree Bend, Deduct	-40.11	
	16MOD-0055		For 30 Degree Bend, Deduct	-71.98	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.19	
16139-0258	EA		24" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	272.85	116.14
	16MOD-0054		For 60 Degree Bend, Deduct	-45.51	
	16MOD-0055		For 30 Degree Bend, Deduct	-82.31	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.61	
16139-0259	EA		30" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	329.56	136.34
	16MOD-0054		For 60 Degree Bend, Deduct	-56.49	
	16MOD-0055		For 30 Degree Bend, Deduct	-101.72	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.59	
16139-0260	EA		36" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	388.91	165.03
	16MOD-0054		For 60 Degree Bend, Deduct	-65.07	
	16MOD-0055		For 30 Degree Bend, Deduct	-117.63	
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.14	
16139-0261			90 Degree, 12" Radius Vertical Risers (16139-0212)		
16139-0262	EA		6" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Steel Cable Tray	169.00	65.36
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.45	
16139-0263	EA		9" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Steel Cable Tray	185.89	74.64
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.37	
16139-0264	EA		12" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Steel Cable Tray	201.06	82.54
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.23	
16139-0265	EA		18" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Steel Cable Tray	218.42	101.18
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.41	
16139-0266	EA		24" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Steel Cable Tray	262.65	116.14
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.59	
16139-0267	EA		30" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Steel Cable Tray	292.43	130.71
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.35	
16139-0268	EA		36" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Steel Cable Tray	326.03	149.21
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.17	
16139-0269			90 Degree, 24" Radius Vertical Risers (16139-0212)		
16139-0270	EA		6" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Steel Cable Tray	198.55	68.16
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.17	
16139-0271	EA		9" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Steel Cable Tray	217.71	78.43
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.24	
16139-0272	EA		12" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Steel Cable Tray	235.69	87.12
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.31	
16139-0273	EA		18" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Steel Cable Tray	275.63	108.24
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.55	
16139-0274	EA		24" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Steel Cable Tray	309.33	125.56
	16MOD-0060		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.47	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0275	EA	30" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Steel Cable Tray	343.13	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.44	
16139-0276	EA	36" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Steel Cable Tray	393.83	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.63	
16139-0277		90 Degree, 36" Radius Vertical Risers <small>(16139-0212)</small>		
16139-0278	EA	6" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Steel Cable Tray	233.37	71.24
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.40	
16139-0279	EA	9" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Steel Cable Tray	256.30	82.54
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.75	
16139-0280	EA	12" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Steel Cable Tray	274.00	92.28
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.71	
16139-0281	EA	18" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Steel Cable Tray	323.41	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.66	
16139-0282	EA	24" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Steel Cable Tray	358.44	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.48	
16139-0283	EA	30" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Steel Cable Tray	410.57	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.99	
16139-0284	EA	36" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Steel Cable Tray	465.94	184.31
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.24	
16139-0285		12" Radius Horizontal Tees <small>(16139-0212)</small>		
16139-0286	EA	6" Horizontal Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	305.75	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.11	
16139-0287	EA	9" Horizontal Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	331.00	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.74	
16139-0288	EA	12" Horizontal Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	347.00	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.83	
16139-0289	EA	18" Horizontal Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	386.79	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.61	
16139-0290	EA	24" Horizontal Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	437.20	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.21	
16139-0291	EA	30" Horizontal Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	483.51	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.97	
16139-0292	EA	36" Horizontal Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	547.24	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.30	
16139-0293		24" Radius Horizontal Tees <small>(16139-0212)</small>		
16139-0294	EA	6" Horizontal Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray	378.55	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.49	
16139-0295	EA	9" Horizontal Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray	407.58	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.30	
16139-0296	EA	12" Horizontal Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray	425.70	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.50	
16139-0297	EA	18" Horizontal Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray	467.46	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.24	
16139-0298	EA	24" Horizontal Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray	519.88	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.65	
16139-0299	EA	30" Horizontal Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray	558.77	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.46	
16139-0300	EA	36" Horizontal Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray	671.91	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.07	
16139-0301		36" Radius Horizontal Tees <small>(16139-0212)</small>		
16139-0302	EA	6" Horizontal Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray	475.31	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.08	
16139-0303	EA	9" Horizontal Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray	509.95	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.24	
16139-0304	EA	12" Horizontal Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray	540.95	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.58	
16139-0305	EA	18" Horizontal Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray	596.25	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.29	
16139-0306	EA	24" Horizontal Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray	677.09	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.06	
16139-0307	EA	30" Horizontal Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray	733.87	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-53.26	
16139-0308	EA	36" Horizontal Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray	830.91	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-59.34	
16139-0309		12" Radius Vertical Tees <small>(16139-0212)</small>		
16139-0310	EA	6" Vertical Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	357.87	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.11	
16139-0311	EA	9" Vertical Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	366.93	120.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.63	
16139-0312	EA	12" Vertical Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	376.36	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.18	
16139-0313	EA	18" Vertical Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	397.28	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.37	
16139-0314	EA	24" Vertical Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	410.40	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.17	
16139-0315	EA	30" Vertical Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray	445.87	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.52	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0316	EA	36" Vertical Tee, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	481.87	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.68	
16139-0317		24" Radius Vertical Tees <small>(16139-0212)</small>		
16139-0318	EA	6" Vertical Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	506.05	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.14	
16139-0319	EA	9" Vertical Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	519.02	130.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.01	
16139-0320	EA	12" Vertical Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	532.73	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.91	
16139-0321	EA	18" Vertical Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	563.21	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.87	
16139-0322	EA	24" Vertical Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	584.20	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.35	
16139-0323	EA	30" Vertical Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	621.64	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.65	
16139-0324	EA	36" Vertical Tee, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	672.62	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.92	
16139-0325		36" Radius Vertical Tees <small>(16139-0212)</small>		
16139-0326	EA	6" Vertical Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	782.02	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.84	
16139-0327	EA	9" Vertical Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	799.46	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-68.07	
16139-0328	EA	12" Vertical Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	818.26	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-69.37	
16139-0329	EA	18" Vertical Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	851.45	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-71.39	
16139-0330	EA	24" Vertical Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	873.81	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-72.87	
16139-0331	EA	30" Vertical Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	931.99	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-76.86	
16139-0332	EA	36" Vertical Tee, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	985.46	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-79.89	
16139-0333		12" Radius Horizontal Crosses <small>(16139-0212)</small>		
16139-0334	EA	6" Horizontal Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	381.03	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.03	
16139-0335	EA	9" Horizontal Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	400.43	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.29	
16139-0336	EA	12" Horizontal Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	427.11	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.20	
16139-0337	EA	18" Horizontal Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	457.57	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.37	
16139-0338	EA	24" Horizontal Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	515.54	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.13	
16139-0339	EA	30" Horizontal Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	573.34	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.68	
16139-0340	EA	36" Horizontal Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	625.80	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.46	
16139-0341		24" Radius Horizontal Crosses <small>(16139-0212)</small>		
16139-0342	EA	6" Horizontal Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	522.21	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.71	
16139-0343	EA	9" Horizontal Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	546.91	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.31	
16139-0344	EA	12" Horizontal Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	573.19	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.98	
16139-0345	EA	18" Horizontal Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	610.64	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.64	
16139-0346	EA	24" Horizontal Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	682.00	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.08	
16139-0347	EA	30" Horizontal Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	734.00	261.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.61	
16139-0348	EA	36" Horizontal Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	820.82	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.33	
16139-0349		36" Radius Horizontal Crosses <small>(16139-0212)</small>		
16139-0350	EA	6" Horizontal Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	651.00	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.76	
16139-0351	EA	9" Horizontal Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	687.01	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.28	
16139-0352	EA	12" Horizontal Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	726.08	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-53.96	
16139-0353	EA	18" Horizontal Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	791.51	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-59.03	
16139-0354	EA	24" Horizontal Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	907.28	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.98	
16139-0355	EA	30" Horizontal Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	990.34	313.20
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-72.93	
16139-0356	EA	36" Horizontal Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,085.81	348.88
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-79.51	

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16139-0357	12" Radius Vertical Crosses <small>(16139-0212)</small>		
16139-0358	EA 6" Vertical Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	434.85	156.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.41	
16139-0359	EA 9" Vertical Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	456.95	165.10
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.94	
16139-0360	EA 12" Vertical Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	488.66	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.36	
16139-0361	EA 18" Vertical Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	525.12	184.70
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.12	
16139-0362	EA 24" Vertical Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	590.76	209.01
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.66	
16139-0363	EA 30" Vertical Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	663.64	223.92
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.70	
16139-0364	EA 36" Vertical Cross, 6" Rung Spacing, 12" Radius, Steel Cable Tray.....	725.80	241.17
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.48	
16139-0365	24" Radius Vertical Crosses <small>(16139-0212)</small>		
16139-0366	EA 6" Vertical Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	626.61	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.15	
16139-0367	EA 9" Vertical Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	654.55	184.63
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.07	
16139-0368	EA 12" Vertical Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	684.07	196.08
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.07	
16139-0369	EA 18" Vertical Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	728.66	209.01
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.45	
16139-0370	EA 24" Vertical Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	807.79	241.50
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-60.66	
16139-0371	EA 30" Vertical Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	868.22	261.43
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-65.04	
16139-0372	EA 36" Vertical Cross, 6" Rung Spacing, 24" Radius, Steel Cable Tray.....	976.44	284.96
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-73.89	
16139-0373	36" Radius Vertical Crosses <small>(16139-0212)</small>		
16139-0374	EA 6" Vertical Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	796.90	196.08
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-63.35	
16139-0375	EA 9" Vertical Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	839.40	209.01
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.52	
16139-0376	EA 12" Vertical Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	884.95	223.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-69.84	
16139-0377	EA 18" Vertical Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	966.58	241.50
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-76.54	
16139-0378	EA 24" Vertical Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,101.81	284.96
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-86.43	
16139-0379	EA 30" Vertical Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,201.08	313.20
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-94.01	
16139-0380	EA 36" Vertical Cross, 6" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,312.76	348.88
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-102.20	
16139-0381	9" Rung Tray Fittings <small>(16139-0001)</small>		
16139-0382	90 Degree, 12" Radius Horizontal Elbows <small>(16139-0381)</small>		
16139-0383	EA 6" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	147.04	65.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.24	
16139-0384	EA 9" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	165.27	74.64
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.31	
16139-0385	EA 12" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	181.97	82.54
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.32	
16139-0386	EA 18" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	226.26	101.18
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.20	
16139-0387	EA 24" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	258.44	116.14
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.16	
16139-0388	EA 30" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	303.12	130.71
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.42	
16139-0389	EA 36" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	348.67	149.40
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.42	
16139-0390	90 Degree, 24" Radius Horizontal Elbows <small>(16139-0381)</small>		
16139-0391	EA 6" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	191.67	68.16
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.49	
16139-0392	EA 9" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	211.06	78.36
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.58	
16139-0393	EA 12" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	228.70	87.12
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.61	
16139-0394	EA 18" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	270.41	108.24
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.02	
16139-0395	EA 24" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	305.87	125.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.13	
16139-0396	EA 30" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	342.56	142.48
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.38	
16139-0397	EA 36" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	399.95	165.03
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.24	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0398		90 Degree, 36" Radius Horizontal Elbows (16139-0381)		
16139-0399	EA	6" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	205.21	71.24
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.58	
16139-0400	EA	9" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	228.68	82.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.00	
16139-0401	EA	12" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	249.32	92.28
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.24	
16139-0402	EA	18" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	302.87	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.61	
16139-0403	EA	24" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	347.33	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.37	
16139-0404	EA	30" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	405.53	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.48	
16139-0405	EA	36" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	464.43	184.31
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.09	
16139-0406		45 Degree, 12" Radius Horizontal Elbows (16139-0381)		
16139-0407	EA	6" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	108.58	47.51
	16MOD-0056	For 60 Degree Bend, Deduct	-17.62	
	16MOD-0057	For 30 Degree Bend, Deduct	-32.01	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-6.90	
16139-0408	EA	9" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	125.56	56.99
	16MOD-0056	For 60 Degree Bend, Deduct	-19.60	
	16MOD-0057	For 30 Degree Bend, Deduct	-35.83	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.81	
16139-0409	EA	12" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	140.75	65.36
	16MOD-0056	For 60 Degree Bend, Deduct	-21.39	
	16MOD-0057	For 30 Degree Bend, Deduct	-39.29	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.63	
16139-0410	EA	18" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	171.27	82.61
	16MOD-0056	For 60 Degree Bend, Deduct	-24.86	
	16MOD-0057	For 30 Degree Bend, Deduct	-46.02	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.24	
16139-0411	EA	24" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	211.85	101.18
	16MOD-0056	For 60 Degree Bend, Deduct	-31.13	
	16MOD-0057	For 30 Degree Bend, Deduct	-57.50	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.75	
16139-0412	EA	30" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	248.84	116.14
	16MOD-0056	For 60 Degree Bend, Deduct	-37.59	
	16MOD-0057	For 30 Degree Bend, Deduct	-69.10	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.20	
16139-0413	EA	36" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	284.89	136.34
	16MOD-0056	For 60 Degree Bend, Deduct	-41.75	
	16MOD-0057	For 30 Degree Bend, Deduct	-77.15	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.13	
16139-0414		45 Degree, 24" Radius Horizontal Elbows (16139-0381)		
16139-0415	EA	6" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	118.87	49.02
	16MOD-0056	For 60 Degree Bend, Deduct	-20.45	
	16MOD-0057	For 30 Degree Bend, Deduct	-36.80	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.80	
16139-0416	EA	9" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	138.12	59.09
	16MOD-0056	For 60 Degree Bend, Deduct	-22.93	
	16MOD-0057	For 30 Degree Bend, Deduct	-41.49	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.89	
16139-0417	EA	12" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	158.13	68.23
	16MOD-0056	For 60 Degree Bend, Deduct	-26.03	
	16MOD-0057	For 30 Degree Bend, Deduct	-47.18	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.13	
16139-0418	EA	18" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	190.87	87.12
	16MOD-0056	For 60 Degree Bend, Deduct	-29.58	
	16MOD-0057	For 30 Degree Bend, Deduct	-54.14	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.83	
16139-0419	EA	24" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	235.59	108.24
	16MOD-0056	For 60 Degree Bend, Deduct	-36.26	
	16MOD-0057	For 30 Degree Bend, Deduct	-66.45	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.54	
16139-0420	EA	30" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	275.25	125.56
	16MOD-0056	For 60 Degree Bend, Deduct	-42.71	
	16MOD-0057	For 30 Degree Bend, Deduct	-78.16	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.06	
16139-0421	EA	36" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	324.73	149.47
	16MOD-0056	For 60 Degree Bend, Deduct	-49.87	
	16MOD-0057	For 30 Degree Bend, Deduct	-91.42	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.02	
16139-0422		45 Degree, 36" Radius Horizontal Elbows (16139-0381)		
16139-0423	EA	6" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	137.71	50.58
	16MOD-0056	For 60 Degree Bend, Deduct	-26.06	
	16MOD-0057	For 30 Degree Bend, Deduct	-46.25	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.56	

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16139-0424	EA 9" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	158.82	61.43
	16MOD-0056 For 60 Degree Bend, Deduct	-28.86	
	16MOD-0057 For 30 Degree Bend, Deduct	-51.52	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.76	
16139-0425	EA 12" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	176.48	71.30
	16MOD-0056 For 60 Degree Bend, Deduct	-30.91	
	16MOD-0057 For 30 Degree Bend, Deduct	-55.47	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.71	
16139-0426	EA 18" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	216.30	92.28
	16MOD-0056 For 60 Degree Bend, Deduct	-35.99	
	16MOD-0057 For 30 Degree Bend, Deduct	-65.11	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.94	
16139-0427	EA 24" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	259.64	116.14
	16MOD-0056 For 60 Degree Bend, Deduct	-41.15	
	16MOD-0057 For 30 Degree Bend, Deduct	-75.04	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.28	
16139-0428	EA 30" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	312.51	136.34
	16MOD-0056 For 60 Degree Bend, Deduct	-50.86	
	16MOD-0057 For 30 Degree Bend, Deduct	-92.34	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.89	
16139-0429	EA 36" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	369.93	165.03
	16MOD-0056 For 60 Degree Bend, Deduct	-58.81	
	16MOD-0057 For 30 Degree Bend, Deduct	-107.19	
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.24	
16139-0430	90 Degree, 12" Radius Vertical Risers (16139-0381)		
16139-0431	EA 6" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Steel Cable Tray	161.16	65.36
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.67	
16139-0432	EA 9" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Steel Cable Tray	177.88	74.64
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.57	
16139-0433	EA 12" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Steel Cable Tray	192.78	82.54
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.40	
16139-0434	EA 18" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Steel Cable Tray	226.26	101.18
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.20	
16139-0435	EA 24" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Steel Cable Tray	253.64	116.14
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.68	
16139-0436	EA 30" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Steel Cable Tray	282.70	130.71
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.38	
16139-0437	EA 36" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Steel Cable Tray	315.94	149.21
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.16	
16139-0438	90 Degree, 24" Radius Vertical Risers (16139-0381)		
16139-0439	EA 6" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	187.47	68.16
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.07	
16139-0440	EA 9" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	206.36	78.43
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.10	
16139-0441	EA 12" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	223.89	87.12
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.13	
16139-0442	EA 18" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	263.20	108.24
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.30	
16139-0443	EA 24" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	296.27	125.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.17	
16139-0444	EA 30" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	329.35	142.48
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.06	
16139-0445	EA 36" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Steel Cable Tray	378.34	165.03
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.08	
16139-0446	90 Degree, 36" Radius Vertical Risers (16139-0381)		
16139-0447	EA 6" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Steel Cable Tray	218.42	71.24
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.90	
16139-0448	EA 9" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Steel Cable Tray	240.81	82.54
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.20	
16139-0449	EA 12" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Steel Cable Tray	258.33	92.28
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.14	
16139-0450	EA 18" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Steel Cable Tray	306.47	116.14
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.97	
16139-0451	EA 24" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Steel Cable Tray	341.33	136.34
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.77	
16139-0452	EA 30" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Steel Cable Tray	391.12	156.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.04	
16139-0453	EA 36" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Steel Cable Tray	445.22	184.31
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.17	
16139-0454	12" Radius Horizontal Tees (16139-0381)		
16139-0455	EA 6" Horizontal Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray	289.66	125.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.51	
16139-0456	EA 9" Horizontal Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray	313.71	136.34
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.01	
16139-0457	EA 12" Horizontal Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray	328.75	142.48
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.00	
16139-0458	EA 18" Horizontal Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray	365.90	156.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.52	
16139-0459	EA 24" Horizontal Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray	412.70	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.76	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0460	EA	30" Horizontal Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	454.21	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.04	
16139-0461	EA	36" Horizontal Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	514.10	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.99	
16139-0462		24" Radius Horizontal Tees (16139-0381)		
16139-0463	EA	6" Horizontal Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	353.33	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.97	
16139-0464	EA	9" Horizontal Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	381.17	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.66	
16139-0465	EA	12" Horizontal Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	398.32	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.76	
16139-0466	EA	18" Horizontal Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	437.92	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.28	
16139-0467	EA	24" Horizontal Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	487.70	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.43	
16139-0468	EA	30" Horizontal Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	523.71	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.95	
16139-0469	EA	36" Horizontal Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	627.00	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.58	
16139-0470		36" Radius Horizontal Tees (16139-0381)		
16139-0471	EA	6" Horizontal Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	437.60	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.31	
16139-0472	EA	9" Horizontal Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	470.80	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.33	
16139-0473	EA	12" Horizontal Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	499.16	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.41	
16139-0474	EA	18" Horizontal Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	551.34	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.79	
16139-0475	EA	24" Horizontal Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	626.42	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.99	
16139-0476	EA	30" Horizontal Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	678.63	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.74	
16139-0477	EA	36" Horizontal Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	771.59	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-53.41	
16139-0478		12" Radius Vertical Tees (16139-0381)		
16139-0479	EA	6" Vertical Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	330.49	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.37	
16139-0480	EA	9" Vertical Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	339.31	120.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.87	
16139-0481	EA	12" Vertical Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	348.50	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.39	
16139-0482	EA	18" Vertical Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	368.94	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.53	
16139-0483	EA	24" Vertical Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	381.59	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.28	
16139-0484	EA	30" Vertical Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	415.13	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.44	
16139-0485	EA	36" Vertical Tee, 9" Rung Spacing, 12" Radius, Steel Cable Tray.....	449.93	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.48	
16139-0486		24" Radius Vertical Tees (16139-0381)		
16139-0487	EA	6" Vertical Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	456.57	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.20	
16139-0488	EA	9" Vertical Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	468.83	130.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.99	
16139-0489	EA	12" Vertical Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	481.82	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.82	
16139-0490	EA	18" Vertical Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	510.85	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.63	
16139-0491	EA	24" Vertical Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	530.41	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.97	
16139-0492	EA	30" Vertical Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	566.40	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.13	
16139-0493	EA	36" Vertical Tee, 9" Rung Spacing, 24" Radius, Steel Cable Tray.....	614.98	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.16	
16139-0494		36" Radius Vertical Tees (16139-0381)		
16139-0495	EA	6" Vertical Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	689.56	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-57.59	
16139-0496	EA	9" Vertical Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	705.80	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.71	
16139-0497	EA	12" Vertical Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	723.39	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-59.89	
16139-0498	EA	18" Vertical Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	755.39	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-61.79	
16139-0499	EA	24" Vertical Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	776.54	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-63.14	
16139-0500	EA	30" Vertical Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	831.12	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.77	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0501	EA	36" Vertical Tee, 9" Rung Spacing, 36" Radius, Steel Cable Tray	883.39	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-69.69	
16139-0502		12" Radius Horizontal Crosses (16139-0381)		
16139-0503	EA	6" Horizontal Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	361.10	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.04	
16139-0504	EA	9" Horizontal Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	379.54	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.20	
16139-0505	EA	12" Horizontal Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	404.30	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.92	
16139-0506	EA	18" Horizontal Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	432.59	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.87	
16139-0507	EA	24" Horizontal Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	487.68	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.35	
16139-0508	EA	30" Horizontal Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	539.96	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.34	
16139-0509	EA	36" Horizontal Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	588.57	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.73	
16139-0510		24" Radius Horizontal Crosses (16139-0381)		
16139-0511	EA	6" Horizontal Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	483.55	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.84	
16139-0512	EA	9" Horizontal Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	507.04	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.32	
16139-0513	EA	12" Horizontal Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	532.13	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.87	
16139-0514	EA	18" Horizontal Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	566.93	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.27	
16139-0515	EA	24" Horizontal Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	635.40	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.42	
16139-0516	EA	30" Horizontal Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	684.28	261.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.64	
16139-0517	EA	36" Horizontal Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	763.18	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.57	
16139-0518		36" Radius Horizontal Crosses (16139-0381)		
16139-0519	EA	6" Horizontal Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray	596.97	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.36	
16139-0520	EA	9" Horizontal Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray	630.58	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.64	
16139-0521	EA	12" Horizontal Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray	667.24	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.07	
16139-0522	EA	18" Horizontal Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray	726.66	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.54	
16139-0523	EA	24" Horizontal Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray	835.23	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-59.77	
16139-0524	EA	30" Horizontal Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray	912.29	313.20
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-65.13	
16139-0525	EA	36" Horizontal Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray	1,001.76	348.88
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-71.10	
16139-0526		12" Radius Vertical Crosses (16139-0381)		
16139-0527	EA	6" Vertical Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	405.95	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.52	
16139-0528	EA	9" Vertical Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	426.65	165.10
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.91	
16139-0529	EA	12" Vertical Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	455.58	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.05	
16139-0530	EA	18" Vertical Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	488.90	184.70
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.50	
16139-0531	EA	24" Vertical Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	550.36	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.62	
16139-0532	EA	30" Vertical Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	615.24	223.92
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.86	
16139-0533	EA	36" Vertical Cross, 9" Rung Spacing, 12" Radius, Steel Cable Tray	671.83	241.17
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.09	
16139-0534		24" Radius Vertical Crosses (16139-0381)		
16139-0535	EA	6" Vertical Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	570.55	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.54	
16139-0536	EA	9" Vertical Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	596.74	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.29	
16139-0537	EA	12" Vertical Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	624.53	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.11	
16139-0538	EA	18" Vertical Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	665.28	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.11	
16139-0539	EA	24" Vertical Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	740.23	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-53.90	
16139-0540	EA	30" Vertical Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	796.14	261.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-57.83	
16139-0541	EA	36" Vertical Cross, 9" Rung Spacing, 24" Radius, Steel Cable Tray	892.87	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-65.54	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0542		36" Radius Vertical Crosses (16139-0381)		
16139-0543	EA	6" Vertical Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	718.55	196.08
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.52	
16139-0544	EA	9" Vertical Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	757.56	209.01
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.34	
16139-0545	EA	12" Vertical Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	799.63	223.86
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-61.31	
16139-0546	EA	18" Vertical Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	872.56	241.50
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-67.13	
16139-0547	EA	24" Vertical Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	997.34	284.96
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-75.98	
16139-0548	EA	30" Vertical Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,087.90	313.20
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-82.69	
16139-0549	EA	36" Vertical Cross, 9" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,190.88	348.88
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-90.01	
16139-0550		12" Rung Tray Fittings (16139-0001)		
16139-0551		90 Degree, 12" Radius Horizontal Elbows (16139-0550)		
16139-0552	EA	6" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	144.40	65.56
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.98	
16139-0553	EA	9" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	162.41	74.64
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.02	
16139-0554	EA	12" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	178.86	82.54
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.01	
16139-0555	EA	18" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	222.22	101.18
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.79	
16139-0556	EA	24" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	253.90	116.14
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.71	
16139-0557	EA	30" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	297.15	130.71
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.82	
16139-0558	EA	36" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	341.69	149.40
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.72	
16139-0559		90 Degree, 24" Radius Horizontal Elbows (16139-0550)		
16139-0560	EA	6" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	186.21	68.16
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.94	
16139-0561	EA	9" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	205.43	78.36
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.01	
16139-0562	EA	12" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	222.85	87.12
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.02	
16139-0563	EA	18" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	264.11	108.24
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.39	
16139-0564	EA	24" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	299.11	125.56
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.45	
16139-0565	EA	30" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	335.20	142.48
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.65	
16139-0566	EA	36" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	391.21	165.03
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.37	
16139-0567		90 Degree, 36" Radius Horizontal Elbows (16139-0550)		
16139-0568	EA	6" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	199.16	71.24
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.98	
16139-0569	EA	9" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	222.29	82.48
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.36	
16139-0570	EA	12" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	242.64	92.28
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.57	
16139-0571	EA	18" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	295.22	116.14
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.84	
16139-0572	EA	24" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	338.92	136.34
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.53	
16139-0573	EA	30" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	395.44	156.86
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.47	
16139-0574	EA	36" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	453.42	184.31
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.99	
16139-0575		45 Degree, 12" Radius Horizontal Elbows (16139-0550)		
16139-0576	EA	6" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	106.52	47.51
		16MOD-0058 For 60 Degree Bend, Deduct	-16.94	
		16MOD-0059 For 30 Degree Bend, Deduct	-30.88	
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-6.69	
16139-0577	EA	9" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	123.42	56.99
		16MOD-0058 For 60 Degree Bend, Deduct	-18.89	
		16MOD-0059 For 30 Degree Bend, Deduct	-34.65	
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.60	
16139-0578	EA	12" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	138.52	65.36
		16MOD-0058 For 60 Degree Bend, Deduct	-20.66	
		16MOD-0059 For 30 Degree Bend, Deduct	-38.06	
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.41	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0579	EA	18" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	168.92	82.61
	16MOD-0058	For 60 Degree Bend, Deduct	-24.08	
	16MOD-0059	For 30 Degree Bend, Deduct	-44.73	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.01	
16139-0580	EA	24" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	208.82	101.18
	16MOD-0058	For 60 Degree Bend, Deduct	-30.13	
	16MOD-0059	For 30 Degree Bend, Deduct	-55.83	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.45	
16139-0581	EA	30" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	244.97	116.14
	16MOD-0058	For 60 Degree Bend, Deduct	-36.31	
	16MOD-0059	For 30 Degree Bend, Deduct	-66.97	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.82	
16139-0582	EA	36" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	280.85	136.34
	16MOD-0058	For 60 Degree Bend, Deduct	-40.41	
	16MOD-0059	For 30 Degree Bend, Deduct	-74.93	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.72	
16139-0583		45 Degree, 24" Radius Horizontal Elbows (16139-0550)		
16139-0584	EA	6" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	116.27	49.02
	16MOD-0058	For 60 Degree Bend, Deduct	-19.59	
	16MOD-0059	For 30 Degree Bend, Deduct	-35.37	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.54	
16139-0585	EA	9" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	135.34	59.09
	16MOD-0058	For 60 Degree Bend, Deduct	-22.01	
	16MOD-0059	For 30 Degree Bend, Deduct	-39.97	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.61	
16139-0586	EA	12" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	155.02	68.23
	16MOD-0058	For 60 Degree Bend, Deduct	-25.01	
	16MOD-0059	For 30 Degree Bend, Deduct	-45.47	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.82	
16139-0587	EA	18" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	187.68	87.12
	16MOD-0058	For 60 Degree Bend, Deduct	-28.53	
	16MOD-0059	For 30 Degree Bend, Deduct	-52.39	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.51	
16139-0588	EA	24" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	231.72	108.24
	16MOD-0058	For 60 Degree Bend, Deduct	-34.99	
	16MOD-0059	For 30 Degree Bend, Deduct	-64.32	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.15	
16139-0589	EA	30" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	270.63	125.56
	16MOD-0058	For 60 Degree Bend, Deduct	-41.19	
	16MOD-0059	For 30 Degree Bend, Deduct	-75.62	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.60	
16139-0590	EA	36" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	319.43	149.47
	16MOD-0058	For 60 Degree Bend, Deduct	-48.12	
	16MOD-0059	For 30 Degree Bend, Deduct	-88.51	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.49	
16139-0591		45 Degree, 36" Radius Horizontal Elbows (16139-0550)		
16139-0592	EA	6" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	133.97	50.58
	16MOD-0058	For 60 Degree Bend, Deduct	-24.83	
	16MOD-0059	For 30 Degree Bend, Deduct	-44.19	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.18	
16139-0593	EA	9" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	154.87	61.43
	16MOD-0058	For 60 Degree Bend, Deduct	-27.56	
	16MOD-0059	For 30 Degree Bend, Deduct	-49.35	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.37	
16139-0594	EA	12" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	172.44	71.30
	16MOD-0058	For 60 Degree Bend, Deduct	-29.57	
	16MOD-0059	For 30 Degree Bend, Deduct	-53.25	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.30	
16139-0595	EA	18" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	211.93	92.28
	16MOD-0058	For 60 Degree Bend, Deduct	-34.55	
	16MOD-0059	For 30 Degree Bend, Deduct	-62.71	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.50	
16139-0596	EA	24" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	255.02	116.14
	16MOD-0058	For 60 Degree Bend, Deduct	-39.63	
	16MOD-0059	For 30 Degree Bend, Deduct	-72.50	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.82	
16139-0597	EA	30" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	306.54	136.34
	16MOD-0058	For 60 Degree Bend, Deduct	-48.89	
	16MOD-0059	For 30 Degree Bend, Deduct	-89.06	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.29	
16139-0598	EA	36" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	363.29	165.03
	16MOD-0058	For 60 Degree Bend, Deduct	-56.62	
	16MOD-0059	For 30 Degree Bend, Deduct	-103.54	
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.58	
16139-0599		90 Degree, 12" Radius Vertical Risers (16139-0550)		
16139-0600	EA	6" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	157.51	65.36
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.30	
16139-0601	EA	9" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	174.14	74.64
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.19	
16139-0602	EA	12" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	188.91	82.54
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.01	
16139-0603	EA	18" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	222.22	101.18
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.79	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0604	EA	24" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Steel Cable Tray	249.44	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.26	
16139-0605	EA	30" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Steel Cable Tray	278.16	130.71
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.92	
16139-0606	EA	36" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Steel Cable Tray	311.24	149.21
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.69	
16139-0607		90 Degree, 24" Radius Vertical Risers (16139-0550)		
16139-0608	EA	6" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Steel Cable Tray	182.30	68.16
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.55	
16139-0609	EA	9" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Steel Cable Tray	201.06	78.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.57	
16139-0610	EA	12" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Steel Cable Tray	218.39	87.12
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.58	
16139-0611	EA	18" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Steel Cable Tray	257.41	108.24
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.72	
16139-0612	EA	24" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Steel Cable Tray	290.17	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.56	
16139-0613	EA	30" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Steel Cable Tray	322.92	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.42	
16139-0614	EA	36" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Steel Cable Tray	371.11	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.36	
16139-0615		90 Degree, 36" Radius Vertical Risers (16139-0550)		
16139-0616	EA	6" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Steel Cable Tray	211.44	71.24
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.21	
16139-0617	EA	9" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Steel Cable Tray	233.58	82.54
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.48	
16139-0618	EA	12" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Steel Cable Tray	251.02	92.28
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.41	
16139-0619	EA	18" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Steel Cable Tray	298.57	116.14
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.18	
16139-0620	EA	24" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Steel Cable Tray	333.34	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.97	
16139-0621	EA	30" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Steel Cable Tray	382.04	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.13	
16139-0622	EA	36" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Steel Cable Tray	435.55	184.31
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.20	
16139-0623		12" Radius Horizontal Tees (16139-0550)		
16139-0624	EA	6" Horizontal Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	281.62	125.56
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.70	
16139-0625	EA	9" Horizontal Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	305.06	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.14	
16139-0626	EA	12" Horizontal Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	319.62	142.48
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.09	
16139-0627	EA	18" Horizontal Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	355.45	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.47	
16139-0628	EA	24" Horizontal Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	400.45	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.53	
16139-0629	EA	30" Horizontal Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	439.56	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.57	
16139-0630	EA	36" Horizontal Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	497.53	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.33	
16139-0631		24" Radius Horizontal Tees (16139-0550)		
16139-0632	EA	6" Horizontal Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	340.73	136.34
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.71	
16139-0633	EA	9" Horizontal Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	367.96	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.34	
16139-0634	EA	12" Horizontal Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	384.63	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.39	
16139-0635	EA	18" Horizontal Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	423.15	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.80	
16139-0636	EA	24" Horizontal Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	471.61	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.82	
16139-0637	EA	30" Horizontal Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	506.17	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.20	
16139-0638	EA	36" Horizontal Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	604.54	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.33	
16139-0639		36" Radius Horizontal Tees (16139-0550)		
16139-0640	EA	6" Horizontal Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	418.75	149.47
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.42	
16139-0641	EA	9" Horizontal Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	451.23	165.03
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.37	
16139-0642	EA	12" Horizontal Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	478.26	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.32	
16139-0643	EA	18" Horizontal Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	528.88	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.55	
16139-0644	EA	24" Horizontal Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	601.08	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.46	

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR CSI UOM DESCRIPTION		TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0645	EA 30" Horizontal Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	651.01	241.50
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.98	
16139-0646	EA 36" Horizontal Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	741.93	284.96
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.44	
16139-0647	12" Radius Vertical Tees (16139-0550)		
16139-0648	EA 6" Vertical Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	316.80	116.14
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.00	
16139-0649	EA 9" Vertical Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	325.50	120.71
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.49	
16139-0650	EA 12" Vertical Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	334.57	125.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.00	
16139-0651	EA 18" Vertical Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	354.77	136.34
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.11	
16139-0652	EA 24" Vertical Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	367.18	142.48
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.84	
16139-0653	EA 30" Vertical Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	399.76	156.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.90	
16139-0654	EA 36" Vertical Tee, 12" Rung Spacing, 12" Radius, Steel Cable Tray	433.96	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.89	
16139-0655	24" Radius Vertical Tees (16139-0550)		
16139-0656	EA 6" Vertical Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	431.84	125.56
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.72	
16139-0657	EA 9" Vertical Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	443.73	130.71
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.48	
16139-0658	EA 12" Vertical Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	456.36	136.34
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.27	
16139-0659	EA 18" Vertical Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	484.68	149.47
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.01	
16139-0660	EA 24" Vertical Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	503.51	156.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.28	
16139-0661	EA 30" Vertical Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	538.78	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.37	
16139-0662	EA 36" Vertical Tee, 12" Rung Spacing, 24" Radius, Steel Cable Tray	586.16	196.08
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.28	
16139-0663	36" Radius Vertical Tees (16139-0550)		
16139-0664	EA 6" Vertical Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	643.33	136.34
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.97	
16139-0665	EA 9" Vertical Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	658.97	142.48
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.02	
16139-0666	EA 12" Vertical Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	675.96	149.47
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.14	
16139-0667	EA 18" Vertical Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	707.36	165.03
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-56.98	
16139-0668	EA 24" Vertical Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	727.91	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.28	
16139-0669	EA 30" Vertical Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	780.69	196.08
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-61.73	
16139-0670	EA 36" Vertical Tee, 12" Rung Spacing, 36" Radius, Steel Cable Tray	832.35	223.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-64.58	
16139-0671	12" Radius Horizontal Crosses (16139-0550)		
16139-0672	EA 6" Horizontal Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray	351.13	156.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.04	
16139-0673	EA 9" Horizontal Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray	369.09	165.03
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.16	
16139-0674	EA 12" Horizontal Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray	392.89	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.78	
16139-0675	EA 18" Horizontal Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray	420.10	184.63
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.62	
16139-0676	EA 24" Horizontal Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray	473.75	209.01
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.96	
16139-0677	EA 30" Horizontal Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray	523.27	223.86
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.67	
16139-0678	EA 36" Horizontal Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray	569.96	241.50
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.87	
16139-0679	24" Radius Horizontal Crosses (16139-0550)		
16139-0680	EA 6" Horizontal Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray	464.22	174.11
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.91	
16139-0681	EA 9" Horizontal Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray	487.11	184.63
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.33	
16139-0682	EA 12" Horizontal Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray	511.59	196.08
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.82	
16139-0683	EA 18" Horizontal Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray	545.08	209.01
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.09	
16139-0684	EA 24" Horizontal Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray	612.11	241.50
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.09	
16139-0685	EA 30" Horizontal Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray	659.43	261.43
	16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.16	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0686	EA	36" Horizontal Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	734.36	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-49.69	
16139-0687		36" Radius Horizontal Crosses (16139-0550)		
16139-0688	EA	6" Horizontal Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	569.95	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-40.66	
16139-0689	EA	9" Horizontal Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	602.36	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-42.82	
16139-0690	EA	12" Horizontal Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	637.83	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-45.13	
16139-0691	EA	18" Horizontal Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	694.24	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-49.30	
16139-0692	EA	24" Horizontal Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	799.20	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-56.17	
16139-0693	EA	30" Horizontal Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	873.26	313.20
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-61.22	
16139-0694	EA	36" Horizontal Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	959.73	348.88
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-66.90	
16139-0695		12" Radius Vertical Crosses (16139-0550)		
16139-0696	EA	6" Vertical Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	391.49	156.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-26.08	
16139-0697	EA	9" Vertical Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	411.50	165.10
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-27.39	
16139-0698	EA	12" Vertical Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	439.04	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-29.40	
16139-0699	EA	18" Vertical Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	470.79	184.70
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-31.69	
16139-0700	EA	24" Vertical Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	530.17	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-35.60	
16139-0701	EA	30" Vertical Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	591.04	223.92
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-40.44	
16139-0702	EA	36" Vertical Cross, 12" Rung Spacing, 12" Radius, Steel Cable Tray.....	644.84	241.17
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-44.39	
16139-0703		24" Radius Vertical Crosses (16139-0550)		
16139-0704	EA	6" Vertical Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	542.51	174.11
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-39.74	
16139-0705	EA	9" Vertical Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	567.84	184.63
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-41.40	
16139-0706	EA	12" Vertical Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	594.75	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-43.14	
16139-0707	EA	18" Vertical Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	633.59	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-45.94	
16139-0708	EA	24" Vertical Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	706.46	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-50.52	
16139-0709	EA	30" Vertical Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	760.10	261.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-54.22	
16139-0710	EA	36" Vertical Cross, 12" Rung Spacing, 24" Radius, Steel Cable Tray.....	851.08	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-61.36	
16139-0711		36" Radius Vertical Crosses (16139-0550)		
16139-0712	EA	6" Vertical Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	679.37	196.08
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-51.60	
16139-0713	EA	9" Vertical Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	716.64	209.01
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-54.24	
16139-0714	EA	12" Vertical Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	756.97	223.86
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-57.04	
16139-0715	EA	18" Vertical Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	825.55	241.50
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-62.43	
16139-0716	EA	24" Vertical Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	945.10	284.96
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-70.76	
16139-0717	EA	30" Vertical Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,031.32	313.20
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-77.03	
16139-0718	EA	36" Vertical Cross, 12" Rung Spacing, 36" Radius, Steel Cable Tray.....	1,129.94	348.88
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-83.92	
16139-0719		Dropout Or End Plates And Reducers (16139-0001)		
16139-0720		Straight Reducers (16139-0719)		
16139-0721	EA	9"-6" Reducer, Steel Cable Tray.....	135.65	48.24
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-9.54	
16139-0722	EA	12"-9" Reducer, Steel Cable Tray.....	143.49	52.22
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-10.00	
16139-0723	EA	18"-12" Reducer, Steel Cable Tray.....	156.93	60.26
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-10.67	
16139-0724	EA	24"-18" Reducer, Steel Cable Tray.....	173.85	69.74
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-11.57	
16139-0725	EA	30"-24" Reducer, Steel Cable Tray.....	189.55	78.43
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-12.42	
16139-0726	EA	36"-30" Reducer, Steel Cable Tray.....	215.39	89.60
	16MOD-0060	For 3-5/8" Overall Height Instead Of 4-5/8"; Deduct	-14.07	

MINOR		TOTAL DIRECT		DEMOLITION	
CSI	UOM	DESCRIPTION	UNIT COST	UNIT COST	UNIT COST
16139-0727		Reducers (16139-0719)			
16139-0728	EA	18"-6" Reducer, Steel Cable Tray	159.40		60.32
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.91		
16139-0729	EA	24"-12" Reducer, Steel Cable Tray	176.42		69.80
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.82		
16139-0730	EA	30"-12" Reducer, Steel Cable Tray	194.25		78.36
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.89		
16139-0731	EA	30"-18" Reducer, Steel Cable Tray	196.55		78.30
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.13		
16139-0732	EA	36"-12" Reducer, Steel Cable Tray	216.59		89.60
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.19		
16139-0733	EA	36"-18" Reducer, Steel Cable Tray	222.93		91.96
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.63		
16139-0734	EA	36"-24" Reducer, Steel Cable Tray	230.23		94.90
		16MOD-0060 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.11		
16139-0735		Dropout Or End Plate (16139-0719)			
16139-0736	EA	6" Dropout Or End Plate, Steel Cable Tray	38.86		19.61
16139-0737	EA	9" Dropout Or End Plate, Steel Cable Tray	44.59		22.41
16139-0738	EA	12" Dropout Or End Plate, Steel Cable Tray	48.12		24.12
16139-0739	EA	18" Dropout Or End Plate, Steel Cable Tray	56.82		28.50
16139-0740	EA	24" Dropout Or End Plate, Steel Cable Tray	63.58		31.37
16139-0741	EA	30" Dropout Or End Plate, Steel Cable Tray	70.47		34.84
16139-0742	EA	36" Dropout Or End Plate, Steel Cable Tray	79.53		39.21
16139-0743		Ladder Bottom Aluminum Cable Tray (16139)			
		Note: 4-5/8" Height			
16139-0744		Straight Tray Sections (16139-0743)			
16139-0745		4" Rung Spacing (16139-0744)			
16139-0746	LF	6" Aluminum Cable Tray, 4" Rung Spacing, Straight Section	22.05		4.57
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	2.54		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.82		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.10		
16139-0747	LF	9" Aluminum Cable Tray, 4" Rung Spacing, Straight Section	23.27		4.83
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	2.69		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.93		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.16		
16139-0748	LF	12" Aluminum Cable Tray, 4" Rung Spacing, Straight Section	24.49		5.03
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	2.83		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.03		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.22		
16139-0749	LF	18" Aluminum Cable Tray, 4" Rung Spacing, Straight Section	27.11		5.49
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	3.15		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.25		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.36		
16139-0750	LF	24" Aluminum Cable Tray, 4" Rung Spacing, Straight Section	30.68		5.89
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	3.63		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.58		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.53		
16139-0751	LF	30" Aluminum Cable Tray, 4" Rung Spacing, Straight Section	33.45		6.28
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	3.98		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.82		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.67		
16139-0752	LF	36" Aluminum Cable Tray, 4" Rung Spacing, Straight Section	35.99		6.67
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	4.29		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-3.04		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.80		
16139-0753		6" Rung Spacing (16139-0744)			
16139-0754	LF	6" Aluminum Cable Tray, 6" Rung Spacing, Straight Section	20.74		4.57
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	2.35		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.69		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.04		
16139-0755	LF	9" Aluminum Cable Tray, 6" Rung Spacing, Straight Section	21.88		4.83
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	2.48		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.79		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.09		
16139-0756	LF	12" Aluminum Cable Tray, 6" Rung Spacing, Straight Section	23.03		5.03
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	2.61		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.88		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.15		
16139-0757	LF	18" Aluminum Cable Tray, 6" Rung Spacing, Straight Section	25.48		5.49
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	2.90		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.09		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.27		
16139-0758	LF	24" Aluminum Cable Tray, 6" Rung Spacing, Straight Section	28.77		5.89
		16MOD-0061 For Class 12C Instead Of Class 12B, Add	3.34		
		16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.39		
		16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	1.44		



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0759	LF	30"	Aluminum Cable Tray, 6" Rung Spacing, Straight Section.....	31.36	6.28
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	3.66	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.62	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.57	
16139-0760	LF	36"	Aluminum Cable Tray, 6" Rung Spacing, Straight Section.....	33.73	6.67
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	3.95	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.82	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.69	
16139-0761			9" Rung Spacing (16139-0744)		
16139-0762	LF	6"	Aluminum Cable Tray, 9" Rung Spacing, Straight Section.....	18.82	4.38
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.09	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.52	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.94	
16139-0763	LF	9"	Aluminum Cable Tray, 9" Rung Spacing, Straight Section.....	19.21	4.57
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.12	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.54	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.96	
16139-0764	LF	12"	Aluminum Cable Tray, 9" Rung Spacing, Straight Section.....	20.47	4.83
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.27	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.65	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.02	
16139-0765	LF	18"	Aluminum Cable Tray, 9" Rung Spacing, Straight Section.....	21.88	5.16
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.42	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.76	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.09	
16139-0766	LF	24"	Aluminum Cable Tray, 9" Rung Spacing, Straight Section.....	24.24	5.36
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.74	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.98	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.21	
16139-0767	LF	30"	Aluminum Cable Tray, 9" Rung Spacing, Straight Section.....	26.69	5.76
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	3.04	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.19	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.33	
16139-0768	LF	36"	Aluminum Cable Tray, 9" Rung Spacing, Straight Section.....	28.48	6.28
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	3.22	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.32	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.42	
16139-0769			12" Rung Spacing (16139-0744)		
16139-0770	LF	6"	Aluminum Cable Tray, 12" Rung Spacing, Straight Section.....	18.37	4.25
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.05	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.48	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.92	
16139-0771	LF	9"	Aluminum Cable Tray, 12" Rung Spacing, Straight Section.....	18.69	4.38
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.07	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.50	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.93	
16139-0772	LF	12"	Aluminum Cable Tray, 12" Rung Spacing, Straight Section.....	19.51	4.64
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.15	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.56	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.98	
16139-0773	LF	18"	Aluminum Cable Tray, 12" Rung Spacing, Straight Section.....	20.66	4.90
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.28	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.66	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.03	
16139-0774	LF	24"	Aluminum Cable Tray, 12" Rung Spacing, Straight Section.....	22.18	4.96
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.49	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.80	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.11	
16139-0775	LF	30"	Aluminum Cable Tray, 12" Rung Spacing, Straight Section.....	23.93	5.49
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.68	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.94	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.20	
16139-0776	LF	36"	Aluminum Cable Tray, 12" Rung Spacing, Straight Section.....	25.47	5.95
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.83	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-2.05	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.27	
16139-0777			18" Rung Spacing (16139-0744)		
16139-0778	LF	6"	Aluminum Cable Tray, 18" Rung Spacing, Straight Section.....	18.12	4.12
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.03	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.47	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.91	
16139-0779	LF	9"	Aluminum Cable Tray, 18" Rung Spacing, Straight Section.....	18.25	4.31
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.02	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.47	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.91	
16139-0780	LF	12"	Aluminum Cable Tray, 18" Rung Spacing, Straight Section.....	19.18	4.44
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.13	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.55	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	0.96	
16139-0781	LF	18"	Aluminum Cable Tray, 18" Rung Spacing, Straight Section.....	20.20	4.70
	16MOD-0061		For Class 12C Instead Of Class 12B, Add	2.25	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.63	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	1.01	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0782	LF	24" Aluminum Cable Tray, 18" Rung Spacing, Straight Section.....	21.28	4.77
	16MOD-0061	For Class 12C Instead Of Class 12B, Add	2.40	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.73	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	1.06	
16139-0783	LF	30" Aluminum Cable Tray, 18" Rung Spacing, Straight Section.....	22.45	5.22
	16MOD-0061	For Class 12C Instead Of Class 12B, Add	2.50	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.81	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	1.12	
16139-0784	LF	36" Aluminum Cable Tray, 18" Rung Spacing, Straight Section.....	23.93	5.69
	16MOD-0061	For Class 12C Instead Of Class 12B, Add	2.64	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-1.92	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	1.20	
16139-0785		4" Rung Tray Fittings <small>(16139-0743)</small>		
16139-0786		90 Degree, 12" Radius Horizontal Elbows <small>(16139-0785)</small>		
16139-0787	EA	6" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	169.24	65.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.46	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.46	
16139-0788	EA	9" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	185.98	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.38	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.30	
16139-0789	EA	12" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	210.47	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.17	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.52	
16139-0790	EA	18" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	250.67	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.64	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.53	
16139-0791	EA	24" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	295.40	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.86	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.77	
16139-0792	EA	30" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	325.74	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.68	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.29	
16139-0793	EA	36" Horizontal 90 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	379.67	149.40
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.98	
16139-0794		90 Degree, 24" Radius Horizontal Elbows <small>(16139-0785)</small>		
16139-0795	EA	6" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	219.98	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.32	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.00	
16139-0796	EA	9" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	241.53	78.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.08	
16139-0797	EA	12" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	261.47	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.07	
16139-0798	EA	18" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	306.46	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.63	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.32	
16139-0799	EA	24" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	347.47	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.29	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.37	
16139-0800	EA	30" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	388.67	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.99	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.43	
16139-0801	EA	36" Horizontal 90 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	445.24	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.77	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.26	
16139-0802		90 Degree, 36" Radius Horizontal Elbows <small>(16139-0785)</small>		
16139-0803	EA	6" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	235.74	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.64	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.79	
16139-0804	EA	9" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	257.45	82.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.87	
16139-0805	EA	12" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	287.57	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.38	
16139-0806	EA	18" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	344.02	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.72	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.20	
16139-0807	EA	24" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	397.42	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.38	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.87	
16139-0808	EA	30" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	448.32	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.76	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.42	
16139-0809	EA	36" Horizontal 90 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	521.36	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.78	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.07	
16139-0810		45 Degree, 12" Radius Horizontal Elbows <small>(16139-0785)</small>		



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0811	EA		6" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	118.66	47.51
	16MOD-0062		For 60 Degree Bend, Deduct	-20.95	
	16MOD-0063		For 30 Degree Bend, Deduct	-37.56	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.91	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	5.93	
16139-0812	EA		9" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	135.96	56.99
	16MOD-0062		For 60 Degree Bend, Deduct	-23.03	
	16MOD-0063		For 30 Degree Bend, Deduct	-41.55	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.85	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	6.80	
16139-0813	EA		12" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	151.47	65.36
	16MOD-0062		For 60 Degree Bend, Deduct	-24.93	
	16MOD-0063		For 30 Degree Bend, Deduct	-45.18	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.70	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	7.57	
16139-0814	EA		18" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	187.79	82.61
	16MOD-0062		For 60 Degree Bend, Deduct	-30.31	
	16MOD-0063		For 30 Degree Bend, Deduct	-55.11	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.90	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	9.39	
16139-0815	EA		24" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	230.92	101.18
	16MOD-0062		For 60 Degree Bend, Deduct	-37.42	
	16MOD-0063		For 30 Degree Bend, Deduct	-67.99	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.66	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	11.55	
16139-0816	EA		30" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	265.01	116.14
	16MOD-0062		For 60 Degree Bend, Deduct	-42.93	
	16MOD-0063		For 30 Degree Bend, Deduct	-78.00	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.82	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	13.25	
16139-0817	EA		36" Horizontal 45 Degree Elbow, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	301.70	136.34
	16MOD-0062		For 60 Degree Bend, Deduct	-47.29	
	16MOD-0063		For 30 Degree Bend, Deduct	-86.40	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.81	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	15.09	
16139-0818	45 Degree, 24" Radius Horizontal Elbows (16139-0785)				
16139-0819	EA		6" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	134.83	49.02
	16MOD-0062		For 60 Degree Bend, Deduct	-25.71	
	16MOD-0063		For 30 Degree Bend, Deduct	-45.58	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.40	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	6.74	
16139-0820	EA		9" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	157.75	59.09
	16MOD-0062		For 60 Degree Bend, Deduct	-29.40	
	16MOD-0063		For 30 Degree Bend, Deduct	-52.29	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.85	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	7.89	
16139-0821	EA		12" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	174.48	68.23
	16MOD-0062		For 60 Degree Bend, Deduct	-31.43	
	16MOD-0063		For 30 Degree Bend, Deduct	-56.17	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.76	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	8.72	
16139-0822	EA		18" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	210.57	87.12
	16MOD-0062		For 60 Degree Bend, Deduct	-36.08	
	16MOD-0063		For 30 Degree Bend, Deduct	-64.98	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.80	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	10.53	
16139-0823	EA		24" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	256.32	108.24
	16MOD-0062		For 60 Degree Bend, Deduct	-43.11	
	16MOD-0063		For 30 Degree Bend, Deduct	-77.85	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.61	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	12.82	
16139-0824	EA		30" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	300.37	125.56
	16MOD-0062		For 60 Degree Bend, Deduct	-51.00	
	16MOD-0063		For 30 Degree Bend, Deduct	-91.98	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.58	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	15.02	
16139-0825	EA		36" Horizontal 45 Degree Elbow, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	344.80	149.47
	16MOD-0062		For 60 Degree Bend, Deduct	-56.50	
	16MOD-0063		For 30 Degree Bend, Deduct	-102.46	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.03	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	17.24	
16139-0826	45 Degree, 36" Radius Horizontal Elbows (16139-0785)				
16139-0827	EA		6" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	155.68	50.58
	16MOD-0062		For 60 Degree Bend, Deduct	-31.99	
	16MOD-0063		For 30 Degree Bend, Deduct	-56.13	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.35	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	7.78	
16139-0828	EA		9" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	175.31	61.43
	16MOD-0062		For 60 Degree Bend, Deduct	-34.30	
	16MOD-0063		For 30 Degree Bend, Deduct	-60.59	
	16MOD-0070		For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.41	
	16MOD-0071		For 6" Overall Height Instead Of 4-5/8", Add	8.77	

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0829	EA	12" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	193.29	71.30
	16MOD-0062	For 60 Degree Bend, Deduct	-36.45	
	16MOD-0063	For 30 Degree Bend, Deduct	-64.72	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.39	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.66	
16139-0830	EA	18" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	235.91	92.28
	16MOD-0062	For 60 Degree Bend, Deduct	-42.46	
	16MOD-0063	For 30 Degree Bend, Deduct	-75.90	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.90	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.80	
16139-0831	EA	24" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	293.88	116.14
	16MOD-0062	For 60 Degree Bend, Deduct	-52.45	
	16MOD-0063	For 30 Degree Bend, Deduct	-93.87	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.71	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.69	
16139-0832	EA	30" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	333.61	136.34
	16MOD-0062	For 60 Degree Bend, Deduct	-57.82	
	16MOD-0063	For 30 Degree Bend, Deduct	-103.95	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.68	
16139-0833	EA	36" Horizontal 45 Degree Elbow, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	392.06	165.03
	16MOD-0062	For 60 Degree Bend, Deduct	-66.11	
	16MOD-0063	For 30 Degree Bend, Deduct	-119.36	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.45	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.60	
16139-0834		90 Degree, 12" Radius Vertical Risers <small>(16139-0785)</small>		
16139-0835	EA	6" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	183.54	65.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.18	
16139-0836	EA	9" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	203.12	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.09	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.16	
16139-0837	EA	12" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	217.58	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.88	
16139-0838	EA	18" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	251.37	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.71	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.57	
16139-0839	EA	24" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	280.42	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.36	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.02	
16139-0840	EA	30" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	308.75	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.98	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.44	
16139-0841	EA	36" Vertical Riser 90 Degree, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	342.31	149.21
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.80	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.12	
16139-0842		90 Degree, 24" Radius Vertical Risers <small>(16139-0785)</small>		
16139-0843	EA	6" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	194.34	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.72	
16139-0844	EA	9" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	214.82	78.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.74	
16139-0845	EA	12" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	231.38	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.57	
16139-0846	EA	18" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	271.24	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.11	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.56	
16139-0847	EA	24" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	305.53	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.09	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.28	
16139-0848	EA	30" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	339.23	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.05	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.96	
16139-0849	EA	36" Vertical Riser 90 Degree, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	383.60	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.18	
16139-0850		90 Degree, 36" Radius Vertical Risers <small>(16139-0785)</small>		
16139-0851	EA	6" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	243.56	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.18	
16139-0852	EA	9" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	265.06	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.63	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.25	
16139-0853	EA	12" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	289.52	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.48	
16139-0854	EA	18" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	334.69	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.73	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0855	EA	24" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	373.76	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.69	
16139-0856	EA	30" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	418.80	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.81	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.94	
16139-0857	EA	36" Vertical Riser 90 Degree, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	471.28	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.77	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.56	
16139-0858		12" Radius Horizontal Tees (16139-0785)		
16139-0859	EA	6" Horizontal Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	295.27	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.07	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.76	
16139-0860	EA	9" Horizontal Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	318.96	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.53	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.95	
16139-0861	EA	12" Horizontal Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	330.61	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.19	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.53	
16139-0862	EA	18" Horizontal Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	372.89	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.22	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.64	
16139-0863	EA	24" Horizontal Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	412.97	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.65	
16139-0864	EA	30" Horizontal Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	450.21	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.64	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.51	
16139-0865	EA	36" Horizontal Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	519.10	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.96	
16139-0866		24" Radius Horizontal Tees (16139-0785)		
16139-0867	EA	6" Horizontal Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	373.98	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.04	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.70	
16139-0868	EA	9" Horizontal Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	404.28	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.97	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.21	
16139-0869	EA	12" Horizontal Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	420.86	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.04	
16139-0870	EA	18" Horizontal Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	463.76	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.19	
16139-0871	EA	24" Horizontal Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	515.85	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.25	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.79	
16139-0872	EA	30" Horizontal Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	555.79	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.16	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.79	
16139-0873	EA	36" Horizontal Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	719.89	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	35.99	
16139-0874		36" Radius Horizontal Tees (16139-0785)		
16139-0875	EA	6" Horizontal Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	456.48	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.19	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.82	
16139-0876	EA	9" Horizontal Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	488.11	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.41	
16139-0877	EA	12" Horizontal Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	523.01	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.15	
16139-0878	EA	18" Horizontal Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	572.28	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.61	
16139-0879	EA	24" Horizontal Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	643.94	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.74	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.20	
16139-0880	EA	30" Horizontal Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	745.29	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.41	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	37.26	
16139-0881	EA	36" Horizontal Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	855.92	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-61.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	42.80	
16139-0882		12" Radius Vertical Tees (16139-0785)		
16139-0883	EA	6" Vertical Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray	386.89	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.34	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0884	EA	9" Vertical Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	400.15	120.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.01	
16139-0885	EA	12" Vertical Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	409.55	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.48	
16139-0886	EA	18" Vertical Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	431.83	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.82	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.59	
16139-0887	EA	24" Vertical Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	459.00	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.03	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.95	
16139-0888	EA	30" Vertical Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	487.17	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.36	
16139-0889	EA	36" Vertical Tee, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	523.01	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.15	
16139-0890		24" Radius Vertical Tees (16139-0785)		
16139-0891	EA	6" Vertical Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	536.53	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.19	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.83	
16139-0892	EA	9" Vertical Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	549.41	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.05	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.47	
16139-0893	EA	12" Vertical Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	563.04	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.94	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.15	
16139-0894	EA	18" Vertical Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	594.74	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.02	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.74	
16139-0895	EA	24" Vertical Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	615.56	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.48	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.78	
16139-0896	EA	30" Vertical Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	652.81	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-50.77	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.64	
16139-0897	EA	36" Vertical Tee, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	721.83	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.09	
16139-0898		36" Radius Vertical Tee (16139-0785)		
16139-0899	EA	6" Vertical Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	849.93	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-73.63	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	42.50	
16139-0900	EA	9" Vertical Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	868.26	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-74.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	43.41	
16139-0901	EA	12" Vertical Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	887.93	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-76.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	44.40	
16139-0902	EA	18" Vertical Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	922.02	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-78.45	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	46.10	
16139-0903	EA	24" Vertical Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	945.26	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-80.02	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	47.26	
16139-0904	EA	30" Vertical Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	1,006.08	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-84.27	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	50.30	
16139-0905	EA	36" Vertical Tee, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	1,060.42	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-87.39	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	53.02	
16139-0906		12" Radius Horizontal Crosses (16139-0785)		
16139-0907	EA	6" Horizontal Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	381.35	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.07	
16139-0908	EA	9" Horizontal Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	407.69	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.02	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.38	
16139-0909	EA	12" Horizontal Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	424.25	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.21	
16139-0910	EA	18" Horizontal Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	469.96	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.50	
16139-0911	EA	24" Horizontal Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	516.28	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.21	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.81	
16139-0912	EA	30" Horizontal Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	570.57	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.53	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0913	EA	36" Horizontal Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	649.35	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.81	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.47	
16139-0914		24" Radius Horizontal Crosses (16139-0785)		
16139-0915	EA	6" Horizontal Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	520.19	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.51	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.01	
16139-0916	EA	9" Horizontal Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	544.74	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.09	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.24	
16139-0917	EA	12" Horizontal Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	570.87	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.54	
16139-0918	EA	18" Horizontal Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	605.17	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.10	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.26	
16139-0919	EA	24" Horizontal Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	681.80	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.09	
16139-0920	EA	30" Horizontal Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	684.36	261.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.22	
16139-0921	EA	36" Horizontal Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	755.30	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.78	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	37.77	
16139-0922		36" Radius Horizontal Crosses (16139-0785)		
16139-0923	EA	6" Horizontal Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	597.68	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.43	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.88	
16139-0924	EA	9" Horizontal Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	582.96	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.15	
16139-0925	EA	12" Horizontal Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	621.69	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.08	
16139-0926	EA	18" Horizontal Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	721.31	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.07	
16139-0927	EA	24" Horizontal Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	870.03	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-63.25	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	43.50	
16139-0928	EA	30" Horizontal Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	959.40	313.20
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-69.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	47.97	
16139-0929	EA	36" Horizontal Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	1,068.23	348.88
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-77.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	53.41	
16139-0930		12" Radius Vertical Cross (16139-0785)		
16139-0931	EA	6" Vertical Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	381.35	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.07	
16139-0932	EA	9" Vertical Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	407.79	165.10
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.02	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.39	
16139-0933	EA	12" Vertical Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	424.20	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.21	
16139-0934	EA	18" Vertical Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	470.07	184.70
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.50	
16139-0935	EA	24" Vertical Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	516.28	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.21	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.81	
16139-0936	EA	30" Vertical Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	570.74	223.92
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.41	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.54	
16139-0937	EA	36" Vertical Cross, 4" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	648.85	241.17
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.44	
16139-0938		24" Radius Vertical Crosses (16139-0785)		
16139-0939	EA	6" Vertical Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	520.19	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.51	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.01	
16139-0940	EA	9" Vertical Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	544.74	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.09	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.24	
16139-0941	EA	12" Vertical Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	570.87	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.54	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0942	EA	18" Vertical Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	605.17	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.10	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.26	
16139-0943	EA	24" Vertical Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	681.80	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.09	
16139-0944	EA	30" Vertical Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	734.82	261.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.70	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.74	
16139-0945	EA	36" Vertical Cross, 4" Rung Spacing, 24" Radius, Aluminum Cable Tray	812.19	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-57.47	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	40.61	
16139-0946		36" Radius Vertical Crosses <small>(16139-0785)</small>		
16139-0947	EA	6" Vertical Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	719.57	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	35.98	
16139-0948	EA	9" Vertical Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	757.54	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.33	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	37.88	
16139-0949	EA	12" Vertical Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	806.75	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-62.02	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	40.34	
16139-0950	EA	18" Vertical Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	864.79	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.36	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	43.24	
16139-0951	EA	24" Vertical Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,047.80	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-81.03	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	52.39	
16139-0952	EA	30" Vertical Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,156.21	313.20
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-89.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	57.81	
16139-0953	EA	36" Vertical Cross, 4" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,287.26	348.88
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-99.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	64.36	
16139-0954		6" Rung Tray Fittings <small>(16139-0743)</small>		
16139-0955		90 Degree, 12" Radius Horizontal Elbows <small>(16139-0954)</small>		
16139-0956	EA	6" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	160.66	65.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.03	
16139-0957	EA	9" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	177.18	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.50	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.86	
16139-0958	EA	12" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	200.05	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.13	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.00	
16139-0959	EA	18" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	238.95	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.46	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.95	
16139-0960	EA	24" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	280.86	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.41	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.04	
16139-0961	EA	30" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	310.33	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.14	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.52	
16139-0962	EA	36" Horizontal 90 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	361.00	149.40
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.05	
16139-0963		90 Degree, 24" Radius Horizontal Elbows <small>(16139-0954)</small>		
16139-0964	EA	6" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	204.78	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.80	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.24	
16139-0965	EA	9" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	225.68	78.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.04	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.28	
16139-0966	EA	12" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	244.87	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.23	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.24	
16139-0967	EA	18" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	288.44	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.83	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.42	
16139-0968	EA	24" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	327.72	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.31	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.39	
16139-0969	EA	30" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	367.07	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.83	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.35	
16139-0970	EA	36" Horizontal 90 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	420.93	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.05	
16139-0971		90 Degree, 36" Radius Horizontal Elbows <small>(16139-0954)</small>		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0972	EA	6" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	219.03	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.97	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.95	
16139-0973	EA	9" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	240.30	82.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.16	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.02	
16139-0974	EA	12" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	268.47	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.15	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.42	
16139-0975	EA	18" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	322.53	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.57	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.13	
16139-0976	EA	24" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	373.11	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.66	
16139-0977	EA	30" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	421.62	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.09	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.08	
16139-0978	EA	36" Horizontal 90 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	490.76	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.72	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.54	
16139-0979		45 Degree, 12" Radius Horizontal Elbows (16139-0954)		
16139-0980	EA	6" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	113.02	47.51
	16MOD-0064	For 60 Degree Bend, Deduct	-19.09	
	16MOD-0065	For 30 Degree Bend, Deduct	-34.46	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	5.65	
16139-0981	EA	9" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	130.10	56.99
	16MOD-0064	For 60 Degree Bend, Deduct	-21.10	
	16MOD-0065	For 30 Degree Bend, Deduct	-38.33	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.51	
16139-0982	EA	12" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	145.40	65.36
	16MOD-0064	For 60 Degree Bend, Deduct	-22.93	
	16MOD-0065	For 30 Degree Bend, Deduct	-41.84	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.09	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.27	
16139-0983	EA	18" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	180.63	82.61
	16MOD-0064	For 60 Degree Bend, Deduct	-27.95	
	16MOD-0065	For 30 Degree Bend, Deduct	-51.17	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.18	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.03	
16139-0984	EA	24" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	222.02	101.18
	16MOD-0064	For 60 Degree Bend, Deduct	-34.48	
	16MOD-0065	For 30 Degree Bend, Deduct	-63.09	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.77	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.10	
16139-0985	EA	30" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	254.81	116.14
	16MOD-0064	For 60 Degree Bend, Deduct	-39.56	
	16MOD-0065	For 30 Degree Bend, Deduct	-72.39	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.80	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.74	
16139-0986	EA	36" Horizontal 45 Degree Elbow, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	291.06	136.34
	16MOD-0064	For 60 Degree Bend, Deduct	-43.78	
	16MOD-0065	For 30 Degree Bend, Deduct	-80.55	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.74	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.55	
16139-0987		45 Degree, 24" Radius Horizontal Elbows (16139-0954)		
16139-0988	EA	6" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	127.23	49.02
	16MOD-0064	For 60 Degree Bend, Deduct	-23.21	
	16MOD-0065	For 30 Degree Bend, Deduct	-41.40	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.64	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.36	
16139-0989	EA	9" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	149.28	59.09
	16MOD-0064	For 60 Degree Bend, Deduct	-26.61	
	16MOD-0065	For 30 Degree Bend, Deduct	-47.63	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.46	
16139-0990	EA	12" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	165.79	68.23
	16MOD-0064	For 60 Degree Bend, Deduct	-28.56	
	16MOD-0065	For 30 Degree Bend, Deduct	-51.39	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.29	
16139-0991	EA	18" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	201.24	87.12
	16MOD-0064	For 60 Degree Bend, Deduct	-33.00	
	16MOD-0065	For 30 Degree Bend, Deduct	-59.85	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.86	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.06	
16139-0992	EA	24" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	245.47	108.24
	16MOD-0064	For 60 Degree Bend, Deduct	-39.52	
	16MOD-0065	For 30 Degree Bend, Deduct	-71.89	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.53	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.27	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-0993	EA	30" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	287.35	125.56
	16MOD-0064	For 60 Degree Bend, Deduct	-46.71	
	16MOD-0065	For 30 Degree Bend, Deduct	-84.82	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.27	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.37	
16139-0994	EA	36" Horizontal 45 Degree Elbow, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	331.13	149.47
	16MOD-0064	For 60 Degree Bend, Deduct	-51.98	
	16MOD-0065	For 30 Degree Bend, Deduct	-94.94	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.66	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.56	
16139-0995		45 Degree, 36" Radius Horizontal Elbows <small>(16139-0954)</small>		
16139-0996	EA	6" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	145.48	50.58
	16MOD-0064	For 60 Degree Bend, Deduct	-28.63	
	16MOD-0065	For 30 Degree Bend, Deduct	-50.52	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.33	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.27	
16139-0997	EA	9" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	164.89	61.43
	16MOD-0064	For 60 Degree Bend, Deduct	-30.87	
	16MOD-0065	For 30 Degree Bend, Deduct	-54.86	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.37	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.24	
16139-0998	EA	12" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	182.65	71.30
	16MOD-0064	For 60 Degree Bend, Deduct	-32.94	
	16MOD-0065	For 30 Degree Bend, Deduct	-58.86	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.32	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.13	
16139-0999	EA	18" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	224.19	92.28
	16MOD-0064	For 60 Degree Bend, Deduct	-38.59	
	16MOD-0065	For 30 Degree Bend, Deduct	-69.45	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.73	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.21	
16139-1000	EA	24" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	279.55	116.14
	16MOD-0064	For 60 Degree Bend, Deduct	-47.72	
	16MOD-0065	For 30 Degree Bend, Deduct	-85.99	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.28	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.98	
16139-1001	EA	30" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	318.41	136.34
	16MOD-0064	For 60 Degree Bend, Deduct	-52.81	
	16MOD-0065	For 30 Degree Bend, Deduct	-95.59	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.48	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.92	
16139-1002	EA	36" Horizontal 45 Degree Elbow, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	375.35	165.03
	16MOD-0064	For 60 Degree Bend, Deduct	-60.60	
	16MOD-0065	For 30 Degree Bend, Deduct	-110.17	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.78	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.77	
16139-1003		90 Degree, 12" Radius Vertical Risers <small>(16139-0954)</small>		
16139-1004	EA	6" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	177.57	65.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.31	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.88	
16139-1005	EA	9" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	196.83	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.46	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.84	
16139-1006	EA	12" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	211.18	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.24	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.56	
16139-1007	EA	18" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	244.75	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.04	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.24	
16139-1008	EA	24" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	273.48	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.67	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.67	
16139-1009	EA	30" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	301.48	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.07	
16139-1010	EA	36" Vertical Riser 90 Degree, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	334.82	149.21
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.05	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.74	
16139-1011		90 Degree, 24" Radius Vertical Risers <small>(16139-0954)</small>		
16139-1012	EA	6" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	187.88	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.11	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.39	
16139-1013	EA	9" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	208.09	78.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.27	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.40	
16139-1014	EA	12" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	224.49	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.19	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.22	
16139-1015	EA	18" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	263.97	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.38	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.20	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1016	EA	24" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	297.82	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.32	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.89	
16139-1017	EA	30" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	331.10	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.24	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.56	
16139-1018	EA	36" Vertical Riser 90 Degree, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	374.92	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.74	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.75	
16139-1019		90 Degree, 36" Radius Vertical Risers (16139-0954)		
16139-1020	EA	6" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	233.57	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.68	
16139-1021	EA	9" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	254.86	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.74	
16139-1022	EA	12" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	278.67	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.17	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.93	
16139-1023	EA	18" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	323.40	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.66	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.17	
16139-1024	EA	24" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	362.04	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.10	
16139-1025	EA	30" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	406.21	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.55	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.31	
16139-1026	EA	36" Vertical Riser 90 Degree, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	458.15	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.46	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.91	
16139-1027		12" Radius Horizontal Tees (16139-0954)		
16139-1028	EA	6" Horizontal Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	288.65	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.43	
16139-1029	EA	9" Horizontal Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	311.90	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.83	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.60	
16139-1030	EA	12" Horizontal Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	323.44	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.47	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.17	
16139-1031	EA	18" Horizontal Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	364.31	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.36	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.22	
16139-1032	EA	24" Horizontal Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	403.52	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.18	
16139-1033	EA	30" Horizontal Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	439.25	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.54	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.96	
16139-1034	EA	36" Horizontal Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	505.97	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.18	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.30	
16139-1035		24" Radius Horizontal Tees (16139-0954)		
16139-1036	EA	6" Horizontal Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	362.69	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.13	
16139-1037	EA	9" Horizontal Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	392.34	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.78	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.62	
16139-1038	EA	12" Horizontal Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	408.59	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.43	
16139-1039	EA	18" Horizontal Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	450.41	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.53	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.52	
16139-1040	EA	24" Horizontal Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	501.30	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.07	
16139-1041	EA	30" Horizontal Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	539.83	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.56	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.99	
16139-1042	EA	36" Horizontal Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	695.48	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.43	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.77	
16139-1043		36" Radius Horizontal Tees (16139-0954)		
16139-1044	EA	6" Horizontal Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	440.52	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.60	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.03	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1045	EA	9" Horizontal Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	471.72	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.59	
16139-1046	EA	12" Horizontal Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	505.11	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.26	
16139-1047	EA	18" Horizontal Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	553.40	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.67	
16139-1048	EA	24" Horizontal Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	623.10	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.66	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.16	
16139-1049	EA	30" Horizontal Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	718.92	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.77	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	35.95	
16139-1050	EA	36" Horizontal Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	826.62	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	41.33	
16139-1051		12" Radius Vertical Tees (16139-0954)		
16139-1052	EA	6" Vertical Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	372.02	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.60	
16139-1053	EA	9" Vertical Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	384.85	120.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.24	
16139-1054	EA	12" Vertical Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	394.14	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.71	
16139-1055	EA	18" Vertical Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	416.09	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.25	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.80	
16139-1056	EA	24" Vertical Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	441.96	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.32	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.10	
16139-1057	EA	30" Vertical Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	469.80	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.49	
16139-1058	EA	36" Vertical Tee, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	505.11	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.26	
16139-1059		24" Radius Vertical Tees (16139-0954)		
16139-1060	EA	6" Vertical Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	511.35	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.67	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.57	
16139-1061	EA	9" Vertical Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	523.91	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.50	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.20	
16139-1062	EA	12" Vertical Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	537.21	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.36	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.86	
16139-1063	EA	18" Vertical Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	568.15	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.36	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.41	
16139-1064	EA	24" Vertical Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	588.32	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.76	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.42	
16139-1065	EA	30" Vertical Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	624.92	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.98	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.25	
16139-1066	EA	36" Vertical Tee, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	691.44	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.80	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.57	
16139-1067		36" Radius Vertical Tees (16139-0954)		
16139-1068	EA	6" Vertical Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	802.04	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-68.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	40.10	
16139-1069	EA	9" Vertical Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	819.74	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-70.10	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	40.99	
16139-1070	EA	12" Vertical Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	838.79	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-71.43	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	41.94	
16139-1071	EA	18" Vertical Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	872.26	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-73.47	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	43.61	
16139-1072	EA	24" Vertical Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	894.87	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-74.98	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	44.74	
16139-1073	EA	30" Vertical Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	953.83	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-79.04	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	47.69	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1074	EA	36" Vertical Tee, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,007.55	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-82.10	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	50.38	
16139-1075		12" Radius Horizontal Crosses (16139-0954)		
16139-1076	EA	6" Horizontal Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	372.13	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.14	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.61	
16139-1077	EA	9" Horizontal Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	397.49	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.87	
16139-1078	EA	12" Horizontal Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	413.94	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.70	
16139-1079	EA	18" Horizontal Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	457.48	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.36	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.87	
16139-1080	EA	24" Horizontal Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	503.37	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.92	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.17	
16139-1081	EA	30" Horizontal Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	555.38	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.77	
16139-1082	EA	36" Horizontal Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	630.36	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.52	
16139-1083		24" Radius Horizontal Crosses (16139-0954)		
16139-1084	EA	6" Horizontal Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	502.50	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.74	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.13	
16139-1085	EA	9" Horizontal Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	526.50	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.33	
16139-1086	EA	12" Horizontal Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	552.09	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.60	
16139-1087	EA	18" Horizontal Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	585.42	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.12	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.27	
16139-1088	EA	24" Horizontal Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	660.31	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.02	
16139-1089	EA	30" Horizontal Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	711.82	261.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	35.59	
16139-1090	EA	36" Horizontal Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	786.25	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	39.31	
16139-1091		36" Radius Horizontal Crosses (16139-0954)		
16139-1092	EA	6" Horizontal Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	576.84	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.84	
16139-1093	EA	9" Horizontal Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	608.86	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.47	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.44	
16139-1094	EA	12" Horizontal Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	649.15	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.46	
16139-1095	EA	18" Horizontal Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	696.78	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.56	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.84	
16139-1096	EA	24" Horizontal Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	839.64	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-60.21	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	41.98	
16139-1097	EA	30" Horizontal Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	925.75	313.20
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.47	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	46.29	
16139-1098	EA	36" Horizontal Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,030.79	348.88
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-74.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	51.54	
16139-1099		12" Radius Vertical Crosses (16139-0954)		
16139-1100	EA	6" Vertical Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	372.13	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.14	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.61	
16139-1101	EA	9" Vertical Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	397.59	165.10
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.88	
16139-1102	EA	12" Vertical Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	413.89	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.69	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1103	EA	18" Vertical Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	457.59	184.70
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.37	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.88	
16139-1104	EA	24" Vertical Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	503.37	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.92	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.17	
16139-1105	EA	30" Vertical Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	555.55	223.92
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.78	
16139-1106	EA	36" Vertical Cross, 6" Rung Spacing, 12" Radius, Aluminum Cable Tray	629.86	241.17
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.49	
16139-1107		24" Radius Vertical Crosses <small>(16139-0954)</small>		
16139-1108	EA	6" Vertical Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	502.50	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.74	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.13	
16139-1109	EA	9" Vertical Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	526.50	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.33	
16139-1110	EA	12" Vertical Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	552.09	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-38.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.60	
16139-1111	EA	18" Vertical Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	585.42	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.12	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.27	
16139-1112	EA	24" Vertical Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	660.31	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.02	
16139-1113	EA	30" Vertical Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	711.82	261.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	35.59	
16139-1114	EA	36" Vertical Cross, 6" Rung Spacing, 24" Radius, Aluminum Cable Tray	786.25	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	39.31	
16139-1115		36" Radius Vertical Crosses <small>(16139-0954)</small>		
16139-1116	EA	6" Vertical Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	689.36	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.60	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.47	
16139-1117	EA	9" Vertical Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	726.07	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.19	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.30	
16139-1118	EA	12" Vertical Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	773.39	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.69	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	38.67	
16139-1119	EA	18" Vertical Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	829.23	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-62.80	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	41.46	
16139-1120	EA	24" Vertical Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,003.74	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-76.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	50.19	
16139-1121	EA	30" Vertical Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,107.43	313.20
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-84.64	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	55.37	
16139-1122	EA	36" Vertical Cross, 6" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,232.97	348.88
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-94.22	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	61.65	
16139-1123		9" Rung Tray Fittings <small>(16139-0743)</small>		
16139-1124		90 Degree, 12" Radius Horizontal Elbows <small>(16139-1123)</small>		
16139-1125	EA	6" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	152.09	65.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.60	
16139-1126	EA	9" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	168.39	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.42	
16139-1127	EA	12" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	189.63	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.09	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.48	
16139-1128	EA	18" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	227.23	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.29	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.36	
16139-1129	EA	24" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	266.31	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.32	
16139-1130	EA	30" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	294.91	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.60	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.75	
16139-1131	EA	36" Horizontal 90 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	342.33	149.40
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.78	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.12	
16139-1132		90 Degree, 24" Radius Horizontal Elbows <small>(16139-1123)</small>		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1133	EA	6" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	189.59	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.28	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.48	
16139-1134	EA	9" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	209.84	78.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.45	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.49	
16139-1135	EA	12" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	228.26	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.56	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.41	
16139-1136	EA	18" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	270.43	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.03	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.52	
16139-1137	EA	24" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	307.97	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.40	
16139-1138	EA	30" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	345.48	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.67	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.27	
16139-1139	EA	36" Horizontal 90 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	396.62	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.83	
16139-1140		90 Degree, 36" Radius Horizontal Elbows (16139-1123)		
16139-1141	EA	6" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	202.32	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.29	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.12	
16139-1142	EA	9" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	223.16	82.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.45	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.16	
16139-1143	EA	12" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	249.36	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.24	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.47	
16139-1144	EA	18" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	301.04	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.05	
16139-1145	EA	24" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	348.80	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.44	
16139-1146	EA	30" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	394.92	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.75	
16139-1147	EA	36" Horizontal 90 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	460.15	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.66	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.01	
16139-1148		45 Degree, 12" Radius Horizontal Elbows (16139-1123)		
16139-1149	EA	6" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	107.38	47.51
	16MOD-0066	For 60 Degree Bend, Deduct	-17.23	
	16MOD-0067	For 30 Degree Bend, Deduct	-31.35	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-6.78	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	5.37	
16139-1150	EA	9" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	124.24	56.99
	16MOD-0066	For 60 Degree Bend, Deduct	-19.16	
	16MOD-0067	For 30 Degree Bend, Deduct	-35.10	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.68	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.21	
16139-1151	EA	12" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	139.32	65.36
	16MOD-0066	For 60 Degree Bend, Deduct	-20.92	
	16MOD-0067	For 30 Degree Bend, Deduct	-38.50	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.97	
16139-1152	EA	18" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	173.46	82.61
	16MOD-0066	For 60 Degree Bend, Deduct	-25.58	
	16MOD-0067	For 30 Degree Bend, Deduct	-47.23	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.46	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.67	
16139-1153	EA	24" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	213.12	101.18
	16MOD-0066	For 60 Degree Bend, Deduct	-31.55	
	16MOD-0067	For 30 Degree Bend, Deduct	-58.20	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.66	
16139-1154	EA	30" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	244.61	116.14
	16MOD-0066	For 60 Degree Bend, Deduct	-36.19	
	16MOD-0067	For 30 Degree Bend, Deduct	-66.78	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.78	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.23	
16139-1155	EA	36" Horizontal 45 Degree Elbow, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	280.43	136.34
	16MOD-0066	For 60 Degree Bend, Deduct	-40.27	
	16MOD-0067	For 30 Degree Bend, Deduct	-74.70	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.68	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.02	
16139-1156		45 Degree, 24" Radius Horizontal Elbows (16139-1123)		

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1157	EA	6" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	119.63	49.02
	16MOD-0066	For 60 Degree Bend, Deduct	-20.70	
	16MOD-0067	For 30 Degree Bend, Deduct	-37.22	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	5.98	
16139-1158	EA	9" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	140.82	59.09
	16MOD-0066	For 60 Degree Bend, Deduct	-23.82	
	16MOD-0067	For 30 Degree Bend, Deduct	-42.98	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.16	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.04	
16139-1159	EA	12" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	157.11	68.23
	16MOD-0066	For 60 Degree Bend, Deduct	-25.70	
	16MOD-0067	For 30 Degree Bend, Deduct	-46.62	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.03	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.86	
16139-1160	EA	18" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	191.91	87.12
	16MOD-0066	For 60 Degree Bend, Deduct	-29.93	
	16MOD-0067	For 30 Degree Bend, Deduct	-54.72	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.93	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.60	
16139-1161	EA	24" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	234.61	108.24
	16MOD-0066	For 60 Degree Bend, Deduct	-35.94	
	16MOD-0067	For 30 Degree Bend, Deduct	-65.91	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.44	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.73	
16139-1162	EA	30" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	274.33	125.56
	16MOD-0066	For 60 Degree Bend, Deduct	-42.41	
	16MOD-0067	For 30 Degree Bend, Deduct	-77.66	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.97	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.72	
16139-1163	EA	36" Horizontal 45 Degree Elbow, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	317.45	149.47
	16MOD-0066	For 60 Degree Bend, Deduct	-47.47	
	16MOD-0067	For 30 Degree Bend, Deduct	-87.42	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.29	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.87	
16139-1164		45 Degree, 36" Radius Horizontal Elbows <small>(16139-1123)</small>		
16139-1165	EA	6" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	135.28	50.58
	16MOD-0066	For 60 Degree Bend, Deduct	-25.26	
	16MOD-0067	For 30 Degree Bend, Deduct	-44.91	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.31	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.76	
16139-1166	EA	9" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	154.47	61.43
	16MOD-0066	For 60 Degree Bend, Deduct	-27.43	
	16MOD-0067	For 30 Degree Bend, Deduct	-49.13	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.33	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.72	
16139-1167	EA	12" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	172.02	71.30
	16MOD-0066	For 60 Degree Bend, Deduct	-29.43	
	16MOD-0067	For 30 Degree Bend, Deduct	-53.02	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.60	
16139-1168	EA	18" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	212.47	92.28
	16MOD-0066	For 60 Degree Bend, Deduct	-34.73	
	16MOD-0067	For 30 Degree Bend, Deduct	-63.01	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.55	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.62	
16139-1169	EA	24" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	265.23	116.14
	16MOD-0066	For 60 Degree Bend, Deduct	-43.00	
	16MOD-0067	For 30 Degree Bend, Deduct	-78.12	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.26	
16139-1170	EA	30" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	303.22	136.34
	16MOD-0066	For 60 Degree Bend, Deduct	-47.80	
	16MOD-0067	For 30 Degree Bend, Deduct	-87.23	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.96	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.16	
16139-1171	EA	36" Horizontal 45 Degree Elbow, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	358.64	165.03
	16MOD-0066	For 60 Degree Bend, Deduct	-55.09	
	16MOD-0067	For 30 Degree Bend, Deduct	-100.98	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.11	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.93	
16139-1172		90 Degree, 12" Radius Vertical Risers <small>(16139-1123)</small>		
16139-1173	EA	6" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	168.62	65.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.43	
16139-1174	EA	9" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	187.39	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.37	
16139-1175	EA	12" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	201.57	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.28	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.08	
16139-1176	EA	18" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	234.82	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.05	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.74	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1177	EA	24" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	263.06	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.63	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.15	
16139-1178	EA	30" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	290.57	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.16	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.53	
16139-1179	EA	36" Vertical Riser 90 Degree, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	323.58	149.21
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.92	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.18	
16139-1180		90 Degree, 24" Radius Vertical Risers (16139-1123)		
16139-1181	EA	6" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	178.19	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.14	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.91	
16139-1182	EA	9" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	198.00	78.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.90	
16139-1183	EA	12" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	214.16	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.15	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.71	
16139-1184	EA	18" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	253.06	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.29	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.65	
16139-1185	EA	24" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	286.26	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.17	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.31	
16139-1186	EA	30" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	318.89	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.94	
16139-1187	EA	36" Vertical Riser 90 Degree, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	361.89	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.44	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.09	
16139-1188		90 Degree, 36" Radius Vertical Risers (16139-1123)		
16139-1189	EA	6" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	218.60	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.92	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.93	
16139-1190	EA	9" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	239.56	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.08	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.98	
16139-1191	EA	12" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	262.39	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.55	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.12	
16139-1192	EA	18" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	306.47	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-20.97	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.32	
16139-1193	EA	24" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	344.46	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.08	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.22	
16139-1194	EA	30" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	387.32	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.66	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.37	
16139-1195	EA	36" Vertical Riser 90 Degree, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	438.45	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.92	
16139-1196		12" Radius Horizontal Tees (16139-1123)		
16139-1197	EA	6" Horizontal Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	275.41	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.08	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.77	
16139-1198	EA	9" Horizontal Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	297.79	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.89	
16139-1199	EA	12" Horizontal Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	309.12	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.04	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.46	
16139-1200	EA	18" Horizontal Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	347.17	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.36	
16139-1201	EA	24" Horizontal Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	384.64	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.23	
16139-1202	EA	30" Horizontal Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	417.32	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.35	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.87	
16139-1203	EA	36" Horizontal Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	479.71	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.55	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.99	
16139-1204		24" Radius Horizontal Tees (16139-1123)		
16139-1205	EA	6" Horizontal Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	340.12	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.01	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1206	EA	9" Horizontal Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	368.46	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.39	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.42	
16139-1207	EA	12" Horizontal Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	384.07	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.20	
16139-1208	EA	18" Horizontal Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	423.71	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.86	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.19	
16139-1209	EA	24" Horizontal Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	472.22	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.61	
16139-1210	EA	30" Horizontal Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	507.93	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.37	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.40	
16139-1211	EA	36" Horizontal Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	646.64	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.54	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.33	
16139-1212		36" Radius Horizontal Tees (16139-1212)		
16139-1213	EA	6" Horizontal Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	408.62	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.41	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.43	
16139-1214	EA	9" Horizontal Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	438.95	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.14	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.95	
16139-1215	EA	12" Horizontal Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	469.29	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.46	
16139-1216	EA	18" Horizontal Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	515.63	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.22	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.78	
16139-1217	EA	24" Horizontal Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	581.42	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.07	
16139-1218	EA	30" Horizontal Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	666.17	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.31	
16139-1219	EA	36" Horizontal Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	768.02	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-53.05	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	38.40	
16139-1220		12" Radius Vertical Tees (16139-1123)		
16139-1221	EA	6" Vertical Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	342.28	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.55	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.11	
16139-1222	EA	9" Vertical Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	354.24	120.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.36	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.71	
16139-1223	EA	12" Vertical Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	363.32	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.17	
16139-1224	EA	18" Vertical Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	384.62	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.10	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.23	
16139-1225	EA	24" Vertical Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	407.88	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-28.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	20.39	
16139-1226	EA	30" Vertical Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	435.07	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.44	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.75	
16139-1227	EA	36" Vertical Tee, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	469.29	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.46	
16139-1228		24" Radius Vertical Tees (16139-1123)		
16139-1229	EA	6" Vertical Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	460.99	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.64	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.05	
16139-1230	EA	9" Vertical Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	472.90	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.65	
16139-1231	EA	12" Vertical Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	485.55	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.19	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.28	
16139-1232	EA	18" Vertical Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	514.97	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.04	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.75	
16139-1233	EA	24" Vertical Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	533.84	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-40.31	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.69	
16139-1234	EA	30" Vertical Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	569.14	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.46	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1235	EA	36" Vertical Tee, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	630.67	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.73	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.53	
16139-1236		36" Radius Vertical Tees <small>(16139-1123)</small>		
16139-1237	EA	6" Vertical Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	706.24	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-59.26	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	35.31	
16139-1238	EA	9" Vertical Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	722.70	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-60.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.14	
16139-1239	EA	12" Vertical Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	740.51	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-61.60	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	37.03	
16139-1240	EA	18" Vertical Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	772.73	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-63.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	38.64	
16139-1241	EA	24" Vertical Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	794.09	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-64.90	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	39.70	
16139-1242	EA	30" Vertical Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	849.32	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-68.59	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	42.47	
16139-1243	EA	36" Vertical Tee, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	901.80	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-71.53	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	45.09	
16139-1244		12" Radius Horizontal Crosses <small>(16139-1123)</small>		
16139-1245	EA	6" Horizontal Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	353.68	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.30	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.68	
16139-1246	EA	9" Horizontal Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	377.09	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.96	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.85	
16139-1247	EA	12" Horizontal Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	393.32	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.82	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.67	
16139-1248	EA	18" Horizontal Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	432.52	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.63	
16139-1249	EA	24" Horizontal Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	477.54	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.33	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.88	
16139-1250	EA	30" Horizontal Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	524.99	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.85	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.25	
16139-1251	EA	36" Horizontal Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	592.37	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.11	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.62	
16139-1252		24" Radius Horizontal Crosses <small>(16139-1123)</small>		
16139-1253	EA	6" Horizontal Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	467.12	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.20	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.36	
16139-1254	EA	9" Horizontal Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	490.04	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.50	
16139-1255	EA	12" Horizontal Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	514.54	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.11	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.73	
16139-1256	EA	18" Horizontal Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	545.91	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.17	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.30	
16139-1257	EA	24" Horizontal Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	617.34	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.87	
16139-1258	EA	30" Horizontal Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	665.80	261.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.29	
16139-1259	EA	36" Horizontal Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	734.37	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.69	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.72	
16139-1260		36" Radius Horizontal Crosses <small>(16139-1123)</small>		
16139-1261	EA	6" Horizontal Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	535.16	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.18	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.76	
16139-1262	EA	9" Horizontal Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	565.45	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.13	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.27	
16139-1263	EA	12" Horizontal Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	603.13	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.66	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.16	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1264	EA	18" Horizontal Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	647.72	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.39	
16139-1265	EA	24" Horizontal Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	778.87	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.14	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	38.94	
16139-1266	EA	30" Horizontal Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	858.47	313.20
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-59.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	42.92	
16139-1267	EA	36" Horizontal Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	955.90	348.88
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	47.80	
16139-1268		12" Radius Vertical Crosses (16139-1123)		
16139-1269	EA	6" Vertical Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	353.68	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.30	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.68	
16139-1270	EA	9" Vertical Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	377.09	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.96	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.85	
16139-1271	EA	12" Vertical Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	393.32	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.82	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.67	
16139-1272	EA	18" Vertical Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	432.52	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.87	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.63	
16139-1273	EA	24" Vertical Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	477.54	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.33	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.88	
16139-1274	EA	30" Vertical Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	524.99	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.85	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	26.25	
16139-1275	EA	36" Vertical Cross, 9" Rung Spacing, 12" Radius, Aluminum Cable Tray	591.38	240.84
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.07	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.57	
16139-1276		24" Radius Vertical Crosses (16139-1123)		
16139-1277	EA	6" Vertical Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	467.12	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.20	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.36	
16139-1278	EA	9" Vertical Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	490.04	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.50	
16139-1279	EA	12" Vertical Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	514.54	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.11	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.73	
16139-1280	EA	18" Vertical Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	545.91	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.17	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.30	
16139-1281	EA	24" Vertical Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	617.34	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-41.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.87	
16139-1282	EA	30" Vertical Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	665.80	261.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-44.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.29	
16139-1283	EA	36" Vertical Cross, 9" Rung Spacing, 24" Radius, Aluminum Cable Tray	734.37	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-49.69	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.72	
16139-1284		36" Radius Vertical Crosses (16139-1123)		
16139-1285	EA	6" Vertical Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	628.93	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-46.55	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.45	
16139-1286	EA	9" Vertical Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	663.12	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.16	
16139-1287	EA	12" Vertical Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	706.67	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	35.33	
16139-1288	EA	18" Vertical Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	758.10	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.69	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	37.91	
16139-1289	EA	24" Vertical Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	915.61	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-67.81	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	45.78	
16139-1290	EA	30" Vertical Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,009.86	313.20
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-74.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	50.49	
16139-1291	EA	36" Vertical Cross, 9" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,124.39	348.88
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-83.37	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	56.22	
16139-1292		12" Rung Tray Fittings (16139-0743)		
16139-1293		90 Degree, 12" Radius Horizontal Elbows (16139-1292)		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1294	EA	6" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	149.09	65.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.45	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.45	
16139-1295	EA	9" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	165.32	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.31	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.27	
16139-1296	EA	12" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	185.99	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.72	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.30	
16139-1297	EA	18" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	223.12	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.88	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.16	
16139-1298	EA	24" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	261.22	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.44	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.06	
16139-1299	EA	30" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	289.52	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.48	
16139-1300	EA	36" Horizontal 90 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	335.80	149.40
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.13	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.79	
16139-1301	90 Degree, 24" Radius Horizontal Elbows (16139-1292)			
16139-1302	EA	6" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	184.27	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.21	
16139-1303	EA	9" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	204.29	78.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.90	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.21	
16139-1304	EA	12" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	222.45	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.98	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.12	
16139-1305	EA	18" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	264.12	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.39	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.21	
16139-1306	EA	24" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	301.06	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.65	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.05	
16139-1307	EA	30" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	337.92	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.92	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.90	
16139-1308	EA	36" Horizontal 90 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	388.11	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.41	
16139-1309	90 Degree, 36" Radius Horizontal Elbows (16139-1292)			
16139-1310	EA	6" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	196.47	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.71	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.82	
16139-1311	EA	9" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	217.16	82.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.85	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.86	
16139-1312	EA	12" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	242.68	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.58	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.13	
16139-1313	EA	18" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	293.52	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.67	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.68	
16139-1314	EA	24" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	340.29	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.67	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.01	
16139-1315	EA	30" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	385.58	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-25.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.28	
16139-1316	EA	36" Horizontal 90 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	449.44	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.59	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.47	
16139-1317	45 Degree, 12" Radius Horizontal Elbows (16139-1292)			
16139-1318	EA	6" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	105.40	47.51
	16MOD-0068	For 60 Degree Bend, Deduct	-16.58	
	16MOD-0069	For 30 Degree Bend, Deduct	-30.26	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-6.58	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	5.27	
16139-1319	EA	9" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	122.19	56.99
	16MOD-0068	For 60 Degree Bend, Deduct	-18.49	
	16MOD-0069	For 30 Degree Bend, Deduct	-33.98	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.47	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.11	
16139-1320	EA	12" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	137.19	65.36
	16MOD-0068	For 60 Degree Bend, Deduct	-20.22	
	16MOD-0069	For 30 Degree Bend, Deduct	-37.33	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.27	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.86	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1321	EA	18" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	170.96	82.61
	16MOD-0068	For 60 Degree Bend, Deduct	-24.76	
	16MOD-0069	For 30 Degree Bend, Deduct	-45.85	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.21	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.55	
16139-1322	EA	24" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	210.00	101.18
	16MOD-0068	For 60 Degree Bend, Deduct	-30.52	
	16MOD-0069	For 30 Degree Bend, Deduct	-56.48	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.57	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.50	
16139-1323	EA	30" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	241.04	116.14
	16MOD-0068	For 60 Degree Bend, Deduct	-35.02	
	16MOD-0069	For 30 Degree Bend, Deduct	-64.81	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.05	
16139-1324	EA	36" Horizontal 45 Degree Elbow, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	276.71	136.34
	16MOD-0068	For 60 Degree Bend, Deduct	-39.05	
	16MOD-0069	For 30 Degree Bend, Deduct	-72.65	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.31	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.84	
16139-1325		45 Degree, 24" Radius Horizontal Elbows <small>(16139-1292)</small>		
16139-1326	EA	6" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	116.98	49.02
	16MOD-0068	For 60 Degree Bend, Deduct	-19.82	
	16MOD-0069	For 30 Degree Bend, Deduct	-35.76	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-7.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	5.85	
16139-1327	EA	9" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	137.85	59.09
	16MOD-0068	For 60 Degree Bend, Deduct	-22.84	
	16MOD-0069	For 30 Degree Bend, Deduct	-41.35	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.86	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.89	
16139-1328	EA	12" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	154.07	68.23
	16MOD-0068	For 60 Degree Bend, Deduct	-24.69	
	16MOD-0069	For 30 Degree Bend, Deduct	-44.94	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.72	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.70	
16139-1329	EA	18" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	188.64	87.12
	16MOD-0068	For 60 Degree Bend, Deduct	-28.85	
	16MOD-0069	For 30 Degree Bend, Deduct	-52.92	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.60	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.43	
16139-1330	EA	24" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	230.82	108.24
	16MOD-0068	For 60 Degree Bend, Deduct	-34.69	
	16MOD-0069	For 30 Degree Bend, Deduct	-63.83	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.54	
16139-1331	EA	30" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	269.77	125.56
	16MOD-0068	For 60 Degree Bend, Deduct	-40.91	
	16MOD-0069	For 30 Degree Bend, Deduct	-75.15	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.52	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.49	
16139-1332	EA	36" Horizontal 45 Degree Elbow, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	312.67	149.47
	16MOD-0068	For 60 Degree Bend, Deduct	-45.89	
	16MOD-0069	For 30 Degree Bend, Deduct	-84.79	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.81	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.63	
16139-1333		45 Degree, 36" Radius Horizontal Elbows <small>(16139-1292)</small>		
16139-1334	EA	6" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	131.71	50.58
	16MOD-0068	For 60 Degree Bend, Deduct	-24.08	
	16MOD-0069	For 30 Degree Bend, Deduct	-42.95	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.96	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.59	
16139-1335	EA	9" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	150.83	61.43
	16MOD-0068	For 60 Degree Bend, Deduct	-26.23	
	16MOD-0069	For 30 Degree Bend, Deduct	-47.12	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.96	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.54	
16139-1336	EA	12" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	168.30	71.30
	16MOD-0068	For 60 Degree Bend, Deduct	-28.21	
	16MOD-0069	For 30 Degree Bend, Deduct	-50.97	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.42	
16139-1337	EA	18" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	208.36	92.28
	16MOD-0068	For 60 Degree Bend, Deduct	-33.37	
	16MOD-0069	For 30 Degree Bend, Deduct	-60.75	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.14	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.42	
16139-1338	EA	24" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	260.21	116.14
	16MOD-0068	For 60 Degree Bend, Deduct	-41.34	
	16MOD-0069	For 30 Degree Bend, Deduct	-75.36	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.01	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1339	EA	30" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	297.90	136.34
	16MOD-0068	For 60 Degree Bend, Deduct	-46.04	
	16MOD-0069	For 30 Degree Bend, Deduct	-84.31	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-18.43	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.90	
16139-1340	EA	36" Horizontal 45 Degree Elbow, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	352.79	165.03
	16MOD-0068	For 60 Degree Bend, Deduct	-53.15	
	16MOD-0069	For 30 Degree Bend, Deduct	-97.76	
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.53	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.64	
16139-1341		90 Degree, 12" Radius Vertical Risers (16139-1292)		
16139-1342	EA	6" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	162.65	65.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.82	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.13	
16139-1343	EA	9" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	181.09	74.64
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.89	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.05	
16139-1344	EA	12" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	195.17	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.64	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.76	
16139-1345	EA	18" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	228.20	101.18
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.39	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.41	
16139-1346	EA	24" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	256.11	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.93	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.81	
16139-1347	EA	30" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	283.30	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.44	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.17	
16139-1348	EA	36" Vertical Riser 90 Degree, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	316.10	149.21
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.18	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.81	
16139-1349		90 Degree, 24" Radius Vertical Risers (16139-1292)		
16139-1350	EA	6" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	171.74	68.16
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.49	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.59	
16139-1351	EA	9" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	191.27	78.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-12.59	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.56	
16139-1352	EA	12" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	207.26	87.12
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.46	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.36	
16139-1353	EA	18" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	245.79	108.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-15.56	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.29	
16139-1354	EA	24" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	278.56	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.93	
16139-1355	EA	30" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	310.75	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.20	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	15.54	
16139-1356	EA	36" Vertical Riser 90 Degree, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray.....	353.21	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.57	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.66	
16139-1357		90 Degree, 36" Radius Vertical Risers (16139-1292)		
16139-1358	EA	6" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	208.61	71.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-14.92	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.43	
16139-1359	EA	9" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	229.35	82.54
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.06	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	11.47	
16139-1360	EA	12" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	251.54	92.28
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-17.46	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	12.58	
16139-1361	EA	18" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	295.18	116.14
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-19.84	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	14.76	
16139-1362	EA	24" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	332.74	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.91	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	16.64	
16139-1363	EA	30" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	374.73	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-24.40	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.74	
16139-1364	EA	36" Vertical Riser 90 Degree, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray.....	425.32	184.31
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-27.18	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.27	
16139-1365		12" Radius Horizontal Tees (16139-1292)		
16139-1366	EA	6" Horizontal Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray.....	268.79	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-16.42	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	13.44	

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16139-1367	EA 9" Horizontal Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	290.74 -17.71 14.54	136.34
16139-1368	EA 12" Horizontal Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	301.96 -18.32 15.10	142.48
16139-1369	EA 18" Horizontal Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	338.59 -20.79 16.93	156.86
16139-1370	EA 24" Horizontal Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	375.20 -23.01 18.76	174.11
16139-1371	EA 30" Horizontal Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	406.36 -25.25 20.32	184.63
16139-1372	EA 36" Horizontal Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	466.58 -29.24 23.33	209.01
16139-1373	24" Radius Horizontal Tees (16139-1292)		
16139-1374	EA 6" Horizontal Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	328.83 -21.52 16.44	136.34
16139-1375	EA 9" Horizontal Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	356.52 -23.20 17.83	149.47
16139-1376	EA 12" Horizontal Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	371.80 -24.11 18.59	156.86
16139-1377	EA 18" Horizontal Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	410.36 -26.53 20.52	174.11
16139-1378	EA 24" Horizontal Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	457.67 -29.43 22.88	196.08
16139-1379	EA 30" Horizontal Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	491.97 -31.78 24.60	209.01
16139-1380	EA 36" Horizontal Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	622.22 -42.10 31.11	241.50
16139-1381	36" Radius Horizontal Tees (16139-1292)		
16139-1382	EA 6" Horizontal Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	392.66 -26.81 19.63	149.47
16139-1383	EA 9" Horizontal Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	422.56 -28.50 21.13	165.03
16139-1384	EA 12" Horizontal Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	451.38 -30.63 22.57	174.11
16139-1385	EA 18" Horizontal Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	496.74 -33.33 24.84	196.08
16139-1386	EA 24" Horizontal Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	560.59 -37.41 28.03	223.86
16139-1387	EA 30" Horizontal Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	639.80 -43.86 31.99	241.50
16139-1388	EA 36" Horizontal Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	738.71 -50.12 36.94	284.96
16139-1389	12" Radius Vertical Tees (16139-1292)		
16139-1390	EA 6" Vertical Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	327.42 -23.06 16.37	116.14
16139-1391	EA 9" Vertical Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	338.94 -23.83 16.95	120.71
16139-1392	EA 12" Vertical Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	347.91 -24.33 17.40	125.56
16139-1393	EA 18" Vertical Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	368.88 -25.53 18.44	136.34
16139-1394	EA 24" Vertical Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	390.84 -27.21 19.54	142.48
16139-1395	EA 30" Vertical Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray 16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct 16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	417.71 -28.70 20.89	156.86



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1396	EA	36" Vertical Tee, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	451.38	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.63	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.57	
16139-1397		24" Radius Vertical Tees <small>(16139-1292)</small>		
16139-1398	EA	6" Vertical Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	435.82	125.56
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.12	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.79	
16139-1399	EA	9" Vertical Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	447.40	130.71
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.85	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.37	
16139-1400	EA	12" Vertical Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	459.72	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-34.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.99	
16139-1401	EA	18" Vertical Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	488.38	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.38	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.42	
16139-1402	EA	24" Vertical Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	506.59	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.59	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.33	
16139-1403	EA	30" Vertical Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	541.25	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.61	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	27.06	
16139-1404	EA	36" Vertical Tee, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	600.28	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.69	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	30.01	
16139-1405		36" Radius Vertical Tees <small>(16139-1292)</small>		
16139-1406	EA	6" Vertical Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	658.34	136.34
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-54.47	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	32.92	
16139-1407	EA	9" Vertical Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	674.18	142.48
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-55.54	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.71	
16139-1408	EA	12" Vertical Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	691.36	149.47
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-56.68	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	34.57	
16139-1409	EA	18" Vertical Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	722.96	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-58.54	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.15	
16139-1410	EA	24" Vertical Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	743.71	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-59.86	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	37.19	
16139-1411	EA	30" Vertical Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	797.07	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-63.37	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	39.85	
16139-1412	EA	36" Vertical Tee, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	848.92	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-66.24	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	42.45	
16139-1413		12" Radius Horizontal Crosses <small>(16139-1292)</small>		
16139-1414	EA	6" Horizontal Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	344.45	156.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.37	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	17.22	
16139-1415	EA	9" Horizontal Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	366.88	165.03
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.93	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	18.34	
16139-1416	EA	12" Horizontal Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	383.01	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	19.15	
16139-1417	EA	18" Horizontal Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	420.04	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.62	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	21.00	
16139-1418	EA	24" Horizontal Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	464.62	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.04	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.23	
16139-1419	EA	30" Horizontal Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	509.80	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.33	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	25.49	
16139-1420	EA	36" Horizontal Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	573.38	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.22	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	28.67	
16139-1421		24" Radius Horizontal Crosses <small>(16139-1292)</small>		
16139-1422	EA	6" Horizontal Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	449.43	174.11
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.43	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	22.47	
16139-1423	EA	9" Horizontal Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	471.80	184.63
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.79	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	23.59	
16139-1424	EA	12" Horizontal Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	495.77	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.24	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	24.79	

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16139-1425	EA 18" Horizontal Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	526.16	209.01
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.20	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	26.31	
16139-1426	EA 24" Horizontal Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	595.85	241.50
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.46	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	29.79	
16139-1427	EA 30" Horizontal Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	642.79	261.43
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.49	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	32.14	
16139-1428	EA 36" Horizontal Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	708.43	284.96
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.09	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	35.42	
16139-1429	36" Radius Horizontal Crosses (16139-1292)		
16139-1430	EA 6" Horizontal Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	514.33	196.08
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.09	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	25.72	
16139-1431	EA 9" Horizontal Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	543.74	209.01
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-36.95	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	27.19	
16139-1432	EA 12" Horizontal Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	580.12	223.86
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.36	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	29.01	
16139-1433	EA 18" Horizontal Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	623.20	241.50
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.20	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	31.16	
16139-1434	EA 24" Horizontal Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	748.48	284.96
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-51.10	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	37.42	
16139-1435	EA 30" Horizontal Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	824.82	313.20
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-56.38	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	41.24	
16139-1436	EA 36" Horizontal Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	918.46	348.88
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-62.77	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	45.92	
16139-1437	12" Radius Vertical Crosses (16139-1292)		
16139-1438	EA 6" Vertical Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	344.45	156.86
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-21.37	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	17.22	
16139-1439	EA 9" Vertical Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	366.98	165.10
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-22.94	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	18.35	
16139-1440	EA 12" Vertical Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	382.96	174.11
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-23.79	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	19.15	
16139-1441	EA 18" Vertical Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	420.15	184.70
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-26.62	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	21.01	
16139-1442	EA 24" Vertical Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	464.62	209.01
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-29.04	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	23.23	
16139-1443	EA 30" Vertical Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	509.97	223.92
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-32.34	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	25.50	
16139-1444	EA 36" Vertical Cross, 12" Rung Spacing, 12" Radius, Aluminum Cable Tray	572.88	241.17
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-37.19	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	28.64	
16139-1445	24" Radius Vertical Crosses (16139-1292)		
16139-1446	EA 6" Vertical Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	449.43	174.11
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-30.43	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	22.47	
16139-1447	EA 9" Vertical Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	471.80	184.63
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-31.79	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	23.59	
16139-1448	EA 12" Vertical Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	495.77	196.08
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-33.24	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	24.79	
16139-1449	EA 18" Vertical Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	526.16	209.01
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-35.20	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	26.31	
16139-1450	EA 24" Vertical Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	595.85	241.50
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-39.46	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	29.79	
16139-1451	EA 30" Vertical Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	642.79	261.43
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-42.49	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	32.14	
16139-1452	EA 36" Vertical Cross, 12" Rung Spacing, 24" Radius, Aluminum Cable Tray	708.43	284.96
	16MOD-0070 For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-47.09	
	16MOD-0071 For 6" Overall Height Instead Of 4-5/8", Add	35.42	
16139-1453	36" Radius Vertical Crosses (16139-1292)		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1454	EA	6" Vertical Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	598.72	196.08
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-43.53	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	29.94	
16139-1455	EA	9" Vertical Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	631.65	209.01
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-45.75	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	31.58	
16139-1456	EA	12" Vertical Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	673.30	223.86
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-48.68	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	33.67	
16139-1457	EA	18" Vertical Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	722.53	241.50
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-52.13	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	36.13	
16139-1458	EA	24" Vertical Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	871.55	284.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-63.41	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	43.58	
16139-1459	EA	30" Vertical Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	961.08	313.20
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-70.01	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	48.05	
16139-1460	EA	36" Vertical Cross, 12" Rung Spacing, 36" Radius, Aluminum Cable Tray	1,070.10	348.88
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-77.94	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	53.51	
16139-1461		Dropout Or End Plates And Reducers <small>(16139-0743)</small>		
16139-1462		Straight Reducers <small>(16139-1461)</small>		
16139-1463	EA	9"-6" Reducer, Aluminum Cable Tray	129.25	48.24
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-8.90	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.46	
16139-1464	EA	12"-9" Reducer, Aluminum Cable Tray	136.97	52.22
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-9.34	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	6.85	
16139-1465	EA	18"-12" Reducer, Aluminum Cable Tray	151.50	60.26
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.13	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.58	
16139-1466	EA	24"-18" Reducer, Aluminum Cable Tray	168.30	69.74
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.02	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.42	
16139-1467	EA	30"-24" Reducer, Aluminum Cable Tray	183.89	78.43
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.85	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.19	
16139-1468	EA	36"-30" Reducer, Aluminum Cable Tray	205.78	89.60
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.11	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.29	
16139-1469		Reducers <small>(16139-1461)</small>		
16139-1470	EA	18"-6" Reducer, Aluminum Cable Tray	151.57	60.32
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-10.13	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	7.58	
16139-1471	EA	24"-12" Reducer, Aluminum Cable Tray	168.47	69.80
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.03	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	8.42	
16139-1472	EA	30"-12" Reducer, Aluminum Cable Tray	183.79	78.36
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.85	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.19	
16139-1473	EA	30"-18" Reducer, Aluminum Cable Tray	184.77	78.30
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-11.95	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	9.24	
16139-1474	EA	36"-12" Reducer, Aluminum Cable Tray	204.70	89.60
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.00	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.24	
16139-1475	EA	36"-18" Reducer, Aluminum Cable Tray	209.71	91.96
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.31	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.49	
16139-1476	EA	36"-24" Reducer, Aluminum Cable Tray	216.79	94.90
	16MOD-0070	For 3-5/8" Overall Height Instead Of 4-5/8", Deduct	-13.77	
	16MOD-0071	For 6" Overall Height Instead Of 4-5/8", Add	10.84	
16139-1477		Dropout Or End Plate <small>(16139-1461)</small>		
16139-1478	EA	6" Dropout Or End Plate, Aluminum Cable Tray	39.14	19.61
16139-1479	EA	9" Dropout Or End Plate, Aluminum Cable Tray	44.22	22.41
16139-1480	EA	12" Dropout Or End Plate, Aluminum Cable Tray	47.68	24.12
16139-1481	EA	18" Dropout Or End Plate, Aluminum Cable Tray	57.55	28.50
16139-1482	EA	24" Dropout Or End Plate, Aluminum Cable Tray	64.07	31.37
16139-1483	EA	30" Dropout Or End Plate, Aluminum Cable Tray	72.10	34.84
16139-1484	EA	36" Dropout Or End Plate, Aluminum Cable Tray	80.93	39.21
16139-1485		Solid Bottom Cable Tray <small>(16139)</small>		
		Note: 3-5/8" Height.		
16139-1486		Solid Bottom Galvanized Steel Straight Tray Sections <small>(16139-1485)</small>		
16139-1487	LF	6" Solid Bottom Steel Cable Tray, Straight Section	16.51	5.09
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	1.62	
16139-1488	LF	12" Solid Bottom Steel Cable Tray, Straight Section	20.57	6.28
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	2.04	

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR CSI UOM DESCRIPTION		TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1489	LF 18" Solid Bottom Steel Cable Tray, Straight Section <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	27.46 2.62	9.02
16139-1490	LF 24" Solid Bottom Steel Cable Tray, Straight Section <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	31.78 3.04	10.33
16139-1491	LF 30" Solid Bottom Steel Cable Tray, Straight Section <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	38.08 3.63	12.49
16139-1492	LF 36" Solid Bottom Steel Cable Tray, Straight Section <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	48.56 4.90	14.31
16139-1493	Solid Bottom Galvanized Steel Cable Tray Fittings <small>(16139-1485)</small>		
16139-1494	90 Degree, 12" Radius Horizontal Elbows <small>(16139-1493)</small>		
16139-1495	EA 6" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	169.29 14.49	65.43
16139-1496	EA 12" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	220.95 17.80	92.02
16139-1497	EA 18" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	270.77 21.26	116.14
16139-1498	EA 24" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	331.89 26.00	142.67
16139-1499	EA 30" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	387.67 30.60	165.36
16139-1500	EA 36" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	435.52 34.56	184.63
16139-1501	90 Degree, 24" Radius Horizontal Elbows <small>(16139-1493)</small>		
16139-1502	EA 6" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	199.16 18.52	68.10
16139-1503	EA 12" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	263.63 23.19	98.10
16139-1504	EA 18" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	324.96 27.82	125.56
16139-1505	EA 24" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	396.47 33.33	156.86
16139-1506	EA 30" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	465.08 39.05	184.31
16139-1507	EA 36" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	525.63 44.01	209.01
16139-1508	90 Degree, 36" Radius Horizontal Elbows <small>(16139-1493)</small>		
16139-1509	EA 6" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	243.98 24.74	71.17
16139-1510	EA 12" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	315.64 29.89	104.77
16139-1511	EA 18" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	399.99 37.24	136.54
16139-1512	EA 24" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	477.11 42.54	174.11
16139-1513	EA 30" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	572.65 51.06	209.01
16139-1514	EA 36" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	653.46 57.87	240.84
16139-1515	45 Degree, 12" Radius Horizontal Elbows <small>(16139-1493)</small>		
16139-1516	EA 6" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	154.29 12.24	65.43
16139-1517	EA 12" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	204.07 15.27	92.02
16139-1518	EA 18" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	251.24 18.35	116.01
16139-1519	EA 24" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	308.02 22.45	142.48
16139-1520	EA 30" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	359.64 26.39	165.36
16139-1521	EA 36" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	402.99 29.74	184.31
16139-1522	45 Degree, 24" Radius Horizontal Elbows <small>(16139-1493)</small>		
16139-1523	EA 6" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	177.82 15.31	68.16
16139-1524	EA 12" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	238.45 19.43	98.04
16139-1525	EA 18" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	296.29 23.50	125.69
16139-1526	EA 24" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	362.71 28.26	156.86
16139-1527	EA 30" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	426.17 33.15	184.63
16139-1528	EA 36" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add</i>	481.32 37.36	209.01



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1529 45 Degree, 36" Radius Horizontal Elbows (16139-1493)				
16139-1530	EA	6" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray	212.80	71.24
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	20.05	
16139-1531	EA	12" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray	264.13	94.97
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	23.79	
16139-1532	EA	18" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray	356.88	136.54
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	30.78	
16139-1533	EA	24" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray	430.91	174.45
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	35.56	
16139-1534	EA	30" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray	516.59	209.01
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	42.65	
16139-1535	EA	36" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Steel Cable Tray	591.45	241.50
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	48.47	
16139-1536 90 Degree, 12" Radius Vertical Risers (16139-1493)				
16139-1537	EA	6" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Steel Cable Tray	182.26	65.23
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	16.47	
16139-1538	EA	12" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Steel Cable Tray	230.60	92.02
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	19.25	
16139-1539	EA	18" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Steel Cable Tray	271.97	116.14
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	21.44	
16139-1540	EA	24" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Steel Cable Tray	329.48	142.67
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	25.64	
16139-1541	EA	30" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Steel Cable Tray	373.20	165.36
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	28.43	
16139-1542	EA	36" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Steel Cable Tray	408.41	184.31
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	30.55	
16139-1543 90 Degree, 24" Radius Vertical Risers (16139-1493)				
16139-1544	EA	6" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Steel Cable Tray	217.24	68.10
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	21.23	
16139-1545	EA	12" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Steel Cable Tray	276.89	98.10
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	25.18	
16139-1546	EA	18" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Steel Cable Tray	332.19	125.56
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	28.91	
16139-1547	EA	24" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Steel Cable Tray	395.27	156.86
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	33.15	
16139-1548	EA	30" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Steel Cable Tray	448.20	184.31
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	36.52	
16139-1549	EA	36" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Steel Cable Tray	502.72	209.01
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	40.57	
16139-1550 90 Degree, 36" Radius Vertical Risers (16139-1493)				
16139-1551	EA	6" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Steel Cable Tray	259.65	71.17
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	27.09	
16139-1552	EA	12" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Steel Cable Tray	316.59	95.16
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	31.62	
16139-1553	EA	18" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Steel Cable Tray	399.99	136.54
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	37.24	
16139-1554	EA	24" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Steel Cable Tray	479.52	174.11
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	42.91	
16139-1555	EA	30" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Steel Cable Tray	554.57	209.01
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	48.35	
16139-1556	EA	36" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Steel Cable Tray	625.72	240.84
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	53.71	
16139-1557 12" Radius Horizontal Tees (16139-1493)				
16139-1558	EA	6" Horizontal Tee, Solid Bottom, 12" Radius, Steel Cable Tray	293.61	125.56
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	23.12	
16139-1559	EA	12" Horizontal Tee, Solid Bottom, 12" Radius, Steel Cable Tray	352.65	156.59
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	26.80	
16139-1560	EA	18" Horizontal Tee, Solid Bottom, 12" Radius, Steel Cable Tray	416.23	184.63
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	31.66	
16139-1561	EA	24" Horizontal Tee, Solid Bottom, 12" Radius, Steel Cable Tray	495.68	224.31
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	36.96	
16139-1562	EA	30" Horizontal Tee, Solid Bottom, 12" Radius, Steel Cable Tray	541.11	241.50
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	40.92	
16139-1563	EA	36" Horizontal Tee, Solid Bottom, 12" Radius, Steel Cable Tray	634.15	284.96
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	47.62	
16139-1564 24" Radius Horizontal Tees (16139-1493)				
16139-1565	EA	6" Horizontal Tee, Solid Bottom, 24" Radius, Steel Cable Tray	358.67	136.34
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	31.08	
16139-1566	EA	12" Horizontal Tee, Solid Bottom, 24" Radius, Steel Cable Tray	443.35	174.11
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	37.48	
16139-1567	EA	18" Horizontal Tee, Solid Bottom, 24" Radius, Steel Cable Tray	518.40	209.01
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	42.92	
16139-1568	EA	24" Horizontal Tee, Solid Bottom, 24" Radius, Steel Cable Tray	666.01	261.43
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	56.33	
16139-1569	EA	30" Horizontal Tee, Solid Bottom, 24" Radius, Steel Cable Tray	725.78	284.96
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	61.37	

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16139-1570	EA 36" Horizontal Tee, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	852.77 69.77	348.88
16139-1571	36" Radius Horizontal Tees (16139-1493)		
16139-1572	EA 6" Horizontal Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	455.26 43.38	149.47
16139-1573	EA 12" Horizontal Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	557.08 50.88	196.08
16139-1574	EA 18" Horizontal Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	653.24 57.74	241.50
16139-1575	EA 24" Horizontal Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	796.92 72.04	284.96
16139-1576	EA 30" Horizontal Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	873.36 78.63	314.24
16139-1577	EA 36" Horizontal Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	1,015.29 86.94	392.14
16139-1578	12" Radius Vertical Tees (16139-1493)		
16139-1579	EA 6" Vertical Tee, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	347.87 31.26	125.56
16139-1580	EA 12" Vertical Tee, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	406.12 34.78	156.86
16139-1581	EA 18" Vertical Tee, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	437.32 36.58	174.11
16139-1582	EA 24" Vertical Tee, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	468.70 39.59	184.31
16139-1583	EA 30" Vertical Tee, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	520.81 43.28	209.01
16139-1584	EA 36" Vertical Tee, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	580.90 46.89	241.50
16139-1585	24" Radius Vertical Tees (16139-1493)		
16139-1586	EA 6" Vertical Tee, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	432.22 42.11	136.34
16139-1587	EA 12" Vertical Tee, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	504.84 46.70	174.11
16139-1588	EA 18" Vertical Tee, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	552.26 50.16	196.08
16139-1589	EA 24" Vertical Tee, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	584.71 52.87	209.01
16139-1590	EA 30" Vertical Tee, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	661.68 59.01	241.50
16139-1591	EA 36" Vertical Tee, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	746.28 64.44	284.96
16139-1592	36" Radius Vertical Tees (16139-1493)		
16139-1593	EA 6" Vertical Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	568.22 60.36	149.21
16139-1594	EA 12" Vertical Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	652.34 65.17	196.08
16139-1595	EA 18" Vertical Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	722.71 71.10	223.86
16139-1596	EA 24" Vertical Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	764.17 74.38	241.50
16139-1597	EA 30" Vertical Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	896.99 87.05	284.96
16139-1598	EA 36" Vertical Tee, Solid Bottom, 36" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	968.15 93.02	313.20
16139-1599	12" Radius Horizontal Crosses (16139-1493)		
16139-1600	EA 6" Horizontal Cross, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	362.71 28.26	156.86
16139-1601	EA 12" Horizontal Cross, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	417.43 31.84	184.63
16139-1602	EA 18" Horizontal Cross, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	502.06 38.00	223.86
16139-1603	EA 24" Horizontal Cross, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	580.41 43.49	261.43
16139-1604	EA 30" Horizontal Cross, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	683.60 50.34	313.20
16139-1605	EA 36" Horizontal Cross, Solid Bottom, 12" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	758.72 55.66	348.88
16139-1606	24" Radius Horizontal Crosses (16139-1493)		
16139-1607	EA 6" Horizontal Cross, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	475.22 42.21	174.45
16139-1608	EA 12" Horizontal Cross, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	554.57 48.35	209.01
16139-1609	EA 18" Horizontal Cross, Solid Bottom, 24" Radius, Steel Cable Tray..... 16MOD-0072 For 4-5/8" Overall Height Instead Of 3-5/8", Add	666.01 56.33	261.43



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1610	EA	24" Horizontal Cross, Solid Bottom, 24" Radius, Steel Cable Tray	819.10	314.24
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	70.50	
16139-1611	EA	30" Horizontal Cross, Solid Bottom, 24" Radius, Steel Cable Tray	901.00	348.88
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	77.00	
16139-1612	EA	36" Horizontal Cross, Solid Bottom, 24" Radius, Steel Cable Tray	991.17	392.14
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	83.32	
16139-1613		36" Radius Horizontal Crosses (16139-1493)		
16139-1614	EA	6" Horizontal Cross, Solid Bottom, 36" Radius, Steel Cable Tray	628.22	196.08
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	61.55	
16139-1615	EA	12" Horizontal Cross, Solid Bottom, 36" Radius, Steel Cable Tray	734.02	241.50
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	69.86	
16139-1616	EA	18" Horizontal Cross, Solid Bottom, 36" Radius, Steel Cable Tray	885.42	314.24
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	80.44	
16139-1617	EA	24" Horizontal Cross, Solid Bottom, 36" Radius, Steel Cable Tray	1,009.51	348.88
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	93.28	
16139-1618	EA	30" Horizontal Cross, Solid Bottom, 36" Radius, Steel Cable Tray	1,117.77	392.14
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	102.31	
16139-1619	EA	36" Horizontal Cross, Solid Bottom, 36" Radius, Steel Cable Tray	1,240.45	447.64
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	111.46	
16139-1620		Straight Reducers (16139-1493)		
16139-1621	EA	12"-6" Reducer, Solid Bottom, Steel Cable Tray	146.23	52.29
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	13.22	
16139-1622	EA	18"-12" Reducer, Solid Bottom, Steel Cable Tray	158.78	59.09
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	13.97	
16139-1623	EA	24"-18" Reducer, Solid Bottom, Steel Cable Tray	176.17	68.10
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	15.08	
16139-1624	EA	30"-24" Reducer, Solid Bottom, Steel Cable Tray	198.23	78.43
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	16.66	
16139-1625	EA	36"-30" Reducer, Solid Bottom, Steel Cable Tray	214.91	86.99
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	17.74	
16139-1626		Reducers (16139-1493)		
16139-1627	EA	18"-6" Reducer, Solid Bottom, Steel Cable Tray	158.84	59.15
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	13.97	
16139-1628	EA	24"-12" Reducer, Solid Bottom, Steel Cable Tray	175.19	68.23
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	14.91	
16139-1629	EA	30"-12" Reducer, Solid Bottom, Steel Cable Tray	195.72	78.36
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	16.30	
16139-1630	EA	30"-18" Reducer, Solid Bottom, Steel Cable Tray	196.82	78.30
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	16.47	
16139-1631	EA	36"-12" Reducer, Solid Bottom, Steel Cable Tray	213.71	86.99
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	17.56	
16139-1632	EA	36"-18" Reducer, Solid Bottom, Steel Cable Tray	214.91	86.99
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	17.74	
16139-1633	EA	36"-24" Reducer, Solid Bottom, Steel Cable Tray	216.38	87.12
	16MOD-0072	For 4-5/8" Overall Height Instead Of 3-5/8", Add	17.93	
16139-1634		Dropout Or End Plate (16139-1493)		
16139-1635	EA	6" Dropout Or End Plate, Solid Bottom, Steel Cable Tray	44.98	19.61
16139-1636	EA	12" Dropout Or End Plate, Solid Bottom, Steel Cable Tray	55.18	23.92
16139-1637	EA	18" Dropout Or End Plate, Solid Bottom, Steel Cable Tray	63.72	28.36
16139-1638	EA	24" Dropout Or End Plate, Solid Bottom, Steel Cable Tray	71.64	31.37
16139-1639	EA	30" Dropout Or End Plate, Solid Bottom, Steel Cable Tray	79.74	34.84
16139-1640	EA	36" Dropout Or End Plate, Solid Bottom, Steel Cable Tray	88.57	39.21
16139-1641		Solid Bottom Aluminum Straight Cable Tray Sections (16139-1485)		
16139-1642	LF	6" Solid Bottom Aluminum Cable Tray, Straight Section	15.51	4.12
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	1.64	
16139-1643	LF	12" Solid Bottom Aluminum Cable Tray, Straight Section	19.36	4.83
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	2.10	
16139-1644	LF	18" Solid Bottom Aluminum Cable Tray, Straight Section	24.73	6.28
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	2.66	
16139-1645	LF	24" Solid Bottom Aluminum Cable Tray, Straight Section	29.45	6.93
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	3.27	
16139-1646	LF	30" Solid Bottom Aluminum Cable Tray, Straight Section	36.07	8.96
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	3.92	
16139-1647	LF	36" Solid Bottom Steel Aluminum Tray, Straight Section	42.96	9.81
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	4.81	
16139-1648		Solid Bottom Aluminum Cable Tray Fittings (16139-1485)		
16139-1649		90 Degree, 12" Radius Horizontal Elbows (16139-1648)		
16139-1650	EA	6" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray	178.46	65.43
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	15.87	
16139-1651	EA	12" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray	215.45	82.35
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	18.59	
16139-1652	EA	18" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray	249.21	92.22
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	22.01	

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1653	EA	24" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	290.15	108.30
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	25.47	
16139-1654	EA	30" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	342.97	125.69
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	30.50	
16139-1655	EA	36" Horizontal 90 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	387.61	142.67
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	34.36	
16139-1656		90 Degree, 24" Radius Horizontal Elbows (16139-1648)		
16139-1657	EA	6" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	212.31	68.10
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	20.49	
16139-1658	EA	12" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	262.58	87.26
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	24.85	
16139-1659	EA	18" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	296.88	98.04
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	28.19	
16139-1660	EA	24" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	358.56	116.14
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	34.42	
16139-1661	EA	30" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	415.77	136.14
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	39.67	
16139-1662	EA	36" Horizontal 90 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	478.49	156.86
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	45.63	
16139-1663		90 Degree, 36" Radius Horizontal Elbows (16139-1648)		
16139-1664	EA	6" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	265.09	71.17
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	27.91	
16139-1665	EA	12" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	329.82	92.41
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	34.07	
16139-1666	EA	18" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	382.94	104.77
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	39.98	
16139-1667	EA	24" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	432.51	125.36
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	43.98	
16139-1668	EA	30" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	501.95	149.47
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	50.38	
16139-1669	EA	36" Horizontal 90 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	585.98	173.85
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	58.93	
16139-1670		45 Degree, 12" Radius Horizontal Elbows (16139-1648)		
16139-1671	EA	6" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	163.26	65.43
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	13.58	
16139-1672	EA	12" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	198.26	82.35
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	16.01	
16139-1673	EA	18" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	228.06	92.15
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	18.85	
16139-1674	EA	24" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	265.65	108.11
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	21.83	
16139-1675	EA	30" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	313.60	125.69
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	26.09	
16139-1676	EA	36" Horizontal 45 Degree Elbow, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	353.96	142.28
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	29.38	
16139-1677		45 Degree, 24" Radius Horizontal Elbows (16139-1648)		
16139-1678	EA	6" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	190.65	68.16
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	17.24	
16139-1679	EA	12" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	236.66	87.12
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	20.98	
16139-1680	EA	18" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	267.84	98.23
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	23.80	
16139-1681	EA	24" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	322.27	116.14
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	28.98	
16139-1682	EA	30" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	374.86	136.54
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	33.47	
16139-1683	EA	36" Horizontal 45 Degree Elbow, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	430.73	156.86
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	38.47	
16139-1684		45 Degree, 36" Radius Horizontal Elbows (16139-1648)		
16139-1685	EA	6" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	233.03	71.24
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	23.08	
16139-1686	EA	12" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	290.85	92.22
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	28.26	
16139-1687	EA	18" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	337.10	104.77
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	33.11	
16139-1688	EA	24" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	383.86	125.69
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	36.63	
16139-1689	EA	30" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	446.32	149.47
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	42.04	
16139-1690	EA	36" Horizontal 45 Degree Elbow, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	521.84	174.45
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	49.20	
16139-1691		90 Degree, 12" Radius Vertical Risers (16139-1648)		
16139-1692	EA	6" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	191.19	65.23
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8", Add	17.81	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1693	EA	12" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	223.05	82.35
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	19.73	
16139-1694	EA	18" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	250.30	92.22
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	22.17	
16139-1695	EA	24" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	282.56	108.30
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	24.33	
16139-1696	EA	30" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	318.01	125.69
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	26.75	
16139-1697	EA	36" Vertical Riser 90 Degree, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	348.92	142.28
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	28.62	
16139-1698		90 Degree, 24" Radius Vertical Risers (16139-1648)		
16139-1699	EA	6" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	230.76	68.10
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	23.26	
16139-1700	EA	12" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	272.35	87.26
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	26.32	
16139-1701	EA	18" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	300.14	98.04
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	28.68	
16139-1702	EA	24" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	342.28	116.14
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	31.98	
16139-1703	EA	30" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	384.30	136.14
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	34.95	
16139-1704	EA	36" Vertical Riser 90 Degree, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	435.07	156.86
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	39.12	
16139-1705		90 Degree, 36" Radius Vertical Risers (16139-1648)		
16139-1706	EA	6" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	272.69	71.17
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	29.05	
16139-1707	EA	12" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	327.64	92.41
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	33.75	
16139-1708	EA	18" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	363.41	104.77
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	37.05	
16139-1709	EA	24" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	405.38	125.36
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	39.91	
16139-1710	EA	30" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	466.14	149.47
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	45.01	
16139-1711	EA	36" Vertical Riser 90 Degree, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	515.44	173.85
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	48.35	
16139-1712		12" Radius Horizontal Tees (16139-1648)		
16139-1713	EA	6" Horizontal Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	316.65	125.56
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	26.58	
16139-1714	EA	12" Horizontal Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	367.37	142.28
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	31.39	
16139-1715	EA	18" Horizontal Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	407.94	156.86
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	35.05	
16139-1716	EA	24" Horizontal Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	454.62	174.45
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	39.12	
16139-1717	EA	30" Horizontal Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	537.23	209.01
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	45.75	
16139-1718	EA	36" Horizontal Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	652.78	261.43
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	54.35	
16139-1719		24" Radius Horizontal Tees (16139-1648)		
16139-1720	EA	6" Horizontal Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	404.15	136.34
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	37.90	
16139-1721	EA	12" Horizontal Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	461.12	156.86
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	43.03	
16139-1722	EA	18" Horizontal Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	515.96	174.11
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	48.37	
16139-1723	EA	24" Horizontal Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	625.14	209.01
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	58.93	
16139-1724	EA	30" Horizontal Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	750.45	261.43
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	69.00	
16139-1725	EA	36" Horizontal Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	829.09	285.81
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	76.73	
16139-1726		36" Radius Horizontal Tees (16139-1648)		
16139-1727	EA	6" Horizontal Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	536.68	149.47
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	55.59	
16139-1728	EA	12" Horizontal Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	604.95	174.11
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	61.72	
16139-1729	EA	18" Horizontal Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	690.36	196.08
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	70.88	
16139-1730	EA	24" Horizontal Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	824.72	240.84
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	83.56	
16139-1731	EA	30" Horizontal Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	990.37	314.24
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	96.19	
16139-1732	EA	36" Horizontal Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	1,102.41	348.88
	16MOD-0073	For 4-5/8" Overall Height Instead Of 3-5/8"; Add	107.21	

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR		TOTAL DIRECT		DEMOLITION	
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST	UNIT COST	UNIT COST
16139-1733	12" Radius Vertical Tees <small>(16139-1648)</small>				
16139-1734	EA 6" Vertical Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	362.23		125.56	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	33.41			
16139-1735	EA 12" Vertical Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	393.77		142.48	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	35.32			
16139-1736	EA 18" Vertical Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	411.49		149.21	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	36.85			
16139-1737	EA 24" Vertical Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	434.65		156.59	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	39.10			
16139-1738	EA 30" Vertical Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	479.06		174.11	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	42.84			
16139-1739	EA 36" Vertical Tee, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	548.08		209.01	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	47.37			
16139-1740	24" Radius Vertical Tees <small>(16139-1648)</small>				
16139-1741	EA 6" Vertical Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	452.99		136.34	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	45.22			
16139-1742	EA 12" Vertical Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	500.19		156.86	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	48.89			
16139-1743	EA 18" Vertical Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	530.11		165.03	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	52.01			
16139-1744	EA 24" Vertical Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	566.97		174.11	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	56.02			
16139-1745	EA 30" Vertical Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	630.67		196.08	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	61.92			
16139-1746	EA 36" Vertical Tee, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	721.62		240.84	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	68.10			
16139-1747	36" Radius Vertical Tees <small>(16139-1648)</small>				
16139-1748	EA 6" Vertical Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	601.42		149.21	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	65.34			
16139-1749	EA 12" Vertical Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	655.65		172.02	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	69.68			
16139-1750	EA 18" Vertical Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	697.83		184.31	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	73.96			
16139-1751	EA 24" Vertical Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	728.34		196.08	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	76.57			
16139-1752	EA 30" Vertical Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	807.16		223.86	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	83.77			
16139-1753	EA 36" Vertical Tee, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	922.74		284.96	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	30.91			
16139-1754	12" Radius Horizontal Crosses <small>(16139-1648)</small>				
16139-1755	EA 6" Horizontal Cross, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	374.24		142.48	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	32.39			
16139-1756	EA 12" Horizontal Cross, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	415.54		156.86	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	36.19			
16139-1757	EA 18" Horizontal Cross, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	482.95		184.31	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	41.73			
16139-1758	EA 24" Horizontal Cross, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	572.74		223.86	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	48.61			
16139-1759	EA 30" Horizontal Cross, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	627.20		240.84	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	53.93			
16139-1760	EA 36" Horizontal Cross, Solid Bottom, 12" Radius, Aluminum Cable Tray.....	725.98		285.81	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	61.26			
16139-1761	24" Radius Horizontal Crosses <small>(16139-1648)</small>				
16139-1762	EA 6" Horizontal Cross, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	500.61		157.12	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	48.91			
16139-1763	EA 12" Horizontal Cross, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	566.97		174.11	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	56.02			
16139-1764	EA 18" Horizontal Cross, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	649.01		209.01	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	62.51			
16139-1765	EA 24" Horizontal Cross, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	800.45		262.15	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	76.38			
16139-1766	EA 30" Horizontal Cross, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	877.92		285.81	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	84.05			
16139-1767	EA 36" Horizontal Cross, Solid Bottom, 24" Radius, Aluminum Cable Tray.....	999.31		348.88	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	91.75			
16139-1768	36" Radius Horizontal Crosses <small>(16139-1648)</small>				
16139-1769	EA 6" Horizontal Cross, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	697.20		174.11	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	75.56			
16139-1770	EA 12" Horizontal Cross, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	766.33		196.08	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	82.27			
16139-1771	EA 18" Horizontal Cross, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	890.83		241.50	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	93.38			
16139-1772	EA 24" Horizontal Cross, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	1,055.49		314.24	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	105.95			
16139-1773	EA 30" Horizontal Cross, Solid Bottom, 36" Radius, Aluminum Cable Tray.....	1,156.68		348.88	
	16MOD-0073 For 4-5/8" Overall Height Instead Of 3-5/8", Add	115.35			



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1774	EA		36" Horizontal Cross, Solid Bottom, 36" Radius, Aluminum Cable Tray	1,326.44	392.14
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	133.61	
16139-1775			Straight Reducers <small>(16139-1648)</small>		
16139-1776	EA		12"-6" Reducer, Solid Bottom, Aluminum Cable Tray	142.03	44.84
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	13.83	
16139-1777	EA		18"-12" Reducer, Solid Bottom, Aluminum Cable Tray	156.47	52.22
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	14.77	
16139-1778	EA		24"-18" Reducer, Solid Bottom, Aluminum Cable Tray	172.29	59.09
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	15.99	
16139-1779	EA		30"-24" Reducer, Solid Bottom, Aluminum Cable Tray	193.93	68.16
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	17.73	
16139-1780	EA		36"-30" Reducer, Solid Bottom, Aluminum Cable Tray	215.16	78.30
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	19.22	
16139-1781			Reducers <small>(16139-1648)</small>		
16139-1782	EA		18"-6" Reducer, Solid Bottom, Aluminum Cable Tray	155.42	52.22
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	14.61	
16139-1783	EA		24"-12" Reducer, Solid Bottom, Aluminum Cable Tray	171.38	59.22
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	15.84	
16139-1784	EA		30"-12" Reducer, Solid Bottom, Aluminum Cable Tray	191.69	68.10
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	17.40	
16139-1785	EA		30"-18" Reducer, Solid Bottom, Aluminum Cable Tray	192.70	68.10
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	17.56	
16139-1786	EA		36"-12" Reducer, Solid Bottom, Aluminum Cable Tray	215.16	78.30
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	19.22	
16139-1787	EA		36"-18" Reducer, Solid Bottom, Aluminum Cable Tray	216.25	78.30
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	19.39	
16139-1788	EA		36"-24" Reducer, Solid Bottom, Aluminum Cable Tray	218.62	78.43
	16MOD-0073		For 4-5/8" Overall Height Instead Of 3-5/8"; Add	19.72	
16139-1789			Dropout Or End Plate <small>(16139-1648)</small>		
16139-1790	EA		6" Dropout Or End Plate, Solid Bottom, Aluminum Cable Tray	46.41	19.61
16139-1791	EA		12" Dropout Or End Plate, Solid Bottom, Aluminum Cable Tray	55.39	23.92
16139-1792	EA		18" Dropout Or End Plate, Solid Bottom, Aluminum Cable Tray	65.88	28.36
16139-1793	EA		24" Dropout Or End Plate, Solid Bottom, Aluminum Cable Tray	72.75	31.37
16139-1794	EA		30" Dropout Or End Plate, Solid Bottom, Aluminum Cable Tray	81.92	34.84
16139-1795	EA		36" Dropout Or End Plate, Solid Bottom, Aluminum Cable Tray	93.03	39.21
16139-1796			Vented Bottom Cable Tray <small>(16139)</small>		
			Note: 6" Height.		
16139-1797			Vented Bottom Galvanized Steel Cable Tray <small>(16139-1796)</small>		
16139-1798	LF		6" Vented Bottom Steel Cable Tray, Straight Section	21.88	6.86
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-1.62	
16139-1799	LF		12" Vented Bottom Steel Cable Tray, Straight Section	25.77	7.84
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-1.92	
16139-1800	LF		18" Vented Bottom Steel Cable Tray, Straight Section	30.34	9.02
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-2.28	
16139-1801	LF		24" Vented Bottom Steel Cable Tray, Straight Section	34.83	10.33
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-2.62	
16139-1802	LF		30" Vented Bottom Steel Cable Tray, Straight Section	46.04	12.49
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-3.56	
16139-1803	LF		36" Vented Bottom Steel Cable Tray, Straight Section	54.39	15.68
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-4.13	
16139-1804			Vented Bottom Galvanized Steel Cable Tray Fittings <small>(16139-1796)</small>		
16139-1805			90 Degree, 12" Radius Horizontal Elbows <small>(16139-1804)</small>		
16139-1806	EA		6" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	201.84	82.61
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-13.30	
16139-1807	EA		12" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	262.50	111.76
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-16.93	
16139-1808	EA		18" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	325.08	142.48
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-20.63	
16139-1809	EA		24" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	398.73	174.45
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-25.34	
16139-1810	EA		30" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	449.84	196.47
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-28.61	
16139-1811	EA		36" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	515.48	224.31
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-32.85	
16139-1812			90 Degree, 24" Radius Horizontal Elbows <small>(16139-1804)</small>		
16139-1813	EA		6" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	239.90	87.06
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-16.73	
16139-1814	EA		12" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	310.41	120.71
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-20.98	
16139-1815	EA		18" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	393.41	156.86
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-26.27	
16139-1816	EA		24" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	475.57	196.08
	16MOD-0074		For 4-5/8" Overall Height Instead Of 6"; Deduct	-31.22	

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR		TOTAL DIRECT	DEMOLITION
CSI	UOM DESCRIPTION	UNIT COST	UNIT COST
16139-1817	EA 30" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	509.17	202.54
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-34.04	
16139-1818	EA 36" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	634.90	261.43
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-41.70	
16139-1819	90 Degree, 36" Radius Horizontal Elbows (16139-1804)		
16139-1820	EA 6" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	295.01	92.02
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-21.83	
16139-1821	EA 12" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	380.13	130.91
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-27.11	
16139-1822	EA 18" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	485.12	174.45
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-33.98	
16139-1823	EA 24" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	578.23	223.86
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-39.17	
16139-1824	EA 30" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	666.09	261.43
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-44.82	
16139-1825	EA 36" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	778.80	313.20
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-51.78	
16139-1826	45 Degree, 12" Radius Horizontal Elbows (16139-1804)		
16139-1827	EA 6" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	187.84	82.67
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-11.90	
16139-1828	EA 12" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	245.74	111.76
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-15.26	
16139-1829	EA 18" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	305.46	142.28
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-18.69	
16139-1830	EA 24" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	374.45	174.11
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-22.93	
16139-1831	EA 30" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	422.91	196.47
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-25.92	
16139-1832	EA 36" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Steel Cable Tray	483.49	223.86
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-29.70	
16139-1833	45 Degree, 24" Radius Horizontal Elbows (16139-1804)		
16139-1834	EA 6" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	219.18	87.12
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-14.66	
16139-1835	EA 12" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	286.39	120.71
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-18.58	
16139-1836	EA 18" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	364.80	157.12
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-23.39	
16139-1837	EA 24" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	442.84	196.08
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-27.94	
16139-1838	EA 30" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	507.73	224.31
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-32.08	
16139-1839	EA 36" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Steel Cable Tray	591.08	261.43
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-37.32	
16139-1840	45 Degree, 36" Radius Horizontal Elbows (16139-1804)		
16139-1841	EA 6" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	264.15	92.22
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-18.73	
16139-1842	EA 12" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	343.92	130.52
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-23.51	
16139-1843	EA 18" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	442.35	174.45
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-29.70	
16139-1844	EA 24" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	533.94	224.31
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-34.70	
16139-1845	EA 30" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	615.41	261.43
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-39.76	
16139-1846	EA 36" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Steel Cable Tray	723.98	314.24
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-46.21	
16139-1847	90 Degree, 12" Radius Vertical Risers (16139-1804)		
16139-1848	EA 6" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Steel Cable Tray	220.10	82.35
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-15.14	
16139-1849	EA 12" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Steel Cable Tray	278.70	111.76
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-18.55	
16139-1850	EA 18" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Steel Cable Tray	331.08	142.48
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-21.23	
16139-1851	EA 24" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Steel Cable Tray	397.53	174.45
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-25.22	
16139-1852	EA 30" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Steel Cable Tray	436.64	196.47
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-27.29	
16139-1853	EA 36" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Steel Cable Tray	488.24	223.86
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-30.17	
16139-1854	90 Degree, 24" Radius Vertical Risers (16139-1804)		
16139-1855	EA 6" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Steel Cable Tray	263.90	87.06
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-19.13	
16139-1856	EA 12" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Steel Cable Tray	327.21	120.71
	16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-22.66	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1857	EA	18" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Steel Cable Tray	400.61	156.86
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-26.99	
16139-1858	EA	24" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Steel Cable Tray	470.77	196.08
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-30.74	
16139-1859	EA	30" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Steel Cable Tray	535.03	223.86
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-34.85	
16139-1860	EA	36" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Steel Cable Tray	604.90	261.43
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-38.70	
16139-1861		90 Degree, 36" Radius Vertical Risers (16139-1804)		
16139-1862	EA	6" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Steel Cable Tray	314.21	92.02
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-23.75	
16139-1863	EA	12" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Steel Cable Tray	388.53	130.91
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-27.95	
16139-1864	EA	18" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Steel Cable Tray	480.32	174.45
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-33.50	
16139-1865	EA	24" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Steel Cable Tray	575.83	223.86
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-38.93	
16139-1866	EA	30" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Steel Cable Tray	643.30	261.43
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-42.54	
16139-1867	EA	36" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Steel Cable Tray	752.40	313.20
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-49.14	
16139-1868		12" Radius Horizontal Tees (16139-1804)		
16139-1869	EA	6" Horizontal Tee, Vented Bottom, 12" Radius, Steel Cable Tray	358.62	156.86
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-22.79	
16139-1870	EA	12" Horizontal Tee, Vented Bottom, 12" Radius, Steel Cable Tray	434.13	195.69
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-27.11	
16139-1871	EA	18" Horizontal Tee, Vented Bottom, 12" Radius, Steel Cable Tray	496.29	224.31
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-30.93	
16139-1872	EA	24" Horizontal Tee, Vented Bottom, 12" Radius, Steel Cable Tray	577.30	261.43
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-35.94	
16139-1873	EA	30" Horizontal Tee, Vented Bottom, 12" Radius, Steel Cable Tray	636.97	284.96
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-39.95	
16139-1874	EA	36" Horizontal Tee, Vented Bottom, 12" Radius, Steel Cable Tray	699.61	313.20
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-43.86	
16139-1875		24" Radius Horizontal Tees (16139-1804)		
16139-1876	EA	6" Horizontal Tee, Vented Bottom, 24" Radius, Steel Cable Tray	451.00	174.11
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-30.59	
16139-1877	EA	12" Horizontal Tee, Vented Bottom, 24" Radius, Steel Cable Tray	548.23	223.86
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-36.17	
16139-1878	EA	18" Horizontal Tee, Vented Bottom, 24" Radius, Steel Cable Tray	631.30	261.43
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-41.34	
16139-1879	EA	24" Horizontal Tee, Vented Bottom, 24" Radius, Steel Cable Tray	776.40	313.20
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-51.54	
16139-1880	EA	30" Horizontal Tee, Vented Bottom, 24" Radius, Steel Cable Tray	857.45	348.88
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-56.67	
16139-1881	EA	36" Horizontal Tee, Vented Bottom, 24" Radius, Steel Cable Tray	958.33	392.14
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-63.15	
16139-1882		36" Radius Horizontal Tees (16139-1804)		
16139-1883	EA	6" Horizontal Tee, Vented Bottom, 36" Radius, Steel Cable Tray	557.16	196.08
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-39.38	
16139-1884	EA	12" Horizontal Tee, Vented Bottom, 36" Radius, Steel Cable Tray	698.49	261.43
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-48.06	
16139-1885	EA	18" Horizontal Tee, Vented Bottom, 36" Radius, Steel Cable Tray	810.47	314.24
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-54.86	
16139-1886	EA	24" Horizontal Tee, Vented Bottom, 36" Radius, Steel Cable Tray	999.13	392.14
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-67.23	
16139-1887	EA	30" Horizontal Tee, Vented Bottom, 36" Radius, Steel Cable Tray	1,115.48	449.73
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-74.07	
16139-1888	EA	36" Horizontal Tee, Vented Bottom, 36" Radius, Steel Cable Tray	1,301.07	521.49
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-86.65	
16139-1889		12" Radius Vertical Tees (16139-1804)		
16139-1890	EA	6" Vertical Tee, Vented Bottom, 12" Radius, Steel Cable Tray	423.41	156.86
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-29.27	
16139-1891	EA	12" Vertical Tee, Vented Bottom, 12" Radius, Steel Cable Tray	491.17	196.08
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-32.78	
16139-1892	EA	18" Vertical Tee, Vented Bottom, 12" Radius, Steel Cable Tray	516.37	209.01
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-34.22	
16139-1893	EA	24" Vertical Tee, Vented Bottom, 12" Radius, Steel Cable Tray	550.63	223.86
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-36.41	
16139-1894	EA	30" Vertical Tee, Vented Bottom, 12" Radius, Steel Cable Tray	590.83	241.50
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-38.96	
16139-1895	EA	36" Vertical Tee, Vented Bottom, 12" Radius, Steel Cable Tray	666.97	284.96
	16MOD-0074	For 4-5/8" Overall Height Instead Of 6", Deduct	-42.95	
16139-1896		24" Radius Vertical Tees (16139-1804)		

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR CSI UOM DESCRIPTION		TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1897	EA 6" Vertical Tee, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	507.39 -36.23	174.11
16139-1898	EA 12" Vertical Tee, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	601.02 -41.45	223.86
16139-1899	EA 18" Vertical Tee, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	641.22 -44.00	241.50
16139-1900	EA 24" Vertical Tee, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	692.49 -47.46	261.43
16139-1901	EA 30" Vertical Tee, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	744.96 -50.75	284.96
16139-1902	EA 36" Vertical Tee, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	874.25 -58.35	348.88
16139-1903	36" Radius Vertical Tees <small>(16139-1804)</small>		
16139-1904	EA 6" Vertical Tee, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	671.70 -50.86	195.69
16139-1905	EA 12" Vertical Tee, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	789.68 -57.18	261.43
16139-1906	EA 18" Vertical Tee, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	840.95 -60.35	284.96
16139-1907	EA 24" Vertical Tee, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	913.65 -65.18	314.24
16139-1908	EA 30" Vertical Tee, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,031.43 -74.07	348.88
16139-1909	EA 36" Vertical Tee, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,202.05 -82.90	447.64
16139-1910	12" Radius Horizontal Crosses <small>(16139-1804)</small>		
16139-1911	EA 6" Horizontal Cross, Vented Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	451.58 -28.82	196.08
16139-1912	EA 12" Horizontal Cross, Vented Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	499.89 -31.29	224.31
16139-1913	EA 18" Horizontal Cross, Vented Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	576.10 -35.82	261.43
16139-1914	EA 24" Horizontal Cross, Vented Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	669.61 -40.86	313.20
16139-1915	EA 30" Horizontal Cross, Vented Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	744.99 -45.53	347.64
16139-1916	EA 36" Horizontal Cross, Vented Bottom, 12" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	839.55 -51.28	392.14
16139-1917	24" Radius Horizontal Crosses <small>(16139-1804)</small>		
16139-1918	EA 6" Horizontal Cross, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	569.48 -38.25	224.31
16139-1919	EA 12" Horizontal Cross, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	640.90 -42.30	261.43
16139-1920	EA 18" Horizontal Cross, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	747.60 -48.66	313.20
16139-1921	EA 24" Horizontal Cross, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	940.34 -61.36	392.14
16139-1922	EA 30" Horizontal Cross, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,062.86 -68.98	447.64
16139-1923	EA 36" Horizontal Cross, Vented Bottom, 24" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,205.08 -77.05	521.49
16139-1924	36" Radius Horizontal Crosses <small>(16139-1804)</small>		
16139-1925	EA 6" Horizontal Cross, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	765.68 -54.78	261.43
16139-1926	EA 12" Horizontal Cross, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	870.46 -60.86	314.24
16139-1927	EA 18" Horizontal Cross, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,007.53 -68.07	392.14
16139-1928	EA 24" Horizontal Cross, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,299.72 -86.28	524.24
16139-1929	EA 30" Horizontal Cross, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,515.35 -99.17	628.41
16139-1930	EA 36" Horizontal Cross, Vented Bottom, 36" Radius, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	1,811.10 -115.75	784.30
16139-1931	Straight Reducers <small>(16139-1804)</small>		
16139-1932	EA 12"-6" Reducer, Vented Bottom, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	171.90 -11.62	66.80
16139-1933	EA 18"-12" Reducer, Vented Bottom, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	187.34 -12.52	74.64
16139-1934	EA 24"-18" Reducer, Vented Bottom, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	212.17 -13.97	86.99
16139-1935	EA 30"-24" Reducer, Vented Bottom, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	232.98 -15.13	98.04
16139-1936	EA 36"-30" Reducer, Vented Bottom, Steel Cable Tray <i>16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct</i>	254.34 -16.44	107.97



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1937 Reducers <small>(16139-1804)</small>				
16139-1938	EA	18"-6" Reducer, Vented Bottom, Steel Cable Tray.....	187.34	74.64
		16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-12.52	
16139-1939	EA	24"-12" Reducer, Vented Bottom, Steel Cable Tray.....	211.23	87.12
		16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-13.86	
16139-1940	EA	30"-12" Reducer, Vented Bottom, Steel Cable Tray.....	231.62	97.91
		16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-15.00	
16139-1941	EA	30"-18" Reducer, Vented Bottom, Steel Cable Tray.....	232.66	97.84
		16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-15.11	
16139-1942	EA	36"-12" Reducer, Vented Bottom, Steel Cable Tray.....	253.14	107.97
		16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-16.32	
16139-1943	EA	36"-18" Reducer, Vented Bottom, Steel Cable Tray.....	254.34	107.97
		16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-16.44	
16139-1944	EA	36"-24" Reducer, Vented Bottom, Steel Cable Tray.....	255.94	108.24
		16MOD-0074 For 4-5/8" Overall Height Instead Of 6", Deduct	-16.58	
16139-1945 Dropout Or End Plate <small>(16139-1804)</small>				
16139-1946	EA	6" Dropout Or End Plate, Vented Bottom, Steel Cable Tray.....	54.65	24.12
16139-1947	EA	12" Dropout Or End Plate, Vented Bottom, Steel Cable Tray.....	64.82	28.30
16139-1948	EA	18" Dropout Or End Plate, Vented Bottom, Steel Cable Tray.....	71.45	31.24
16139-1949	EA	24" Dropout Or End Plate, Vented Bottom, Steel Cable Tray.....	80.36	34.84
16139-1950	EA	30" Dropout Or End Plate, Vented Bottom, Steel Cable Tray.....	89.16	39.15
16139-1951	EA	36" Dropout Or End Plate, Vented Bottom, Steel Cable Tray.....	104.43	46.79
16139-1952 Vented Bottom Aluminum Cable Tray <small>(16139-1796)</small>				
16139-1953	LF	6" Vented Bottom Aluminum Cable Tray, Straight Section.....	19.95	5.09
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-1.57	
16139-1954	LF	9" Vented Bottom Aluminum Cable Tray, Straight Section.....	22.14	5.62
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-1.75	
16139-1955	LF	12" Vented Bottom Aluminum Cable Tray, Straight Section.....	24.77	6.28
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-1.96	
16139-1956	LF	18" Vented Bottom Aluminum Cable Tray, Straight Section.....	28.84	6.99
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-2.30	
16139-1957	LF	24" Vented Bottom Aluminum Cable Tray, Straight Section.....	33.11	7.78
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-2.67	
16139-1958	LF	30" Vented Bottom Aluminum Cable Tray, Straight Section.....	42.04	8.96
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-3.46	
16139-1959	LF	36" Vented Bottom Aluminum Cable Tray, Straight Section.....	46.79	10.52
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-3.80	
16139-1960 Vented Bottom Aluminum Cable Tray Fittings <small>(16139-1796)</small>				
16139-1961 90 Degree, 12" Radius Horizontal Elbows <small>(16139-1960)</small>				
16139-1962	EA	6" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray.....	212.53	82.61
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-14.37	
16139-1963	EA	9" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray.....	230.89	89.67
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-15.61	
16139-1964	EA	12" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray.....	255.10	100.98
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-17.10	
16139-1965	EA	18" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray.....	287.45	111.90
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-19.42	
16139-1966	EA	24" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray.....	344.78	136.54
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-23.10	
16139-1967	EA	30" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray.....	406.19	157.12
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-27.53	
16139-1968	EA	36" Horizontal 90 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray.....	448.11	174.45
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-30.27	
16139-1969 90 Degree, 24" Radius Horizontal Elbows <small>(16139-1960)</small>				
16139-1970	EA	6" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	253.64	87.06
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-18.11	
16139-1971	EA	12" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	307.33	108.24
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-21.72	
16139-1972	EA	18" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	347.73	120.71
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-24.71	
16139-1973	EA	24" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	415.83	149.21
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-29.15	
16139-1974	EA	30" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	480.71	173.85
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-33.59	
16139-1975	EA	36" Horizontal 90 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	532.99	196.08
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-36.96	
16139-1976 90 Degree, 36" Radius Horizontal Elbows <small>(16139-1960)</small>				
16139-1977	EA	6" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	306.45	92.02
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-22.97	
16139-1978	EA	12" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	368.56	116.27
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-27.16	
16139-1979	EA	18" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	416.76	130.91
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-30.77	
16139-1980	EA	24" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	492.13	165.03
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-35.46	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-1981	EA	30" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	521.59	159.93
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-38.83	
16139-1982	EA	36" Horizontal 90 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	649.80	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-46.33	
16139-1983		45 Degree, 12" Radius Horizontal Elbows <small>(16139-1960)</small>		
16139-1984	EA	6" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray	196.18	82.67
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-12.73	
16139-1985	EA	9" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray	213.11	89.80
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-13.83	
16139-1986	EA	12" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray	236.00	100.98
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-15.19	
16139-1987	EA	18" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray	265.04	111.76
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-17.19	
16139-1988	EA	24" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray	318.67	136.34
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-20.50	
16139-1989	EA	30" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray	374.44	157.12
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-24.35	
16139-1990	EA	36" Horizontal 45 Degree Elbow, Vented Bottom, 12" Radius, Aluminum Cable Tray	412.97	174.11
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-26.79	
16139-1991		45 Degree, 24" Radius Horizontal Elbows <small>(16139-1960)</small>		
16139-1992	EA	6" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray	229.89	87.12
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-15.73	
16139-1993	EA	12" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray	279.39	108.24
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-18.92	
16139-1994	EA	18" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray	315.75	120.91
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-21.50	
16139-1995	EA	24" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray	379.44	149.47
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-25.49	
16139-1996	EA	30" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray	439.73	174.45
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-29.44	
16139-1997	EA	36" Horizontal 45 Degree Elbow, Vented Bottom, 24" Radius, Aluminum Cable Tray	487.63	196.08
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-32.42	
16139-1998		45 Degree, 36" Radius Horizontal Elbows <small>(16139-1960)</small>		
16139-1999	EA	6" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	273.07	92.22
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-19.62	
16139-2000	EA	12" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	329.66	116.01
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-23.30	
16139-2001	EA	18" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	373.06	130.91
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-26.40	
16139-2002	EA	24" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	444.84	165.36
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-30.71	
16139-2003	EA	30" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	506.64	184.63
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-35.28	
16139-2004	EA	36" Horizontal 45 Degree Elbow, Vented Bottom, 36" Radius, Aluminum Cable Tray	589.76	224.31
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-40.28	
16139-2005		90 Degree, 12" Radius Vertical Risers <small>(16139-1960)</small>		
16139-2006	EA	6" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Aluminum Cable Tray	228.47	82.35
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-15.98	
16139-2007	EA	9" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Aluminum Cable Tray	245.67	89.47
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-17.11	
16139-2008	EA	12" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Aluminum Cable Tray	265.96	100.98
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-18.18	
16139-2009	EA	18" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Aluminum Cable Tray	287.45	111.90
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-19.42	
16139-2010	EA	24" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Aluminum Cable Tray	339.35	136.54
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-22.56	
16139-2011	EA	30" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Aluminum Cable Tray	379.06	157.12
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-24.81	
16139-2012	EA	36" Vertical Riser 90 Degree, Vented Bottom, 12" Radius, Aluminum Cable Tray	408.52	174.11
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-26.34	
16139-2013		90 Degree, 24" Radius Vertical Risers <small>(16139-1960)</small>		
16139-2014	EA	6" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Aluminum Cable Tray	267.75	87.06
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-19.52	
16139-2015	EA	12" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Aluminum Cable Tray	313.84	108.24
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-22.37	
16139-2016	EA	18" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Aluminum Cable Tray	346.65	120.71
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-24.60	
16139-2017	EA	24" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Aluminum Cable Tray	396.68	149.47
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-27.21	
16139-2018	EA	30" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Aluminum Cable Tray	445.42	174.11
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-30.03	
16139-2019	EA	36" Vertical Riser 90 Degree, Vented Bottom, 24" Radius, Aluminum Cable Tray	489.58	196.08
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-32.62	
16139-2020		90 Degree, 36" Radius Vertical Risers <small>(16139-1960)</small>		



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2021	EA	6" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	305.37	92.02
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-22.87	
16139-2022	EA	12" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	356.62	116.27
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-25.97	
16139-2023	EA	18" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	400.48	130.91
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-29.14	
16139-2024	EA	24" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	472.59	165.03
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-33.51	
16139-2025	EA	30" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	524.77	184.63
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-37.09	
16139-2026	EA	36" Vertical Riser 90 Degree, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	596.62	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-41.01	
16139-2027		12" Radius Horizontal Tees <small>(16139-1960)</small>		
16139-2028	EA	6" Horizontal Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	375.38	156.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-24.47	
16139-2029	EA	9" Horizontal Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	392.28	165.03
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-25.47	
16139-2030	EA	12" Horizontal Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	416.68	173.85
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-27.18	
16139-2031	EA	18" Horizontal Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	475.05	196.47
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-31.13	
16139-2032	EA	24" Horizontal Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	542.35	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-35.58	
16139-2033	EA	30" Horizontal Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	616.96	261.43
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-39.91	
16139-2034	EA	36" Horizontal Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	681.19	284.96
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-44.37	
16139-2035		24" Radius Horizontal Tees <small>(16139-1960)</small>		
16139-2036	EA	6" Horizontal Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	463.86	174.11
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-31.88	
16139-2037	EA	12" Horizontal Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	523.66	195.69
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-36.06	
16139-2038	EA	18" Horizontal Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	590.11	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-40.36	
16139-2039	EA	24" Horizontal Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	705.88	260.71
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-48.86	
16139-2040	EA	30" Horizontal Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	816.73	314.24
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-55.49	
16139-2041	EA	36" Horizontal Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	923.34	348.88
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-63.26	
16139-2042		36" Radius Horizontal Tees <small>(16139-1960)</small>		
16139-2043	EA	6" Horizontal Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray	605.71	196.08
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-44.23	
16139-2044	EA	12" Horizontal Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray	693.21	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-50.67	
16139-2045	EA	18" Horizontal Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray	727.48	218.36
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-54.55	
16139-2046	EA	24" Horizontal Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray	945.29	313.20
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-68.43	
16139-2047	EA	30" Horizontal Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray	1,106.59	393.72
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-77.85	
16139-2048	EA	36" Horizontal Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray	1,267.03	447.64
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-89.40	
16139-2049		12" Radius Vertical Tees <small>(16139-1960)</small>		
16139-2050	EA	6" Vertical Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	417.71	156.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-28.70	
16139-2051	EA	9" Vertical Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	432.44	165.03
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-29.49	
16139-2052	EA	12" Vertical Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	459.52	174.11
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-31.44	
16139-2053	EA	18" Vertical Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	478.10	184.63
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-32.42	
16139-2054	EA	24" Vertical Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	500.87	195.69
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-33.78	
16139-2055	EA	30" Vertical Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	530.72	209.01
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-35.65	
16139-2056	EA	36" Vertical Tee, Vented Bottom, 12" Radius, Aluminum Cable Tray	591.38	240.84
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-39.07	
16139-2057		24" Radius Vertical Tees <small>(16139-1960)</small>		
16139-2058	EA	6" Vertical Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	511.62	174.11
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-36.65	
16139-2059	EA	12" Vertical Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	564.90	195.69
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-40.18	
16139-2060	EA	18" Vertical Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	603.43	209.01
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-42.92	
16139-2061	EA	24" Vertical Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray	644.37	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-45.78	

16000 Electrical
16100 Basic Materials And Methods
16139 Cable Trays


MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2062	EA	30" Vertical Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	694.49	240.84
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-49.38	
16139-2063	EA	36" Vertical Tee, Vented Bottom, 24" Radius, Aluminum Cable Tray.....	774.82	285.81
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-53.66	
16139-2064		36" Radius Vertical Tees (16139-1960)		
16139-2065	EA	6" Vertical Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	668.00	195.69
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-50.49	
16139-2066	EA	12" Vertical Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	736.62	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-55.01	
16139-2067	EA	18" Vertical Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	775.88	240.84
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-57.52	
16139-2068	EA	24" Vertical Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	838.43	262.15
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-62.00	
16139-2069	EA	30" Vertical Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	910.48	285.81
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-67.23	
16139-2070	EA	36" Vertical Tee, Vented Bottom, 36" Radius, Aluminum Cable Tray.....	1,035.23	347.64
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-74.55	
16139-2071		12" Radius Horizontal Crosses (16139-1960)		
16139-2072	EA	6" Horizontal Cross, Vented Bottom, 12" Radius, Aluminum Cable Tray	432.39	174.11
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-28.73	
16139-2073	EA	9" Horizontal Cross, Vented Bottom, 12" Radius, Aluminum Cable Tray	459.65	184.63
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-30.58	
16139-2074	EA	12" Horizontal Cross, Vented Bottom, 12" Radius, Aluminum Cable Tray	483.73	196.47
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-32.00	
16139-2075	EA	18" Horizontal Cross, Vented Bottom, 12" Radius, Aluminum Cable Tray	536.93	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-35.04	
16139-2076	EA	24" Horizontal Cross, Vented Bottom, 12" Radius, Aluminum Cable Tray	616.89	260.71
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-39.96	
16139-2077	EA	30" Horizontal Cross, Vented Bottom, 12" Radius, Aluminum Cable Tray	695.00	284.18
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-45.82	
16139-2078	EA	36" Horizontal Cross, Vented Bottom, 12" Radius, Aluminum Cable Tray	848.46	348.88
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-55.77	
16139-2079		24" Radius Horizontal Crosses (16139-1960)		
16139-2080	EA	6" Horizontal Cross, Vented Bottom, 24" Radius, Aluminum Cable Tray	582.49	196.47
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-41.88	
16139-2081	EA	12" Horizontal Cross, Vented Bottom, 24" Radius, Aluminum Cable Tray	651.97	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-46.54	
16139-2082	EA	18" Horizontal Cross, Vented Bottom, 24" Radius, Aluminum Cable Tray	735.18	260.71
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-51.79	
16139-2083	EA	24" Horizontal Cross, Vented Bottom, 24" Radius, Aluminum Cable Tray	869.32	313.20
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-60.83	
16139-2084	EA	30" Horizontal Cross, Vented Bottom, 24" Radius, Aluminum Cable Tray	953.83	347.64
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-66.41	
16139-2085	EA	36" Horizontal Cross, Vented Bottom, 24" Radius, Aluminum Cable Tray	1,169.36	447.64
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-79.63	
16139-2086		36" Radius Horizontal Crosses (16139-1960)		
16139-2087	EA	6" Horizontal Cross, Vented Bottom, 36" Radius, Aluminum Cable Tray	790.88	223.86
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-60.44	
16139-2088	EA	12" Horizontal Cross, Vented Bottom, 36" Radius, Aluminum Cable Tray	881.84	262.15
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-66.34	
16139-2089	EA	18" Horizontal Cross, Vented Bottom, 36" Radius, Aluminum Cable Tray	1,004.98	313.20
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-74.40	
16139-2090	EA	24" Horizontal Cross, Vented Bottom, 36" Radius, Aluminum Cable Tray	1,215.12	393.72
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-88.70	
16139-2091	EA	30" Horizontal Cross, Vented Bottom, 36" Radius, Aluminum Cable Tray	1,357.28	449.73
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-98.25	
16139-2092	EA	36" Horizontal Cross, Vented Bottom, 36" Radius, Aluminum Cable Tray	1,574.55	521.49
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-114.00	
16139-2093		Straight Reducers (16139-1960)		
16139-2094	EA	9"-6" Reducer, Vented Bottom, Aluminum Cable Tray	156.65	52.29
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-11.31	
16139-2095	EA	12"-9" Reducer, Vented Bottom, Aluminum Cable Tray	164.50	55.10
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-11.86	
16139-2096	EA	18"-12" Reducer, Vented Bottom, Aluminum Cable Tray	187.00	65.30
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-13.26	
16139-2097	EA	24"-18" Reducer, Vented Bottom, Aluminum Cable Tray	207.82	74.57
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-14.57	
16139-2098	EA	30"-24" Reducer, Vented Bottom, Aluminum Cable Tray	230.98	87.12
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-15.84	
16139-2099	EA	36"-30" Reducer, Vented Bottom, Aluminum Cable Tray	252.06	97.84
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-17.05	
16139-2100		Reducers (16139-1960)		
16139-2101	EA	12"-6" Reducer, Vented Bottom, Aluminum Cable Tray	164.35	54.97
	16MOD-0075	For 4-5/8" Overall Height Instead Of 6", Deduct	-11.85	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2102	EA	18"-6" Reducer, Vented Bottom, Aluminum Cable Tray	186.93	65.30
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-13.25	
16139-2103	EA	18"-9" Reducer, Vented Bottom, Aluminum Cable Tray	186.93	65.30
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-13.25	
16139-2104	EA	24"-6" Reducer, Vented Bottom, Aluminum Cable Tray	207.92	74.64
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-14.57	
16139-2105	EA	24"-9" Reducer, Vented Bottom, Aluminum Cable Tray	207.92	74.64
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-14.57	
16139-2106	EA	24"-12" Reducer, Vented Bottom, Aluminum Cable Tray	208.11	74.70
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-14.58	
16139-2107	EA	30"-12" Reducer, Vented Bottom, Aluminum Cable Tray	233.02	87.06
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-16.05	
16139-2108	EA	30"-18" Reducer, Vented Bottom, Aluminum Cable Tray	230.72	86.99
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-15.82	
16139-2109	EA	36"-12" Reducer, Vented Bottom, Aluminum Cable Tray	252.06	97.84
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-17.05	
16139-2110	EA	36"-18" Reducer, Vented Bottom, Aluminum Cable Tray	252.06	97.84
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-17.05	
16139-2111	EA	36"-24" Reducer, Vented Bottom, Aluminum Cable Tray	252.38	98.04
		16MOD-0075 For 4-5/8" Overall Height Instead Of 6", Deduct	-17.07	
16139-2112		Dropout Or End Plate <small>(16139-1960)</small>		
16139-2113	EA	6" Dropout Or End Plate, Vented Bottom, Aluminum Cable Tray	54.41	24.12
16139-2114	EA	9" Dropout Or End Plate, Vented Bottom, Aluminum Cable Tray	59.37	26.33
16139-2115	EA	12" Dropout Or End Plate, Vented Bottom, Aluminum Cable Tray	63.94	28.30
16139-2116	EA	18" Dropout Or End Plate, Vented Bottom, Aluminum Cable Tray	72.31	31.24
16139-2117	EA	24" Dropout Or End Plate, Vented Bottom, Aluminum Cable Tray	82.52	34.84
16139-2118	EA	30" Dropout Or End Plate, Vented Bottom, Aluminum Cable Tray	91.33	39.15
16139-2119	EA	36" Dropout Or End Plate, Vented Bottom, Aluminum Cable Tray	104.56	44.84
16139-2120		Covers And Dividers <small>(16139)</small>		
16139-2121		Galvanized Steel Covers <small>(16139-2120)</small>		
16139-2122		Ventilated Straight Sections <small>(16139-2121)</small>		
16139-2123	LF	6" Steel Cable Tray Cover, Straight Section	5.78	1.17
16139-2124	LF	9" Steel Cable Tray Cover, Straight Section	6.97	1.37
16139-2125	LF	12" Steel Cable Tray Cover, Straight Section	8.19	1.56
16139-2126	LF	18" Steel Cable Tray Cover, Straight Section	11.10	2.10
16139-2127	LF	24" Steel Cable Tray Cover, Straight Section	14.07	2.81
16139-2128	LF	30" Steel Cable Tray Cover, Straight Section	17.08	3.46
16139-2129	LF	36" Steel Cable Tray Cover, Straight Section	78.39	39.28
16139-2130		90 Degree, 12" Radius Horizontal Elbows <small>(16139-2121)</small>		
16139-2131	EA	6" Horizontal 90 Degree Elbow, 12" Radius, Steel Cable Tray Cover	35.20	4.18
16139-2132	EA	9" Horizontal 90 Degree Elbow, 12" Radius, Steel Cable Tray Cover	39.37	4.90
16139-2133	EA	12" Horizontal 90 Degree Elbow, 12" Radius, Steel Cable Tray Cover	42.65	5.82
16139-2134	EA	18" Horizontal 90 Degree Elbow, 12" Radius, Steel Cable Tray Cover	58.01	7.45
16139-2135	EA	24" Horizontal 90 Degree Elbow, 12" Radius, Steel Cable Tray Cover	71.02	9.48
16139-2136	EA	30" Horizontal 90 Degree Elbow, 12" Radius, Steel Cable Tray Cover	85.88	10.52
16139-2137	EA	36" Horizontal 90 Degree Elbow, 12" Radius, Steel Cable Tray Cover	103.73	12.55
16139-2138		90 Degree, 24" Radius Horizontal Elbows <small>(16139-2121)</small>		
16139-2139	EA	6" Horizontal 90 Degree Elbow, 24" Radius, Steel Cable Tray Cover	54.49	4.64
16139-2140	EA	9" Horizontal 90 Degree Elbow, 24" Radius, Steel Cable Tray Cover	57.01	5.43
16139-2141	EA	12" Horizontal 90 Degree Elbow, 24" Radius, Steel Cable Tray Cover	64.31	6.54
16139-2142	EA	18" Horizontal 90 Degree Elbow, 24" Radius, Steel Cable Tray Cover	79.78	8.30
16139-2143	EA	24" Horizontal 90 Degree Elbow, 24" Radius, Steel Cable Tray Cover	97.84	10.46
16139-2144	EA	30" Horizontal 90 Degree Elbow, 24" Radius, Steel Cable Tray Cover	125.69	12.02
16139-2145	EA	36" Horizontal 90 Degree Elbow, 24" Radius, Steel Cable Tray Cover	146.18	14.25
16139-2146		90 Degree, 36" Radius Horizontal Elbows <small>(16139-2121)</small>		
16139-2147	EA	6" Horizontal 90 Degree Elbow, 36" Radius, Steel Cable Tray Cover	77.06	5.22
16139-2148	EA	9" Horizontal 90 Degree Elbow, 36" Radius, Steel Cable Tray Cover	85.66	6.02
16139-2149	EA	12" Horizontal 90 Degree Elbow, 36" Radius, Steel Cable Tray Cover	92.83	7.45
16139-2150	EA	18" Horizontal 90 Degree Elbow, 36" Radius, Steel Cable Tray Cover	117.71	8.69
16139-2151	EA	24" Horizontal 90 Degree Elbow, 36" Radius, Steel Cable Tray Cover	142.50	12.09
16139-2152	EA	30" Horizontal 90 Degree Elbow, 36" Radius, Steel Cable Tray Cover	167.92	13.66
16139-2153	EA	36" Horizontal 90 Degree Elbow, 36" Radius, Steel Cable Tray Cover	196.48	15.68
16139-2154		45 Degree, 12" Radius Horizontal Elbows <small>(16139-2121)</small>		
16139-2155	EA	6" Horizontal 45 Degree Elbow, 12" Radius, Steel Cable Tray Cover	27.04	4.18
		16MOD-0076 For 60 Degree Bend, Deduct	-7.31	
		16MOD-0077 For 30 Degree Bend, Deduct	-12.42	
16139-2156	EA	9" Horizontal 45 Degree Elbow, 12" Radius, Steel Cable Tray Cover	32.17	4.90
		16MOD-0076 For 60 Degree Bend, Deduct	-8.74	
		16MOD-0077 For 30 Degree Bend, Deduct	-14.83	
16139-2157	EA	12" Horizontal 45 Degree Elbow, 12" Radius, Steel Cable Tray Cover	36.05	5.82
		16MOD-0076 For 60 Degree Bend, Deduct	-9.68	
		16MOD-0077 For 30 Degree Bend, Deduct	-16.45	

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2158	EA	18" Horizontal 45 Degree Elbow, 12" Radius, Steel Cable Tray Cover	43.67	7.12
	16MOD-0076	For 60 Degree Bend, Deduct	-11.68	
	16MOD-0077	For 30 Degree Bend, Deduct	-19.86	
16139-2159	EA	24" Horizontal 45 Degree Elbow, 12" Radius, Steel Cable Tray Cover	50.98	8.23
	16MOD-0076	For 60 Degree Bend, Deduct	-13.65	
	16MOD-0077	For 30 Degree Bend, Deduct	-23.22	
16139-2160	EA	30" Horizontal 45 Degree Elbow, 12" Radius, Steel Cable Tray Cover	59.63	9.48
	16MOD-0076	For 60 Degree Bend, Deduct	-16.03	
	16MOD-0077	For 30 Degree Bend, Deduct	-27.25	
16139-2161	EA	36" Horizontal 45 Degree Elbow, 12" Radius, Steel Cable Tray Cover	66.62	10.46
	16MOD-0076	For 60 Degree Bend, Deduct	-17.98	
	16MOD-0077	For 30 Degree Bend, Deduct	-30.54	
16139-2162		45 Degree, 24" Radius Horizontal Elbows (16139-2121)		
16139-2163	EA	6" Horizontal 45 Degree Elbow, 24" Radius, Steel Cable Tray Cover	37.11	4.64
	16MOD-0076	For 60 Degree Bend, Deduct	-10.47	
	16MOD-0077	For 30 Degree Bend, Deduct	-17.71	
16139-2164	EA	9" Horizontal 45 Degree Elbow, 24" Radius, Steel Cable Tray Cover	42.02	5.43
	16MOD-0076	For 60 Degree Bend, Deduct	-11.79	
	16MOD-0077	For 30 Degree Bend, Deduct	-19.95	
16139-2165	EA	12" Horizontal 45 Degree Elbow, 24" Radius, Steel Cable Tray Cover	48.12	6.54
	16MOD-0076	For 60 Degree Bend, Deduct	-13.37	
	16MOD-0077	For 30 Degree Bend, Deduct	-22.64	
16139-2166	EA	18" Horizontal 45 Degree Elbow, 24" Radius, Steel Cable Tray Cover	55.70	7.84
	16MOD-0076	For 60 Degree Bend, Deduct	-15.37	
	16MOD-0077	For 30 Degree Bend, Deduct	-26.05	
16139-2167	EA	24" Horizontal 45 Degree Elbow, 24" Radius, Steel Cable Tray Cover	64.15	8.96
	16MOD-0076	For 60 Degree Bend, Deduct	-17.73	
	16MOD-0077	For 30 Degree Bend, Deduct	-30.05	
16139-2168	EA	30" Horizontal 45 Degree Elbow, 24" Radius, Steel Cable Tray Cover	79.86	10.46
	16MOD-0076	For 60 Degree Bend, Deduct	-22.34	
	16MOD-0077	For 30 Degree Bend, Deduct	-37.81	
16139-2169	EA	36" Horizontal 45 Degree Elbow, 24" Radius, Steel Cable Tray Cover	88.52	12.09
	16MOD-0076	For 60 Degree Bend, Deduct	-24.58	
	16MOD-0077	For 30 Degree Bend, Deduct	-41.64	
16139-2170		45 Degree, 36" Radius Horizontal Elbows (16139-2121)		
16139-2171	EA	6" Horizontal 45 Degree Elbow, 36" Radius, Steel Cable Tray Cover	51.28	5.22
	16MOD-0076	For 60 Degree Bend, Deduct	-14.93	
	16MOD-0077	For 30 Degree Bend, Deduct	-25.17	
16139-2172	EA	9" Horizontal 45 Degree Elbow, 36" Radius, Steel Cable Tray Cover	58.06	6.02
	16MOD-0076	For 60 Degree Bend, Deduct	-16.84	
	16MOD-0077	For 30 Degree Bend, Deduct	-28.41	
16139-2173	EA	12" Horizontal 45 Degree Elbow, 36" Radius, Steel Cable Tray Cover	65.20	7.45
	16MOD-0076	For 60 Degree Bend, Deduct	-18.66	
	16MOD-0077	For 30 Degree Bend, Deduct	-31.52	
16139-2174	EA	18" Horizontal 45 Degree Elbow, 36" Radius, Steel Cable Tray Cover	74.40	8.30
	16MOD-0076	For 60 Degree Bend, Deduct	-21.38	
	16MOD-0077	For 30 Degree Bend, Deduct	-36.09	
16139-2175	EA	24" Horizontal 45 Degree Elbow, 36" Radius, Steel Cable Tray Cover	90.68	10.13
	16MOD-0076	For 60 Degree Bend, Deduct	-26.04	
	16MOD-0077	For 30 Degree Bend, Deduct	-43.96	
16139-2176	EA	30" Horizontal 45 Degree Elbow, 36" Radius, Steel Cable Tray Cover	100.52	12.09
	16MOD-0076	For 60 Degree Bend, Deduct	-28.54	
	16MOD-0077	For 30 Degree Bend, Deduct	-48.24	
16139-2177	EA	36" Horizontal 45 Degree Elbow, 36" Radius, Steel Cable Tray Cover	118.99	13.07
	16MOD-0076	For 60 Degree Bend, Deduct	-34.25	
	16MOD-0077	For 30 Degree Bend, Deduct	-57.81	
16139-2178		90 Degree, 12" Radius Vertical Risers (16139-2121)		
16139-2179	EA	6" Vertical Riser 90 Degree, 12" Radius, Steel Cable Tray Cover	30.50	4.18
16139-2180	EA	9" Vertical Riser 90 Degree, 12" Radius, Steel Cable Tray Cover	32.17	4.90
16139-2181	EA	12" Vertical Riser 90 Degree, 12" Radius, Steel Cable Tray Cover	35.45	5.82
16139-2182	EA	18" Vertical Riser 90 Degree, 12" Radius, Steel Cable Tray Cover	41.28	7.12
16139-2183	EA	24" Vertical Riser 90 Degree, 12" Radius, Steel Cable Tray Cover	45.37	9.22
16139-2184	EA	30" Vertical Riser 90 Degree, 12" Radius, Steel Cable Tray Cover	50.49	10.52
16139-2185	EA	36" Vertical Riser 90 Degree, 12" Radius, Steel Cable Tray Cover	63.49	12.55
16139-2186		90 Degree, 24" Radius Vertical Risers (16139-2121)		
16139-2187	EA	6" Vertical Riser 90 Degree, 24" Radius, Steel Cable Tray Cover	36.50	4.64
16139-2188	EA	9" Vertical Riser 90 Degree, 24" Radius, Steel Cable Tray Cover	40.82	5.43
16139-2189	EA	12" Vertical Riser 90 Degree, 24" Radius, Steel Cable Tray Cover	43.92	6.54
16139-2190	EA	18" Vertical Riser 90 Degree, 24" Radius, Steel Cable Tray Cover	56.86	7.84
16139-2191	EA	24" Vertical Riser 90 Degree, 24" Radius, Steel Cable Tray Cover	66.05	10.13
16139-2192	EA	30" Vertical Riser 90 Degree, 24" Radius, Steel Cable Tray Cover	75.90	12.09
16139-2193	EA	36" Vertical Riser 90 Degree, 24" Radius, Steel Cable Tray Cover	87.38	14.25
16139-2194		90 Degree, 36" Radius Vertical Risers (16139-2121)		
16139-2195	EA	6" Vertical Riser 90 Degree, 36" Radius, Steel Cable Tray Cover	42.27	5.22
16139-2196	EA	9" Vertical Riser 90 Degree, 36" Radius, Steel Cable Tray Cover	52.67	6.02
16139-2197	EA	12" Vertical Riser 90 Degree, 36" Radius, Steel Cable Tray Cover	60.43	7.45
16139-2198	EA	18" Vertical Riser 90 Degree, 36" Radius, Steel Cable Tray Cover	74.39	8.30



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2199	EA	24" Vertical Riser 90 Degree, 36" Radius, Steel Cable Tray Cover	86.51	11.57
16139-2200	EA	30" Vertical Riser 90 Degree, 36" Radius, Steel Cable Tray Cover	103.13	13.66
16139-2201	EA	36" Vertical Riser 90 Degree, 36" Radius, Steel Cable Tray Cover	120.89	15.68
16139-2202		12" Radius Horizontal Tees (16139-2121)		
16139-2203	EA	6" Horizontal Tee, 12" Radius, Steel Cable Tray Cover	53.97	6.80
16139-2204	EA	9" Horizontal Tee, 12" Radius, Steel Cable Tray Cover	56.86	7.84
16139-2205	EA	12" Horizontal Tee, 12" Radius, Steel Cable Tray Cover	64.51	9.22
16139-2206	EA	18" Horizontal Tee, 12" Radius, Steel Cable Tray Cover	77.46	10.46
16139-2207	EA	24" Horizontal Tee, 12" Radius, Steel Cable Tray Cover	95.72	12.09
16139-2208	EA	30" Horizontal Tee, 12" Radius, Steel Cable Tray Cover	117.78	17.39
16139-2209	EA	36" Horizontal Tee, 12" Radius, Steel Cable Tray Cover	141.57	20.85
16139-2210		24" Radius Horizontal Tees (16139-2121)		
16139-2211	EA	6" Horizontal Tee, 24" Radius, Steel Cable Tray Cover	79.07	7.12
16139-2212	EA	9" Horizontal Tee, 24" Radius, Steel Cable Tray Cover	90.59	8.30
16139-2213	EA	12" Horizontal Tee, 24" Radius, Steel Cable Tray Cover	95.52	9.81
16139-2214	EA	18" Horizontal Tee, 24" Radius, Steel Cable Tray Cover	120.68	11.24
16139-2215	EA	24" Horizontal Tee, 24" Radius, Steel Cable Tray Cover	177.71	13.07
16139-2216	EA	30" Horizontal Tee, 24" Radius, Steel Cable Tray Cover	210.28	19.61
16139-2217	EA	36" Horizontal Tee, 24" Radius, Steel Cable Tray Cover	235.77	24.12
16139-2218		36" Radius Horizontal Tees (16139-2121)		
16139-2219	EA	6" Horizontal Tee, 36" Radius, Steel Cable Tray Cover	133.61	7.45
16139-2220	EA	9" Horizontal Tee, 36" Radius, Steel Cable Tray Cover	138.10	8.69
16139-2221	EA	12" Horizontal Tee, 36" Radius, Steel Cable Tray Cover	154.23	10.46
16139-2222	EA	18" Horizontal Tee, 36" Radius, Steel Cable Tray Cover	180.94	12.09
16139-2223	EA	24" Horizontal Tee, 36" Radius, Steel Cable Tray Cover	234.97	14.25
16139-2224	EA	30" Horizontal Tee, 36" Radius, Steel Cable Tray Cover	266.62	22.48
16139-2225	EA	36" Horizontal Tee, 36" Radius, Steel Cable Tray Cover	307.75	28.43
16139-2226		12" Radius Horizontal Crosses (16139-2121)		
16139-2227	EA	6" Horizontal Cross, 12" Radius, Steel Cable Tray Cover	78.95	9.22
16139-2228	EA	9" Horizontal Cross, 12" Radius, Steel Cable Tray Cover	83.53	9.81
16139-2229	EA	12" Horizontal Cross, 12" Radius, Steel Cable Tray Cover	92.46	10.46
16139-2230	EA	18" Horizontal Cross, 12" Radius, Steel Cable Tray Cover	108.92	12.09
16139-2231	EA	24" Horizontal Cross, 12" Radius, Steel Cable Tray Cover	136.96	17.39
16139-2232	EA	30" Horizontal Cross, 12" Radius, Steel Cable Tray Cover	158.33	20.85
16139-2233	EA	36" Horizontal Cross, 12" Radius, Steel Cable Tray Cover	181.31	22.41
16139-2234		24" Radius Horizontal Crosses (16139-2121)		
16139-2235	EA	6" Horizontal Cross, 24" Radius, Steel Cable Tray Cover	137.55	9.81
16139-2236	EA	9" Horizontal Cross, 24" Radius, Steel Cable Tray Cover	149.43	10.46
16139-2237	EA	12" Horizontal Cross, 24" Radius, Steel Cable Tray Cover	160.27	11.24
16139-2238	EA	18" Horizontal Cross, 24" Radius, Steel Cable Tray Cover	190.91	13.07
16139-2239	EA	24" Horizontal Cross, 24" Radius, Steel Cable Tray Cover	239.06	19.61
16139-2240	EA	30" Horizontal Cross, 24" Radius, Steel Cable Tray Cover	272.91	24.12
16139-2241	EA	36" Horizontal Cross, 24" Radius, Steel Cable Tray Cover	305.05	26.07
16139-2242		36" Radius Horizontal Crosses (16139-2121)		
16139-2243	EA	6" Horizontal Cross, 36" Radius, Steel Cable Tray Cover	220.23	10.46
16139-2244	EA	9" Horizontal Cross, 36" Radius, Steel Cable Tray Cover	228.67	11.24
16139-2245	EA	12" Horizontal Cross, 36" Radius, Steel Cable Tray Cover	240.93	12.09
16139-2246	EA	18" Horizontal Cross, 36" Radius, Steel Cable Tray Cover	278.16	14.25
16139-2247	EA	24" Horizontal Cross, 36" Radius, Steel Cable Tray Cover	361.38	22.41
16139-2248	EA	30" Horizontal Cross, 36" Radius, Steel Cable Tray Cover	395.56	28.56
16139-2249	EA	36" Horizontal Cross, 36" Radius, Steel Cable Tray Cover	424.25	31.37
16139-2250		Reducers (16139-2121)		
16139-2251	EA	9"-6" Reducer, Steel Cable Tray Covers	35.17	4.90
16139-2252	EA	12"-6" Reducer, Steel Cable Tray Covers	37.88	5.82
16139-2253	EA	12"-9" Reducer, Steel Cable Tray Covers	37.88	5.82
16139-2254	EA	18"-6" Reducer, Steel Cable Tray Covers	41.88	7.12
16139-2255	EA	18"-12" Reducer, Steel Cable Tray Covers	41.88	7.12
16139-2256	EA	24"-12" Reducer, Steel Cable Tray Covers	51.47	7.84
16139-2257	EA	24"-18" Reducer, Steel Cable Tray Covers	55.07	7.84
16139-2258	EA	30"-12" Reducer, Steel Cable Tray Covers	53.35	8.96
16139-2259	EA	30"-18" Reducer, Steel Cable Tray Covers	56.95	8.96
16139-2260	EA	30"-24" Reducer, Steel Cable Tray Covers	59.34	8.96
16139-2261	EA	36"-12" Reducer, Steel Cable Tray Covers	61.90	9.81
16139-2262	EA	36"-18" Reducer, Steel Cable Tray Covers	63.10	9.81
16139-2263	EA	36"-24" Reducer, Steel Cable Tray Covers	64.30	9.81
16139-2264	EA	36"-30" Reducer, Steel Cable Tray Covers	64.90	9.81
16139-2265		Aluminum Covers (16139-2120)		

MINOR
CSI UOM DESCRIPTIONTOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2266			Ventilated Straight Sections (16139-2265)		
16139-2267	LF		6" Aluminum Cable Tray Cover, Straight Section.....	5.31	1.17
16139-2268	LF		9" Aluminum Cable Tray Cover, Straight Section.....	6.31	1.37
16139-2269	LF		12" Aluminum Cable Tray Cover, Straight Section.....	7.39	1.56
16139-2270	LF		18" Aluminum Cable Tray Cover, Straight Section.....	9.83	2.10
16139-2271	LF		24" Aluminum Cable Tray Cover, Straight Section.....	12.69	2.81
16139-2272	LF		30" Aluminum Cable Tray Cover, Straight Section.....	14.54	3.46
16139-2273	LF		36" Aluminum Cable Tray Cover, Straight Section.....	74.77	39.28
16139-2274			90 Degree, 12" Radius Horizontal Elbows (16139-2265)		
16139-2275	EA		6" Horizontal 90 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	31.96	4.18
16139-2276	EA		9" Horizontal 90 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	34.22	4.90
16139-2277	EA		12" Horizontal 90 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	37.87	5.82
16139-2278	EA		18" Horizontal 90 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	49.32	7.45
16139-2279	EA		24" Horizontal 90 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	62.50	9.48
16139-2280	EA		30" Horizontal 90 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	73.38	10.52
16139-2281	EA		36" Horizontal 90 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	89.31	12.55
16139-2282			90 Degree, 24" Radius Horizontal Elbows (16139-2265)		
16139-2283	EA		6" Horizontal 90 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	41.89	4.64
16139-2284	EA		9" Horizontal 90 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	51.35	5.43
16139-2285	EA		12" Horizontal 90 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	57.59	6.54
16139-2286	EA		18" Horizontal 90 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	69.14	8.30
16139-2287	EA		24" Horizontal 90 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	85.82	10.46
16139-2288	EA		30" Horizontal 90 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	103.67	12.02
16139-2289	EA		36" Horizontal 90 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	126.89	14.25
16139-2290			90 Degree, 36" Radius Horizontal Elbows (16139-2265)		
16139-2291	EA		6" Horizontal 90 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	67.28	5.22
16139-2292	EA		9" Horizontal 90 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	74.10	6.02
16139-2293	EA		12" Horizontal 90 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	85.15	7.45
16139-2294	EA		18" Horizontal 90 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	101.34	8.69
16139-2295	EA		24" Horizontal 90 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	125.38	12.09
16139-2296	EA		30" Horizontal 90 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	144.29	13.66
16139-2297	EA		36" Horizontal 90 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	168.27	15.68
16139-2298			45 Degree, 12" Radius Horizontal Elbows (16139-2265)		
16139-2299	EA		6" Horizontal 45 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	25.45	4.18
	16MOD-0078		For 60 Degree Bend, Deduct	-6.79	
	16MOD-0079		For 30 Degree Bend, Deduct	-11.55	
16139-2300	EA		9" Horizontal 45 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	27.16	4.90
	16MOD-0078		For 60 Degree Bend, Deduct	-7.08	
	16MOD-0079		For 30 Degree Bend, Deduct	-12.08	
16139-2301	EA		12" Horizontal 45 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	30.92	5.82
	16MOD-0078		For 60 Degree Bend, Deduct	-7.98	
	16MOD-0079		For 30 Degree Bend, Deduct	-13.63	
16139-2302	EA		18" Horizontal 45 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	36.29	7.12
	16MOD-0078		For 60 Degree Bend, Deduct	-9.25	
	16MOD-0079		For 30 Degree Bend, Deduct	-15.81	
16139-2303	EA		24" Horizontal 45 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	40.91	8.23
	16MOD-0078		For 60 Degree Bend, Deduct	-10.33	
	16MOD-0079		For 30 Degree Bend, Deduct	-17.68	
16139-2304	EA		30" Horizontal 45 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	50.03	9.48
	16MOD-0078		For 60 Degree Bend, Deduct	-12.87	
	16MOD-0079		For 30 Degree Bend, Deduct	-21.97	
16139-2305	EA		36" Horizontal 45 Degree Elbow, 12" Radius, Aluminum Cable Tray Cover	58.67	10.46
	16MOD-0078		For 60 Degree Bend, Deduct	-15.35	
	16MOD-0079		For 30 Degree Bend, Deduct	-26.17	
16139-2306			45 Degree, 24" Radius Horizontal Elbows (16139-2265)		
16139-2307	EA		6" Horizontal 45 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	29.14	4.64
	16MOD-0078		For 60 Degree Bend, Deduct	-7.84	
	16MOD-0079		For 30 Degree Bend, Deduct	-13.33	
16139-2308	EA		9" Horizontal 45 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	36.15	5.43
	16MOD-0078		For 60 Degree Bend, Deduct	-9.85	
	16MOD-0079		For 30 Degree Bend, Deduct	-16.73	
16139-2309	EA		12" Horizontal 45 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	39.14	6.54
	16MOD-0078		For 60 Degree Bend, Deduct	-10.40	
	16MOD-0079		For 30 Degree Bend, Deduct	-17.71	
16139-2310	EA		18" Horizontal 45 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	47.29	7.84
	16MOD-0078		For 60 Degree Bend, Deduct	-12.59	
	16MOD-0079		For 30 Degree Bend, Deduct	-21.42	
16139-2311	EA		24" Horizontal 45 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	57.29	8.96
	16MOD-0078		For 60 Degree Bend, Deduct	-15.46	
	16MOD-0079		For 30 Degree Bend, Deduct	-26.27	
16139-2312	EA		30" Horizontal 45 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	66.31	10.46
	16MOD-0078		For 60 Degree Bend, Deduct	-17.86	
	16MOD-0079		For 30 Degree Bend, Deduct	-30.36	
16139-2313	EA		36" Horizontal 45 Degree Elbow, 24" Radius, Aluminum Cable Tray Cover	76.56	12.09
	16MOD-0078		For 60 Degree Bend, Deduct	-20.63	
	16MOD-0079		For 30 Degree Bend, Deduct	-35.06	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2314		45 Degree, 36" Radius Horizontal Elbows (16139-2265)		
16139-2315	EA	6" Horizontal 45 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	45.58	5.22
		16MOD-0078 For 60 Degree Bend, Deduct	-13.05	
		16MOD-0079 For 30 Degree Bend, Deduct	-22.03	
16139-2316	EA	9" Horizontal 45 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	50.23	6.02
		16MOD-0078 For 60 Degree Bend, Deduct	-14.26	
		16MOD-0079 For 30 Degree Bend, Deduct	-24.10	
16139-2317	EA	12" Horizontal 45 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	54.74	7.45
		16MOD-0078 For 60 Degree Bend, Deduct	-15.21	
		16MOD-0079 For 30 Degree Bend, Deduct	-25.76	
16139-2318	EA	18" Horizontal 45 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	64.82	8.30
		16MOD-0078 For 60 Degree Bend, Deduct	-18.21	
		16MOD-0079 For 30 Degree Bend, Deduct	-30.82	
16139-2319	EA	24" Horizontal 45 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	78.75	10.13
		16MOD-0078 For 60 Degree Bend, Deduct	-22.10	
		16MOD-0079 For 30 Degree Bend, Deduct	-37.40	
16139-2320	EA	30" Horizontal 45 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	90.67	12.09
		16MOD-0078 For 60 Degree Bend, Deduct	-25.29	
		16MOD-0079 For 30 Degree Bend, Deduct	-42.82	
16139-2321	EA	36" Horizontal 45 Degree Elbow, 36" Radius, Aluminum Cable Tray Cover	102.11	13.07
		16MOD-0078 For 60 Degree Bend, Deduct	-28.68	
		16MOD-0079 For 30 Degree Bend, Deduct	-48.53	
16139-2322		90 Degree, 12" Radius Vertical Risers (16139-2265)		
16139-2323	EA	6" Vertical Riser 90 Degree, 12" Radius, Aluminum Cable Tray Cover	28.25	4.18
16139-2324	EA	9" Vertical Riser 90 Degree, 12" Radius, Aluminum Cable Tray Cover	29.60	4.90
16139-2325	EA	12" Vertical Riser 90 Degree, 12" Radius, Aluminum Cable Tray Cover	32.98	5.82
16139-2326	EA	18" Vertical Riser 90 Degree, 12" Radius, Aluminum Cable Tray Cover	39.01	7.12
16139-2327	EA	24" Vertical Riser 90 Degree, 12" Radius, Aluminum Cable Tray Cover	43.59	9.22
16139-2328	EA	30" Vertical Riser 90 Degree, 12" Radius, Aluminum Cable Tray Cover	46.25	10.52
16139-2329	EA	36" Vertical Riser 90 Degree, 12" Radius, Aluminum Cable Tray Cover	55.62	12.55
16139-2330		90 Degree, 24" Radius Vertical Risers (16139-2265)		
16139-2331	EA	6" Vertical Riser 90 Degree, 24" Radius, Aluminum Cable Tray Cover	32.12	4.64
16139-2332	EA	9" Vertical Riser 90 Degree, 24" Radius, Aluminum Cable Tray Cover	35.61	5.43
16139-2333	EA	12" Vertical Riser 90 Degree, 24" Radius, Aluminum Cable Tray Cover	39.68	6.54
16139-2334	EA	18" Vertical Riser 90 Degree, 24" Radius, Aluminum Cable Tray Cover	47.80	7.84
16139-2335	EA	24" Vertical Riser 90 Degree, 24" Radius, Aluminum Cable Tray Cover	54.84	10.13
16139-2336	EA	30" Vertical Riser 90 Degree, 24" Radius, Aluminum Cable Tray Cover	68.95	12.09
16139-2337	EA	36" Vertical Riser 90 Degree, 24" Radius, Aluminum Cable Tray Cover	76.97	14.25
16139-2338		90 Degree, 36" Radius Vertical Risers (16139-2265)		
16139-2339	EA	6" Vertical Riser 90 Degree, 36" Radius, Aluminum Cable Tray Cover	36.89	5.22
16139-2340	EA	9" Vertical Riser 90 Degree, 36" Radius, Aluminum Cable Tray Cover	44.80	6.02
16139-2341	EA	12" Vertical Riser 90 Degree, 36" Radius, Aluminum Cable Tray Cover	52.60	7.45
16139-2342	EA	18" Vertical Riser 90 Degree, 36" Radius, Aluminum Cable Tray Cover	62.64	8.30
16139-2343	EA	24" Vertical Riser 90 Degree, 36" Radius, Aluminum Cable Tray Cover	76.84	11.57
16139-2344	EA	30" Vertical Riser 90 Degree, 36" Radius, Aluminum Cable Tray Cover	95.45	13.66
16139-2345	EA	36" Vertical Riser 90 Degree, 36" Radius, Aluminum Cable Tray Cover	104.24	15.68
16139-2346		12" Radius Horizontal Tees (16139-2265)		
16139-2347	EA	6" Horizontal Tee, 12" Radius, Aluminum Cable Tray Cover	46.10	6.80
16139-2348	EA	9" Horizontal Tee, 12" Radius, Aluminum Cable Tray Cover	49.97	7.84
16139-2349	EA	12" Horizontal Tee, 12" Radius, Aluminum Cable Tray Cover	56.56	9.22
16139-2350	EA	18" Horizontal Tee, 12" Radius, Aluminum Cable Tray Cover	66.31	10.46
16139-2351	EA	24" Horizontal Tee, 12" Radius, Aluminum Cable Tray Cover	81.99	12.09
16139-2352	EA	30" Horizontal Tee, 12" Radius, Aluminum Cable Tray Cover	101.70	17.39
16139-2353	EA	36" Horizontal Tee, 12" Radius, Aluminum Cable Tray Cover	122.69	20.85
16139-2354		24" Radius Horizontal Tees (16139-2265)		
16139-2355	EA	6" Horizontal Tee, 24" Radius, Aluminum Cable Tray Cover	68.31	7.12
16139-2356	EA	9" Horizontal Tee, 24" Radius, Aluminum Cable Tray Cover	76.75	8.30
16139-2357	EA	12" Horizontal Tee, 24" Radius, Aluminum Cable Tray Cover	86.87	9.81
16139-2358	EA	18" Horizontal Tee, 24" Radius, Aluminum Cable Tray Cover	101.17	11.24
16139-2359	EA	24" Horizontal Tee, 24" Radius, Aluminum Cable Tray Cover	153.05	13.07
16139-2360	EA	30" Horizontal Tee, 24" Radius, Aluminum Cable Tray Cover	178.13	19.61
16139-2361	EA	36" Horizontal Tee, 24" Radius, Aluminum Cable Tray Cover	201.90	24.12
16139-2362		36" Radius Horizontal Tees (16139-2265)		
16139-2363	EA	6" Horizontal Tee, 36" Radius, Aluminum Cable Tray Cover	115.52	7.45
16139-2364	EA	9" Horizontal Tee, 36" Radius, Aluminum Cable Tray Cover	119.78	8.69
16139-2365	EA	12" Horizontal Tee, 36" Radius, Aluminum Cable Tray Cover	133.57	10.46
16139-2366	EA	18" Horizontal Tee, 36" Radius, Aluminum Cable Tray Cover	151.48	12.09
16139-2367	EA	24" Horizontal Tee, 36" Radius, Aluminum Cable Tray Cover	190.92	14.25
16139-2368	EA	30" Horizontal Tee, 36" Radius, Aluminum Cable Tray Cover	225.20	22.48
16139-2369	EA	36" Horizontal Tee, 36" Radius, Aluminum Cable Tray Cover	259.01	28.43

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**
 MINOR
 CSI UOM DESCRIPTION

 TOTAL DIRECT DEMOLITION
 UNIT COST UNIT COST

MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2370			12" Radius Horizontal Crosses (16139-2265)		
16139-2371	EA		6" Horizontal Cross, 12" Radius, Aluminum Cable Tray Cover	68.54	9.22
16139-2372	EA		9" Horizontal Cross, 12" Radius, Aluminum Cable Tray Cover	72.77	9.81
16139-2373	EA		12" Horizontal Cross, 12" Radius, Aluminum Cable Tray Cover	80.42	10.46
16139-2374	EA		18" Horizontal Cross, 12" Radius, Aluminum Cable Tray Cover	96.10	12.09
16139-2375	EA		24" Horizontal Cross, 12" Radius, Aluminum Cable Tray Cover	116.88	17.39
16139-2376	EA		30" Horizontal Cross, 12" Radius, Aluminum Cable Tray Cover	138.93	20.85
16139-2377	EA		36" Horizontal Cross, 12" Radius, Aluminum Cable Tray Cover	157.80	22.41
16139-2378			24" Radius Horizontal Crosses (16139-2265)		
16139-2379	EA		6" Horizontal Cross, 24" Radius, Aluminum Cable Tray Cover	120.55	9.81
16139-2380	EA		9" Horizontal Cross, 24" Radius, Aluminum Cable Tray Cover	129.23	10.46
16139-2381	EA		12" Horizontal Cross, 24" Radius, Aluminum Cable Tray Cover	139.16	11.24
16139-2382	EA		18" Horizontal Cross, 24" Radius, Aluminum Cable Tray Cover	161.73	13.07
16139-2383	EA		24" Horizontal Cross, 24" Radius, Aluminum Cable Tray Cover	199.81	19.61
16139-2384	EA		30" Horizontal Cross, 24" Radius, Aluminum Cable Tray Cover	235.49	24.12
16139-2385	EA		36" Horizontal Cross, 24" Radius, Aluminum Cable Tray Cover	255.11	26.07
16139-2386			36" Radius Horizontal Crosses (16139-2265)		
16139-2387	EA		6" Horizontal Cross, 36" Radius, Aluminum Cable Tray Cover	184.58	10.46
16139-2388	EA		9" Horizontal Cross, 36" Radius, Aluminum Cable Tray Cover	193.42	11.24
16139-2389	EA		12" Horizontal Cross, 36" Radius, Aluminum Cable Tray Cover	207.91	12.09
16139-2390	EA		18" Horizontal Cross, 36" Radius, Aluminum Cable Tray Cover	229.99	14.25
16139-2391	EA		24" Horizontal Cross, 36" Radius, Aluminum Cable Tray Cover	292.46	22.41
16139-2392	EA		30" Horizontal Cross, 36" Radius, Aluminum Cable Tray Cover	340.63	28.56
16139-2393	EA		36" Horizontal Cross, 36" Radius, Aluminum Cable Tray Cover	372.45	31.37
16139-2394			Reducers (16139-2265)		
16139-2395	EA		9"-6" Reducer, Aluminum Cable Tray Covers	34.76	4.90
16139-2396	EA		12"-6" Reducer, Aluminum Cable Tray Covers	37.35	5.82
16139-2397	EA		12"-9" Reducer, Aluminum Cable Tray Covers	37.35	5.82
16139-2398	EA		18"-6" Reducer, Aluminum Cable Tray Covers	42.27	7.12
16139-2399	EA		18"-12" Reducer, Aluminum Cable Tray Covers	42.27	7.12
16139-2400	EA		24"-12" Reducer, Aluminum Cable Tray Covers	46.72	7.84
16139-2401	EA		24"-18" Reducer, Aluminum Cable Tray Covers	51.03	7.84
16139-2402	EA		30"-12" Reducer, Aluminum Cable Tray Covers	54.02	8.96
16139-2403	EA		30"-18" Reducer, Aluminum Cable Tray Covers	55.63	8.96
16139-2404	EA		30"-24" Reducer, Aluminum Cable Tray Covers	56.74	8.96
16139-2405	EA		36"-12" Reducer, Aluminum Cable Tray Covers	59.72	9.81
16139-2406	EA		36"-18" Reducer, Aluminum Cable Tray Covers	60.81	9.81
16139-2407	EA		36"-24" Reducer, Aluminum Cable Tray Covers	61.35	9.81
16139-2408	EA		36"-30" Reducer, Aluminum Cable Tray Covers	61.89	9.81
16139-2409			Galvanized Steel Dividers (16139-2120)		
16139-2410			Straight Dividers (16139-2409)		
16139-2411	LF		3" Deep Galvanized Steel Divider Strip, Straight.....	5.92	1.56
16139-2412	LF		4" Deep Galvanized Steel Divider Strip, Straight.....	6.96	1.69
16139-2413	LF		6" Deep Galvanized Steel Divider Strip, Straight.....	8.61	1.97
16139-2414			3" Deep Vertical Dividers (16139-2409)		
16139-2415	EA		Vertical Divider, 3" Deep, 12" Radius, 30 Degree, Steel Cable Tray	34.89	11.24
16139-2416	EA		Vertical Divider, 3" Deep, 12" Radius, 45 Degree, Steel Cable Tray	39.68	11.63
16139-2417	EA		Vertical Divider, 3" Deep, 12" Radius, 60 Degree, Steel Cable Tray	41.73	12.09
16139-2418	EA		Vertical Divider, 3" Deep, 12" Radius, 90 Degree, Steel Cable Tray	47.91	12.55
16139-2419	EA		Vertical Divider, 3" Deep, 24" Radius, 30 Degree, Steel Cable Tray	45.51	12.55
16139-2420	EA		Vertical Divider, 3" Deep, 24" Radius, 45 Degree, Steel Cable Tray	49.36	13.07
16139-2421	EA		Vertical Divider, 3" Deep, 24" Radius, 60 Degree, Steel Cable Tray	57.54	13.66
16139-2422	EA		Vertical Divider, 3" Deep, 24" Radius, 90 Degree, Steel Cable Tray	71.18	14.25
16139-2423	EA		Vertical Divider, 3" Deep, 36" Radius, 30 Degree, Steel Cable	56.79	14.25
16139-2424	EA		Vertical Divider, 3" Deep, 36" Radius, 45 Degree, Steel Cable Tray	63.30	14.96
16139-2425	EA		Vertical Divider, 3" Deep, 36" Radius, 60 Degree, Steel Cable Tray	71.13	15.68
16139-2426	EA		Vertical Divider, 3" Deep, 36" Radius, 90 Degree, Steel Cable Tray	89.91	16.54
16139-2427			4" Deep Vertical Dividers (16139-2409)		
16139-2428	EA		Vertical Divider, 4" Deep, 12" Radius, 30 Degree, Steel Cable Tray	39.98	11.63
16139-2429	EA		Vertical Divider, 4" Deep, 12" Radius, 45 Degree, Steel Cable Tray	44.13	12.09
16139-2430	EA		Vertical Divider, 4" Deep, 12" Radius, 60 Degree, Steel Cable Tray	47.91	12.55
16139-2431	EA		Vertical Divider, 4" Deep, 12" Radius, 90 Degree, Steel Cable Tray	54.76	13.07
16139-2432	EA		Vertical Divider, 4" Deep, 24" Radius, 30 Degree, Steel Cable Tray	54.76	13.07
16139-2433	EA		Vertical Divider, 4" Deep, 24" Radius, 45 Degree, Steel Cable Tray	64.14	13.66
16139-2434	EA		Vertical Divider, 4" Deep, 24" Radius, 60 Degree, Steel Cable Tray	70.58	14.25
16139-2435	EA		Vertical Divider, 4" Deep, 24" Radius, 90 Degree, Steel Cable Tray	87.29	14.96
16139-2436	EA		Vertical Divider, 4" Deep, 36" Radius, 30 Degree, Steel Cable Tray	61.14	13.66
16139-2437	EA		Vertical Divider, 4" Deep, 36" Radius, 45 Degree, Steel Cable Tray	67.58	14.25
16139-2438	EA		Vertical Divider, 4" Deep, 36" Radius, 60 Degree, Steel Cable Tray	80.09	14.96



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2439	EA	Vertical Divider, 4" Deep, 36" Radius, 90 Degree, Steel Cable Tray.....	101.13	15.68
16139-2440		6" Deep Vertical Dividers (16139-2409)		
16139-2441	EA	Vertical Divider, 6" Deep, 12" Radius, 30 Degree, Steel Cable Tray.....	44.26	13.07
16139-2442	EA	Vertical Divider, 6" Deep, 12" Radius, 45 Degree, Steel Cable Tray.....	47.94	13.66
16139-2443	EA	Vertical Divider, 6" Deep, 12" Radius, 60 Degree, Steel Cable Tray.....	52.59	14.25
16139-2444	EA	Vertical Divider, 6" Deep, 12" Radius, 90 Degree, Steel Cable Tray.....	60.90	14.96
16139-2445	EA	Vertical Divider, 6" Deep, 24" Radius, 30 Degree, Steel Cable Tray.....	55.74	13.66
16139-2446	EA	Vertical Divider, 6" Deep, 24" Radius, 45 Degree, Steel Cable Tray.....	65.19	14.25
16139-2447	EA	Vertical Divider, 6" Deep, 24" Radius, 60 Degree, Steel Cable Tray.....	72.29	14.96
16139-2448	EA	Vertical Divider, 6" Deep, 24" Radius, 90 Degree, Steel Cable Tray.....	88.53	15.68
16139-2449	EA	Vertical Divider, 6" Deep, 36" Radius, 30 Degree, Steel Cable Tray.....	62.19	14.25
16139-2450	EA	Vertical Divider, 6" Deep, 36" Radius, 45 Degree, Steel Cable Tray.....	72.29	14.96
16139-2451	EA	Vertical Divider, 6" Deep, 36" Radius, 60 Degree, Steel Cable Tray.....	88.53	15.68
16139-2452	EA	Vertical Divider, 6" Deep, 36" Radius, 90 Degree, Steel Cable Tray.....	107.91	16.54
16139-2453		Horizontal Dividers (16139-2409)		
16139-2454	EA	3" Deep Horizontal Fitting Divider Strip, Steel Cable Tray.....	38.91	9.48
16139-2455	EA	4" Deep Horizontal Fitting Divider Strip, Steel Cable Tray.....	43.25	10.46
16139-2456	EA	6" Deep Horizontal Fitting Divider Strip, Steel Cable Tray.....	52.34	11.63
16139-2457		Aluminum Dividers (16139-2120)		
16139-2458		Straight Dividers (16139-2457)		
16139-2459	LF	3" Deep Aluminum Divider Strip, Straight.....	5.47	1.50
16139-2460	LF	4" Deep Aluminum Divider Strip, Straight.....	6.44	1.63
16139-2461	LF	6" Deep Aluminum Divider Strip, Straight.....	7.90	1.83
16139-2462		3" Deep Vertical Dividers (16139-2457)		
16139-2463	EA	Vertical Divider, 3" Deep, 12" Radius, 30 Degree, Aluminum Cable Tray.....	30.47	10.85
16139-2464	EA	Vertical Divider, 3" Deep, 12" Radius, 45 Degree, Aluminum Cable Tray.....	33.34	11.24
16139-2465	EA	Vertical Divider, 3" Deep, 12" Radius, 60 Degree, Aluminum Cable Tray.....	36.49	11.63
16139-2466	EA	Vertical Divider, 3" Deep, 12" Radius, 90 Degree, Aluminum Cable Tray.....	41.84	12.09
16139-2467	EA	Vertical Divider, 3" Deep, 24" Radius, 30 Degree, Aluminum Cable Tray.....	40.75	12.09
16139-2468	EA	Vertical Divider, 3" Deep, 24" Radius, 45 Degree, Aluminum Cable Tray.....	44.79	12.55
16139-2469	EA	Vertical Divider, 3" Deep, 24" Radius, 60 Degree, Aluminum Cable Tray.....	51.61	13.07
16139-2470	EA	Vertical Divider, 3" Deep, 24" Radius, 90 Degree, Aluminum Cable Tray.....	63.44	13.66
16139-2471	EA	Vertical Divider, 3" Deep, 36" Radius, 30 Degree, Aluminum Cable Tray.....	54.21	13.66
16139-2472	EA	Vertical Divider, 3" Deep, 36" Radius, 45 Degree, Aluminum Cable Tray.....	64.49	14.25
16139-2473	EA	Vertical Divider, 3" Deep, 36" Radius, 60 Degree, Aluminum Cable Tray.....	77.54	14.96
16139-2474	EA	Vertical Divider, 3" Deep, 36" Radius, 90 Degree, Aluminum Cable Tray.....	95.06	15.68
16139-2475		4" Deep Vertical Dividers (16139-2457)		
16139-2476	EA	Vertical Divider, 4" Deep, 12" Radius, 30 Degree, Aluminum Cable Tray.....	36.22	11.24
16139-2477	EA	Vertical Divider, 4" Deep, 12" Radius, 45 Degree, Aluminum Cable Tray.....	39.69	11.63
16139-2478	EA	Vertical Divider, 4" Deep, 12" Radius, 60 Degree, Aluminum Cable Tray.....	43.46	12.09
16139-2479	EA	Vertical Divider, 4" Deep, 12" Radius, 90 Degree, Aluminum Cable Tray.....	48.58	12.55
16139-2480	EA	Vertical Divider, 4" Deep, 24" Radius, 30 Degree, Aluminum Cable Tray.....	48.04	12.55
16139-2481	EA	Vertical Divider, 4" Deep, 24" Radius, 45 Degree, Aluminum Cable Tray.....	55.40	13.07
16139-2482	EA	Vertical Divider, 4" Deep, 24" Radius, 60 Degree, Aluminum Cable Tray.....	62.35	13.66
16139-2483	EA	Vertical Divider, 4" Deep, 24" Radius, 90 Degree, Aluminum Cable Tray.....	78.05	14.25
16139-2484	EA	Vertical Divider, 4" Deep, 36" Radius, 30 Degree, Aluminum Cable Tray.....	64.09	13.07
16139-2485	EA	Vertical Divider, 4" Deep, 36" Radius, 45 Degree, Aluminum Cable Tray.....	77.00	13.66
16139-2486	EA	Vertical Divider, 4" Deep, 36" Radius, 60 Degree, Aluminum Cable Tray.....	89.99	14.25
16139-2487	EA	Vertical Divider, 4" Deep, 36" Radius, 90 Degree, Aluminum Cable Tray.....	108.47	14.96
16139-2488		6" Deep Vertical Dividers (16139-2457)		
16139-2489	EA	Vertical Divider, 6" Deep, 12" Radius, 30 Degree, Aluminum Cable Tray.....	40.12	12.55
16139-2490	EA	Vertical Divider, 6" Deep, 12" Radius, 45 Degree, Aluminum Cable Tray.....	44.55	13.07
16139-2491	EA	Vertical Divider, 6" Deep, 12" Radius, 60 Degree, Aluminum Cable Tray.....	46.62	13.66
16139-2492	EA	Vertical Divider, 6" Deep, 12" Radius, 90 Degree, Aluminum Cable Tray.....	52.01	14.25
16139-2493	EA	Vertical Divider, 6" Deep, 24" Radius, 30 Degree, Aluminum Cable Tray.....	49.98	13.07
16139-2494	EA	Vertical Divider, 6" Deep, 24" Radius, 45 Degree, Aluminum Cable Tray.....	61.27	13.66
16139-2495	EA	Vertical Divider, 6" Deep, 24" Radius, 60 Degree, Aluminum Cable Tray.....	66.12	14.25
16139-2496	EA	Vertical Divider, 6" Deep, 24" Radius, 90 Degree, Aluminum Cable Tray.....	82.42	14.96
16139-2497	EA	Vertical Divider, 6" Deep, 36" Radius, 30 Degree, Aluminum Cable Tray.....	65.61	13.66
16139-2498	EA	Vertical Divider, 6" Deep, 36" Radius, 45 Degree, Aluminum Cable Tray.....	81.31	14.25
16139-2499	EA	Vertical Divider, 6" Deep, 36" Radius, 60 Degree, Aluminum Cable Tray.....	92.73	14.96
16139-2500	EA	Vertical Divider, 6" Deep, 36" Radius, 90 Degree, Aluminum Cable Tray.....	107.54	15.68
16139-2501		Horizontal Dividers (16139-2457)		
16139-2502	EA	3" Deep Horizontal Fitting Divider Strip, Aluminum Cable Tray.....	34.71	8.96
16139-2503	EA	4" Deep Horizontal Fitting Divider Strip, Aluminum Cable Tray.....	38.05	9.81
16139-2504	EA	6" Deep Horizontal Fitting Divider Strip, Aluminum Cable Tray.....	46.80	10.85
16139-2505		Wall Brackets (16139)		

16000 Electrical**16100 Basic Materials And Methods****16139 Cable Trays**

MINOR		TOTAL DIRECT		DEMOLITION	
CSI	UOM	DESCRIPTION	UNIT COST	UNIT COST	UNIT COST
16139-2506		Wall Brackets <small>(16139-2505)</small>			
16139-2507	EA	6" Wide Tray Wall Bracket.....	37.55		13.07
16139-2508	EA	9" Wide Tray Wall Bracket.....	38.98		13.66
16139-2509	EA	12" Wide Tray Wall Bracket.....	42.28		14.25
16139-2510	EA	18" Wide Tray Wall Bracket.....	44.75		14.96
16139-2511	EA	24" Wide Tray Wall Bracket.....	48.24		15.68
16139-2512	EA	30" Wide Tray Wall Bracket.....	55.93		16.54
16139-2513	EA	36" Wide Tray Wall Bracket.....	65.50		17.65
16139-2514		Fiberglass Cable Tray <small>(16139)</small>			
16139-2515		Ladder Bottom Fiberglass Cable Tray <small>(16139-2514)</small>			
		Note: Excludes hangers and support system.			
16139-2516		Straight Tray Sections <small>(16139-2515)</small>			
16139-2517	LF	6" Fiberglass Cable Tray - Straight Section, 12" Rung Spacing.....	6.65		1.76
		16MOD-0080 For 9" Rung Spacing, Add	0.14		
		16MOD-0081 For 6" Rung Spacing, Add	0.60		
		16MOD-0082 For 4" Rung Spacing, Add	1.11		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.10		
		16MOD-0084 For Solid Bottom, Add	1.60		
		16MOD-0085 For Vented Trough Bottom, Add	1.94		
16139-2518	LF	9" Fiberglass Cable Tray - Straight Section, 12" Rung Spacing.....	7.43		2.16
		16MOD-0080 For 9" Rung Spacing, Add	0.15		
		16MOD-0081 For 6" Rung Spacing, Add	0.62		
		16MOD-0082 For 4" Rung Spacing, Add	1.14		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.10		
		16MOD-0084 For Solid Bottom, Add	1.74		
		16MOD-0085 For Vented Trough Bottom, Add	2.07		
16139-2519	LF	12" Fiberglass Cable Tray - Straight Section, 12" Rung Spacing.....	8.20		2.62
		16MOD-0080 For 9" Rung Spacing, Add	0.15		
		16MOD-0081 For 6" Rung Spacing, Add	0.64		
		16MOD-0082 For 4" Rung Spacing, Add	1.18		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.11		
		16MOD-0084 For Solid Bottom, Add	1.87		
		16MOD-0085 For Vented Trough Bottom, Add	2.20		
16139-2520	LF	18" Fiberglass Cable Tray - Straight Section, 12" Rung Spacing.....	9.82		3.46
		16MOD-0080 For 9" Rung Spacing, Add	0.16		
		16MOD-0081 For 6" Rung Spacing, Add	0.69		
		16MOD-0082 For 4" Rung Spacing, Add	1.27		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.12		
		16MOD-0084 For Solid Bottom, Add	2.16		
		16MOD-0085 For Vented Trough Bottom, Add	2.49		
16139-2521	LF	24" Fiberglass Cable Tray - Straight Section, 12" Rung Spacing.....	11.45		4.38
		16MOD-0080 For 9" Rung Spacing, Add	0.17		
		16MOD-0081 For 6" Rung Spacing, Add	0.74		
		16MOD-0082 For 4" Rung Spacing, Add	1.35		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.12		
		16MOD-0084 For Solid Bottom, Add	2.45		
		16MOD-0085 For Vented Trough Bottom, Add	2.78		
16139-2522	LF	30" Fiberglass Cable Tray - Straight Section, 12" Rung Spacing.....	12.51		4.77
		16MOD-0080 For 9" Rung Spacing, Add	0.19		
		16MOD-0081 For 6" Rung Spacing, Add	0.80		
		16MOD-0082 For 4" Rung Spacing, Add	1.46		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.13		
		16MOD-0084 For Solid Bottom, Add	2.67		
		16MOD-0085 For Vented Trough Bottom, Add	3.03		
16139-2523	LF	36" Fiberglass Cable Tray - Straight Section, 12" Rung Spacing.....	13.60		5.22
		16MOD-0080 For 9" Rung Spacing, Add	0.20		
		16MOD-0081 For 6" Rung Spacing, Add	0.86		
		16MOD-0082 For 4" Rung Spacing, Add	1.58		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.14		
		16MOD-0084 For Solid Bottom, Add	2.90		
		16MOD-0085 For Vented Trough Bottom, Add	3.28		
16139-2524		90 Degree Horizontal Elbows <small>(16139-2515)</small>			
16139-2525	EA	6" Horizontal 90 Degree Elbow, Fiberglass Cable Tray.....	35.91		13.07
		16MOD-0080 For 9" Rung Spacing, Add	0.57		
		16MOD-0081 For 6" Rung Spacing, Add	2.45		
		16MOD-0082 For 4" Rung Spacing, Add	4.48		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.41		
		16MOD-0084 For Solid Bottom, Add	7.83		
		16MOD-0085 For Vented Trough Bottom, Add	8.97		
		16MOD-0086 For 60 Degree Bend, Deduct	-7.34		
		16MOD-0087 For 45 Degree Bend, Deduct	-10.11		
		16MOD-0088 For 30 Degree Bend, Deduct	-12.89		
16139-2526	EA	9" Horizontal 90 Degree Elbow, Fiberglass Cable Tray.....	40.10		15.23
		16MOD-0080 For 9" Rung Spacing, Add	0.60		
		16MOD-0081 For 6" Rung Spacing, Add	2.58		
		16MOD-0082 For 4" Rung Spacing, Add	4.74		
		16MOD-0083 For 18" Rung Spacing, Deduct	-0.43		
		16MOD-0084 For Solid Bottom, Add	8.60		
		16MOD-0085 For Vented Trough Bottom, Add	9.75		
		16MOD-0086 For 60 Degree Bend, Deduct	-7.97		
		16MOD-0087 For 45 Degree Bend, Deduct	-11.01		
		16MOD-0088 For 30 Degree Bend, Deduct	-14.05		



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2527	EA	12"	Horizontal 90 Degree Elbow, Fiberglass Cable Tray	46.92	19.15
	16MOD-0080		For 9" Rung Spacing, Add	0.64	
	16MOD-0081		For 6" Rung Spacing, Add	2.72	
	16MOD-0082		For 4" Rung Spacing, Add	4.99	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.45	
	16MOD-0084		For Solid Bottom, Add	9.76	
	16MOD-0085		For Vented Trough Bottom, Add	10.86	
	16MOD-0086		For 60 Degree Bend, Deduct	-8.87	
	16MOD-0087		For 45 Degree Bend, Deduct	-12.30	
	16MOD-0088		For 30 Degree Bend, Deduct	-15.74	
16139-2528	EA	18"	Horizontal 90 Degree Elbow, Fiberglass Cable Tray	55.50	23.14
	16MOD-0080		For 9" Rung Spacing, Add	0.73	
	16MOD-0081		For 6" Rung Spacing, Add	3.13	
	16MOD-0082		For 4" Rung Spacing, Add	5.74	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.52	
	16MOD-0084		For Solid Bottom, Add	11.45	
	16MOD-0085		For Vented Trough Bottom, Add	12.67	
	16MOD-0086		For 60 Degree Bend, Deduct	-10.35	
	16MOD-0087		For 45 Degree Bend, Deduct	-14.37	
	16MOD-0088		For 30 Degree Bend, Deduct	-18.40	
16139-2529	EA	24"	Horizontal 90 Degree Elbow, Fiberglass Cable Tray	62.80	26.61
	16MOD-0080		For 9" Rung Spacing, Add	0.80	
	16MOD-0081		For 6" Rung Spacing, Add	3.44	
	16MOD-0082		For 4" Rung Spacing, Add	6.31	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.57	
	16MOD-0084		For Solid Bottom, Add	12.86	
	16MOD-0085		For Vented Trough Bottom, Add	14.16	
	16MOD-0086		For 60 Degree Bend, Deduct	-11.56	
	16MOD-0087		For 45 Degree Bend, Deduct	-16.07	
	16MOD-0088		For 30 Degree Bend, Deduct	-20.59	
16139-2530	EA	30"	Horizontal 90 Degree Elbow, Fiberglass Cable Tray	68.84	28.36
	16MOD-0080		For 9" Rung Spacing, Add	0.92	
	16MOD-0081		For 6" Rung Spacing, Add	3.95	
	16MOD-0082		For 4" Rung Spacing, Add	7.25	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.66	
	16MOD-0084		For Solid Bottom, Add	14.28	
	16MOD-0085		For Vented Trough Bottom, Add	15.85	
	16MOD-0086		For 60 Degree Bend, Deduct	-12.95	
	16MOD-0087		For 45 Degree Bend, Deduct	-17.97	
	16MOD-0088		For 30 Degree Bend, Deduct	-22.99	
16139-2531	EA	36"	Horizontal 90 Degree Elbow, Fiberglass Cable Tray	76.03	30.53
	16MOD-0080		For 9" Rung Spacing, Add	1.06	
	16MOD-0081		For 6" Rung Spacing, Add	4.54	
	16MOD-0082		For 4" Rung Spacing, Add	8.33	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.76	
	16MOD-0084		For Solid Bottom, Add	15.95	
	16MOD-0085		For Vented Trough Bottom, Add	17.83	
	16MOD-0086		For 60 Degree Bend, Deduct	-14.57	
	16MOD-0087		For 45 Degree Bend, Deduct	-20.19	
	16MOD-0088		For 30 Degree Bend, Deduct	-25.80	
16139-2532	Inside Or Outside Vertical Risers ⁽¹⁶¹³⁹⁻²⁵¹⁵⁾				
16139-2533	EA	6"	Vertical Inside Or Outside Riser 90, Fiberglass Cable Tray	52.93	13.07
	16MOD-0080		For 9" Rung Spacing, Add	1.17	
	16MOD-0081		For 6" Rung Spacing, Add	5.00	
	16MOD-0082		For 4" Rung Spacing, Add	9.16	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.83	
	16MOD-0084		For Solid Bottom, Add	12.94	
	16MOD-0085		For Vented Trough Bottom, Add	15.78	
	16MOD-0086		For 60 Degree Bend, Deduct	-12.96	
	16MOD-0087		For 45 Degree Bend, Deduct	-17.60	
	16MOD-0088		For 30 Degree Bend, Deduct	-22.25	
16139-2534	EA	9"	Vertical Inside Or Outside Riser 90, Fiberglass	56.66	15.23
	16MOD-0080		For 9" Rung Spacing, Add	1.18	
	16MOD-0081		For 6" Rung Spacing, Add	5.07	
	16MOD-0082		For 4" Rung Spacing, Add	9.29	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.84	
	16MOD-0084		For Solid Bottom, Add	13.57	
	16MOD-0085		For Vented Trough Bottom, Add	16.37	
	16MOD-0086		For 60 Degree Bend, Deduct	-13.44	
	16MOD-0087		For 45 Degree Bend, Deduct	-18.30	
	16MOD-0088		For 30 Degree Bend, Deduct	-23.16	
16139-2535	EA	12"	Vertical Inside Or Outside Riser 90, Fiberglass Cable Tray	63.01	19.15
	16MOD-0080		For 9" Rung Spacing, Add	1.20	
	16MOD-0081		For 6" Rung Spacing, Add	5.14	
	16MOD-0082		For 4" Rung Spacing, Add	9.42	
	16MOD-0083		For 18" Rung Spacing, Deduct	-0.86	
	16MOD-0084		For Solid Bottom, Add	14.59	
	16MOD-0085		For Vented Trough Bottom, Add	17.30	
	16MOD-0086		For 60 Degree Bend, Deduct	-14.18	
	16MOD-0087		For 45 Degree Bend, Deduct	-19.38	
	16MOD-0088		For 30 Degree Bend, Deduct	-24.59	

16000 Electrical
16100 Basic Materials And Methods
16139 Cable Trays



MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

16139-2536	EA 18" Vertical Inside Or Outside Riser 90, Fiberglass Cable Tray	69.93	23.14
	16MOD-0080 For 9" Rung Spacing, Add	1.24	
	16MOD-0081 For 6" Rung Spacing, Add	5.29	
	16MOD-0082 For 4" Rung Spacing, Add	9.70	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.88	
	16MOD-0084 For Solid Bottom, Add	15.78	
	16MOD-0085 For Vented Trough Bottom, Add	18.45	
	16MOD-0086 For 60 Degree Bend, Deduct	-15.11	
	16MOD-0087 For 45 Degree Bend, Deduct	-20.72	
	16MOD-0088 For 30 Degree Bend, Deduct	-26.34	
16139-2537	EA 24" Vertical Inside Or Outside Riser 90, Fiberglass Cable Tray	76.08	26.61
	16MOD-0080 For 9" Rung Spacing, Add	1.27	
	16MOD-0081 For 6" Rung Spacing, Add	5.43	
	16MOD-0082 For 4" Rung Spacing, Add	9.96	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.91	
	16MOD-0084 For Solid Bottom, Add	16.85	
	16MOD-0085 For Vented Trough Bottom, Add	19.47	
	16MOD-0086 For 60 Degree Bend, Deduct	-15.94	
	16MOD-0087 For 45 Degree Bend, Deduct	-21.92	
	16MOD-0088 For 30 Degree Bend, Deduct	-27.89	
16139-2538	EA 30" Vertical Inside Or Outside Riser 90, Fiberglass Cable Tray	79.64	28.36
	16MOD-0080 For 9" Rung Spacing, Add	1.30	
	16MOD-0081 For 6" Rung Spacing, Add	5.57	
	16MOD-0082 For 4" Rung Spacing, Add	10.22	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.93	
	16MOD-0084 For Solid Bottom, Add	17.52	
	16MOD-0085 For Vented Trough Bottom, Add	20.17	
	16MOD-0086 For 60 Degree Bend, Deduct	-16.51	
	16MOD-0087 For 45 Degree Bend, Deduct	-22.72	
	16MOD-0088 For 30 Degree Bend, Deduct	-28.93	
16139-2539	EA 36" Vertical Inside Or Outside Riser 90, Fiberglass Cable Tray	86.80	30.53
	16MOD-0080 For 9" Rung Spacing, Add	1.44	
	16MOD-0081 For 6" Rung Spacing, Add	6.16	
	16MOD-0082 For 4" Rung Spacing, Add	11.29	
	16MOD-0083 For 18" Rung Spacing, Deduct	-1.03	
	16MOD-0084 For Solid Bottom, Add	19.18	
	16MOD-0085 For Vented Trough Bottom, Add	22.14	
	16MOD-0086 For 60 Degree Bend, Deduct	-18.12	
	16MOD-0087 For 45 Degree Bend, Deduct	-24.92	
	16MOD-0088 For 30 Degree Bend, Deduct	-31.73	
16139-2540	Horizontal Tees <small>(16139-2515)</small>		
16139-2541	EA 6" Horizontal Tee, Fiberglass Cable Tray	77.77	32.68
	16MOD-0080 For 9" Rung Spacing, Add	1.01	
	16MOD-0081 For 6" Rung Spacing, Add	4.31	
	16MOD-0082 For 4" Rung Spacing, Add	7.91	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.72	
	16MOD-0084 For Solid Bottom, Add	15.98	
	16MOD-0085 For Vented Trough Bottom, Add	17.63	
16139-2542	EA 9" Horizontal Tee, Fiberglass Cable Tray	87.40	38.37
	16MOD-0080 For 9" Rung Spacing, Add	1.05	
	16MOD-0081 For 6" Rung Spacing, Add	4.48	
	16MOD-0082 For 4" Rung Spacing, Add	8.22	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.75	
	16MOD-0084 For Solid Bottom, Add	17.59	
	16MOD-0085 For Vented Trough Bottom, Add	19.14	
16139-2543	EA 12" Horizontal Tee, Fiberglass Cable Tray	99.65	45.75
	16MOD-0080 For 9" Rung Spacing, Add	1.09	
	16MOD-0081 For 6" Rung Spacing, Add	4.65	
	16MOD-0082 For 4" Rung Spacing, Add	8.53	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.78	
	16MOD-0084 For Solid Bottom, Add	19.60	
	16MOD-0085 For Vented Trough Bottom, Add	20.99	
16139-2544	EA 18" Horizontal Tee, Fiberglass Cable Tray	111.27	51.44
	16MOD-0080 For 9" Rung Spacing, Add	1.20	
	16MOD-0081 For 6" Rung Spacing, Add	5.12	
	16MOD-0082 For 4" Rung Spacing, Add	9.39	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.85	
	16MOD-0084 For Solid Bottom, Add	21.81	
	16MOD-0085 For Vented Trough Bottom, Add	23.30	
16139-2545	EA 24" Horizontal Tee, Fiberglass Cable Tray	117.03	53.59
	16MOD-0080 For 9" Rung Spacing, Add	1.28	
	16MOD-0081 For 6" Rung Spacing, Add	5.50	
	16MOD-0082 For 4" Rung Spacing, Add	10.08	
	16MOD-0083 For 18" Rung Spacing, Deduct	-0.92	
	16MOD-0084 For Solid Bottom, Add	23.05	
	16MOD-0085 For Vented Trough Bottom, Add	24.70	
16139-2546	EA 30" Horizontal Tee, Fiberglass Cable Tray	125.44	56.66
	16MOD-0080 For 9" Rung Spacing, Add	1.42	
	16MOD-0081 For 6" Rung Spacing, Add	6.07	
	16MOD-0082 For 4" Rung Spacing, Add	11.13	
	16MOD-0083 For 18" Rung Spacing, Deduct	-1.01	
	16MOD-0084 For Solid Bottom, Add	24.89	
	16MOD-0085 For Vented Trough Bottom, Add	26.81	



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2547	EA	36" Horizontal Tee, Fiberglass Cable Tray.....	136.22	61.04
	16MOD-0080	For 9" Rung Spacing, Add	1.57	
	16MOD-0081	For 6" Rung Spacing, Add	6.71	
	16MOD-0082	For 4" Rung Spacing, Add	12.30	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.12	
	16MOD-0084	For Solid Bottom, Add	27.14	
	16MOD-0085	For Vented Trough Bottom, Add	29.33	
16139-2548		Horizontal Crosses (16139-2515)		
16139-2549	EA	6" Horizontal Cross, Fiberglass Cable Tray.....	121.81	56.66
	16MOD-0080	For 9" Rung Spacing, Add	1.29	
	16MOD-0081	For 6" Rung Spacing, Add	5.53	
	16MOD-0082	For 4" Rung Spacing, Add	10.13	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.92	
	16MOD-0084	For Solid Bottom, Add	23.80	
	16MOD-0085	For Vented Trough Bottom, Add	25.36	
16139-2550	EA	9" Horizontal Cross, Fiberglass Cable Tray.....	129.44	61.04
	16MOD-0080	For 9" Rung Spacing, Add	1.33	
	16MOD-0081	For 6" Rung Spacing, Add	5.69	
	16MOD-0082	For 4" Rung Spacing, Add	10.43	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.95	
	16MOD-0084	For Solid Bottom, Add	25.11	
	16MOD-0085	For Vented Trough Bottom, Add	26.61	
16139-2551	EA	12" Horizontal Cross, Fiberglass Cable Tray.....	137.07	65.43
	16MOD-0080	For 9" Rung Spacing, Add	1.37	
	16MOD-0081	For 6" Rung Spacing, Add	5.85	
	16MOD-0082	For 4" Rung Spacing, Add	10.73	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.98	
	16MOD-0084	For Solid Bottom, Add	26.42	
	16MOD-0085	For Vented Trough Bottom, Add	27.87	
16139-2552	EA	18" Horizontal Cross, Fiberglass Cable Tray.....	146.72	69.74
	16MOD-0080	For 9" Rung Spacing, Add	1.47	
	16MOD-0081	For 6" Rung Spacing, Add	6.32	
	16MOD-0082	For 4" Rung Spacing, Add	11.59	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.05	
	16MOD-0084	For Solid Bottom, Add	28.33	
	16MOD-0085	For Vented Trough Bottom, Add	29.93	
16139-2553	EA	24" Horizontal Cross, Fiberglass Cable Tray.....	155.64	74.12
	16MOD-0080	For 9" Rung Spacing, Add	1.56	
	16MOD-0081	For 6" Rung Spacing, Add	6.68	
	16MOD-0082	For 4" Rung Spacing, Add	12.25	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.11	
	16MOD-0084	For Solid Bottom, Add	30.03	
	16MOD-0085	For Vented Trough Bottom, Add	31.70	
16139-2554	EA	30" Horizontal Cross, Fiberglass Cable Tray.....	166.11	78.49
	16MOD-0080	For 9" Rung Spacing, Add	1.70	
	16MOD-0081	For 6" Rung Spacing, Add	7.27	
	16MOD-0082	For 4" Rung Spacing, Add	13.33	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.21	
	16MOD-0084	For Solid Bottom, Add	32.19	
	16MOD-0085	For Vented Trough Bottom, Add	34.09	
16139-2555	EA	36" Horizontal Cross, Fiberglass Cable Tray.....	179.70	84.12
	16MOD-0080	For 9" Rung Spacing, Add	1.87	
	16MOD-0081	For 6" Rung Spacing, Add	8.03	
	16MOD-0082	For 4" Rung Spacing, Add	14.73	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.34	
	16MOD-0084	For Solid Bottom, Add	34.99	
	16MOD-0085	For Vented Trough Bottom, Add	37.19	
16139-2556		Horizontal Wyes (16139-2515)		
16139-2557	EA	6" Horizontal Wye, Fiberglass Cable Tray.....	74.87	32.68
	16MOD-0080	For 9" Rung Spacing, Add	0.90	
	16MOD-0081	For 6" Rung Spacing, Add	3.88	
	16MOD-0082	For 4" Rung Spacing, Add	7.11	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.65	
	16MOD-0084	For Solid Bottom, Add	15.11	
	16MOD-0085	For Vented Trough Bottom, Add	16.47	
16139-2558	EA	9" Horizontal Wye, Fiberglass Cable Tray.....	79.18	34.90
	16MOD-0080	For 9" Rung Spacing, Add	0.94	
	16MOD-0081	For 6" Rung Spacing, Add	4.03	
	16MOD-0082	For 4" Rung Spacing, Add	7.39	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.67	
	16MOD-0084	For Solid Bottom, Add	15.91	
	16MOD-0085	For Vented Trough Bottom, Add	17.29	
16139-2559	EA	12" Horizontal Wye, Fiberglass Cable Tray.....	96.54	45.75
	16MOD-0080	For 9" Rung Spacing, Add	0.98	
	16MOD-0081	For 6" Rung Spacing, Add	4.19	
	16MOD-0082	For 4" Rung Spacing, Add	7.68	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.70	
	16MOD-0084	For Solid Bottom, Add	18.67	
	16MOD-0085	For Vented Trough Bottom, Add	19.75	
16139-2560	EA	18" Horizontal Wye, Fiberglass Cable Tray.....	107.84	51.44
	16MOD-0080	For 9" Rung Spacing, Add	1.08	
	16MOD-0081	For 6" Rung Spacing, Add	4.61	
	16MOD-0082	For 4" Rung Spacing, Add	8.45	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.77	
	16MOD-0084	For Solid Bottom, Add	20.78	
	16MOD-0085	For Vented Trough Bottom, Add	21.93	

16000 Electrical
16100 Basic Materials And Methods
16139 Cable Trays



MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2561	EA	24" Horizontal Wye, Fiberglass Cable Tray.....	113.29	53.59
	16MOD-0080	For 9" Rung Spacing, Add	1.15	
	16MOD-0081	For 6" Rung Spacing, Add	4.94	
	16MOD-0082	For 4" Rung Spacing, Add	9.05	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.82	
	16MOD-0084	For Solid Bottom, Add	21.93	
	16MOD-0085	For Vented Trough Bottom, Add	23.21	
16139-2562	EA	30" Horizontal Wye, Fiberglass Cable Tray.....	121.39	56.66
	16MOD-0080	For 9" Rung Spacing, Add	1.28	
	16MOD-0081	For 6" Rung Spacing, Add	5.46	
	16MOD-0082	For 4" Rung Spacing, Add	10.02	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.91	
	16MOD-0084	For Solid Bottom, Add	23.67	
	16MOD-0085	For Vented Trough Bottom, Add	25.19	
16139-2563	EA	36" Horizontal Wye, Fiberglass Cable Tray.....	131.75	61.04
	16MOD-0080	For 9" Rung Spacing, Add	1.41	
	16MOD-0081	For 6" Rung Spacing, Add	6.04	
	16MOD-0082	For 4" Rung Spacing, Add	11.07	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.01	
	16MOD-0084	For Solid Bottom, Add	25.80	
	16MOD-0085	For Vented Trough Bottom, Add	27.54	
16139-2564		Straight Reducers (16139-2515)		
16139-2565	EA	9"-6" Reducer, Fiberglass Cable Tray.....	34.25	13.07
	16MOD-0080	For 9" Rung Spacing, Add	0.51	
	16MOD-0081	For 6" Rung Spacing, Add	2.20	
	16MOD-0082	For 4" Rung Spacing, Add	4.03	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.37	
	16MOD-0084	For Solid Bottom, Add	7.33	
	16MOD-0085	For Vented Trough Bottom, Add	8.31	
16139-2566	EA	12"-9" Reducer, Fiberglass Cable Tray.....	37.72	15.23
	16MOD-0080	For 9" Rung Spacing, Add	0.52	
	16MOD-0081	For 6" Rung Spacing, Add	2.23	
	16MOD-0082	For 4" Rung Spacing, Add	4.08	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.37	
	16MOD-0084	For Solid Bottom, Add	7.89	
	16MOD-0085	For Vented Trough Bottom, Add	8.80	
16139-2567	EA	18"-12" Reducer, Fiberglass Cable Tray.....	41.19	17.45
	16MOD-0080	For 9" Rung Spacing, Add	0.53	
	16MOD-0081	For 6" Rung Spacing, Add	2.26	
	16MOD-0082	For 4" Rung Spacing, Add	4.14	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.38	
	16MOD-0084	For Solid Bottom, Add	8.44	
	16MOD-0085	For Vented Trough Bottom, Add	9.29	
16139-2568	EA	24"-18" Reducer, Fiberglass Cable Tray.....	44.33	19.15
	16MOD-0080	For 9" Rung Spacing, Add	0.54	
	16MOD-0081	For 6" Rung Spacing, Add	2.34	
	16MOD-0082	For 4" Rung Spacing, Add	4.28	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.39	
	16MOD-0084	For Solid Bottom, Add	8.99	
	16MOD-0085	For Vented Trough Bottom, Add	9.82	
16139-2569	EA	30"-24" Reducer, Fiberglass Cable Tray.....	49.53	20.92
	16MOD-0080	For 9" Rung Spacing, Add	0.64	
	16MOD-0081	For 6" Rung Spacing, Add	2.72	
	16MOD-0082	For 4" Rung Spacing, Add	4.99	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.45	
	16MOD-0084	For Solid Bottom, Add	10.15	
	16MOD-0085	For Vented Trough Bottom, Add	11.19	
16139-2570	EA	36"-30" Reducer, Fiberglass Cable Tray.....	55.74	23.14
	16MOD-0080	For 9" Rung Spacing, Add	0.74	
	16MOD-0081	For 6" Rung Spacing, Add	3.17	
	16MOD-0082	For 4" Rung Spacing, Add	5.80	
	16MOD-0083	For 18" Rung Spacing, Deduct	-0.53	
	16MOD-0084	For Solid Bottom, Add	11.53	
	16MOD-0085	For Vented Trough Bottom, Add	12.77	
16139-2571		Vertical Tees (16139-2515)		
16139-2572	EA	6" Vertical Tee, Fiberglass Cable Tray.....	103.93	32.68
	16MOD-0080	For 9" Rung Spacing, Add	1.92	
	16MOD-0081	For 6" Rung Spacing, Add	8.24	
	16MOD-0082	For 4" Rung Spacing, Add	15.10	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.37	
	16MOD-0084	For Solid Bottom, Add	23.83	
	16MOD-0085	For Vented Trough Bottom, Add	28.09	
16139-2573	EA	9" Vertical Tee, Fiberglass Cable Tray.....	107.87	34.90
	16MOD-0080	For 9" Rung Spacing, Add	1.95	
	16MOD-0081	For 6" Rung Spacing, Add	8.34	
	16MOD-0082	For 4" Rung Spacing, Add	15.29	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.39	
	16MOD-0084	For Solid Bottom, Add	24.52	
	16MOD-0085	For Vented Trough Bottom, Add	28.77	
16139-2574	EA	12" Vertical Tee, Fiberglass Cable Tray.....	124.88	45.75
	16MOD-0080	For 9" Rung Spacing, Add	1.97	
	16MOD-0081	For 6" Rung Spacing, Add	8.44	
	16MOD-0082	For 4" Rung Spacing, Add	15.47	
	16MOD-0083	For 18" Rung Spacing, Deduct	-1.41	
	16MOD-0084	For Solid Bottom, Add	27.17	
	16MOD-0085	For Vented Trough Bottom, Add	31.08	



MINOR	CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16139-2575	EA		18" Vertical Tee, Fiberglass Cable Tray.....	134.93	51.44
	16MOD-0080		For 9" Rung Spacing, Add	2.02	
	16MOD-0081		For 6" Rung Spacing, Add	8.67	
	16MOD-0082		For 4" Rung Spacing, Add	15.90	
	16MOD-0083		For 18" Rung Spacing, Deduct	-1.45	
	16MOD-0084		For Solid Bottom, Add	28.91	
	16MOD-0085		For Vented Trough Bottom, Add	32.76	
16139-2576	EA		24" Vertical Tee, Fiberglass Cable Tray.....	139.66	53.59
	16MOD-0080		For 9" Rung Spacing, Add	2.07	
	16MOD-0081		For 6" Rung Spacing, Add	8.89	
	16MOD-0082		For 4" Rung Spacing, Add	16.30	
	16MOD-0083		For 18" Rung Spacing, Deduct	-1.48	
	16MOD-0084		For Solid Bottom, Add	29.84	
	16MOD-0085		For Vented Trough Bottom, Add	33.76	
16139-2577	EA		30" Vertical Tee, Fiberglass Cable Tray.....	145.58	56.66
	16MOD-0080		For 9" Rung Spacing, Add	2.12	
	16MOD-0081		For 6" Rung Spacing, Add	9.09	
	16MOD-0082		For 4" Rung Spacing, Add	16.67	
	16MOD-0083		For 18" Rung Spacing, Deduct	-1.52	
	16MOD-0084		For Solid Bottom, Add	30.93	
	16MOD-0085		For Vented Trough Bottom, Add	34.87	
16139-2578	EA		36" Vertical Tee, Fiberglass Cable Tray.....	158.47	61.04
	16MOD-0080		For 9" Rung Spacing, Add	2.34	
	16MOD-0081		For 6" Rung Spacing, Add	10.05	
	16MOD-0082		For 4" Rung Spacing, Add	18.42	
	16MOD-0083		For 18" Rung Spacing, Deduct	-1.67	
	16MOD-0084		For Solid Bottom, Add	33.82	
	16MOD-0085		For Vented Trough Bottom, Add	38.23	

16140 Wiring Devices (16100)

Note: Includes device, installation, wire connections, support clips (where necessary) and testing. Assemblies include outlet device, cover plate, mounting and appropriate box.

16140-0001	EA		Receptacles (16140)		
16140-0002	EA		General Use Receptacles (16140-0001)		
16140-0003	EA		Receptacle Assemblies (16140-0002)		
16140-0004	EA		1 Gang, 15 A, NEMA 5-15, Duplex Receptacle Assembly.....	50.50	14.05
			Note: Includes box, receptacle and cover plate.		
16140-0005	EA		1 Gang, 20 A, NEMA 5-20, Duplex Receptacle Assembly.....	51.35	15.03
			Note: Includes box, receptacle and cover plate.		
16140-0006	EA		2 Gang, 15 A, NEMA 5-15, Duplex Receptacle Assembly.....	83.29	22.06
			Note: Includes box, receptacle and cover plate.		
16140-0007	EA		2 Gang, 20 A, NEMA 5-20, Duplex Receptacle Assembly.....	87.98	24.02
			Note: Includes box, receptacle and cover plate.		
16140-0008	EA		1 Gang, 15 A, GFI, Duplex Receptacle Assembly.....	55.72	14.05
			Note: Includes box, receptacle and cover plate.		
16140-0009	EA		1 Gang, 20 A, GFI, Duplex Receptacle Assembly.....	56.38	14.05
			Note: Includes box, receptacle and cover plate.		
16140-0010	EA		Receptacle Components (16140-0002)		
16140-0011	EA		15 A, NEMA 5-15, Single Receptacle, 125 V, 1 Phase.....	14.49	6.54
16140-0012	EA		15 A, NEMA 5-15, Duplex Receptacle, 125 V, 1 Phase.....	14.19	6.54
16140-0013	EA		15 A, Single Receptacle, 120/277 Volt, 3 Wire.....	15.98	6.54
16140-0014	EA		15 A, Duplex Receptacle, 120/277 Volt, 3 Wire.....	17.02	6.54
16140-0015	EA		15 A, NEMA 6-15, Single Receptacle, 250 V, 1 Phase.....	21.61	8.17
16140-0016	EA		15 A, NEMA 6-15, Duplex Receptacle, 250 V, 1 Phase.....	25.01	8.17
16140-0017	EA		20 A, NEMA 5-20, Single Receptacle, 125 V, 1 Phase.....	14.89	6.54
16140-0018	EA		20 A, NEMA 5-20, Duplex Receptacle, 125 V, 1 Phase.....	14.57	6.54
16140-0019	EA		20 A, Single Receptacle, 120/277 V.....	19.25	6.54
16140-0020	EA		20 A, Duplex Receptacle, 120/277 V.....	18.79	6.54
16140-0021	EA		20 A, NEMA 6-20, Single Receptacle, 250 V, 1 Phase.....	21.61	8.17
16140-0022	EA		20 A, NEMA 6-20, Duplex Receptacle, 250 V, 1 Phase.....	25.01	8.17
16140-0023	EA		20 A, NEMA 14-20, Single Receptacle, 125/250 V, 1 Phase.....	35.94	8.17
16140-0024	EA		20 A, NEMA 15-20, Single Receptacle, 250 V, 3 Phase.....	35.94	8.17
16140-0025	EA		25 A, Duplex Receptacle, 120/277 V.....	32.20	9.81
16140-0026	EA		Specialty Receptacles (16140-0001)		
16140-0027	EA		Specialty (16140-0026)		
16140-0028	EA		30 A, NEMA 5-30, Single Receptacle, 125 V, 1 Phase.....	30.60	11.44
16140-0029	EA		30 A, NEMA 6-30, Single Receptacle, 250 V, 1 Phase.....	30.60	11.44
16140-0030	EA		30 A, NEMA 10-30 Single Receptacles, 125/250 V.....	42.31	11.44
16140-0031	EA		30 A, NEMA 14-30, Single Receptacle, 125/250 V, 1 Phase.....	42.47	11.44
16140-0032	EA		30 A, NEMA 15-30, Single Receptacle, 250 V, 3 Phase.....	45.74	13.07
16140-0033	EA		50 A, NEMA 5-50, Single Receptacle, 125 V, 1 Phase.....	42.91	13.07
16140-0034	EA		50 A, NEMA 6-50, Single Receptacle, 250 V, 1 Phase.....	42.11	13.07
16140-0035	EA		50 A, NEMA 7-50 Single Receptacles, 277 V.....	37.99	13.07
16140-0036	EA		50 A, NEMA 10-50 Single Receptacles, 125/250 V.....	51.04	13.07
16140-0037	EA		50 A, NEMA 14-50, Single Receptacle, 125/250 V, 1 Phase.....	50.09	13.07
16140-0038	EA		50 A, NEMA 15-50, Single Receptacle, 250 V, 3 Phase.....	53.36	14.70
16140-0039	EA		60 A, NEMA 14-60, Single Receptacle, 125/250 V, 1 Phase.....	58.81	16.34
16140-0040	EA		60 A, NEMA 15-60, Single Receptacle, 250 V, 3 Phase.....	65.34	19.61
16140-0041	EA		100 Amp, 3 Phase, 480 V Joy Receptacle With Box - Complete.....	597.97	153.60

16000 Electrical**16100 Basic Materials And Methods****16140 Wiring Devices**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16140-0042	EA	400 Amp, 4 Pole Weatherproof Generator Receptacle With Box - Complete	1,339.04	187.90
16140-0043	EA	Dryer Receptacle, 230 V, 30 Amp	36.13	13.07
16140-0044	EA	Range Receptacle, 230 V, 60 Amp	53.21	19.61
16140-0045	EA	Clock Hanger Receptacle, 120/277 V, 15 Or 20 A	31.22	8.17
16140-0046	EA	Cable Reel With 20 A, 120 V Receptacle - Complete	652.82	199.16
16140-0047		Isolated Ground Receptacles (16140-0026)		
16140-0048	EA	15A, 125 V, NEMA 5-15R Isolated Ground Receptacle, Simplex..... Note: 2 Pole, 3 wire.	45.59	6.54
16140-0049	EA	20 A, 120 V Isolated Ground Receptacles, Simplex.....	27.34	8.17
16140-0050	EA	20 A, 120 V Isolated Ground Receptacles, Duplex	27.26	8.17
16140-0051	EA	30 A, 120 V Isolated Ground Receptacles, Simplex.....	39.03	13.07
16140-0052	EA	Locking 15 A, 250 V Isolated Ground Receptacles	29.96	8.17
16140-0053	EA	Locking 15 A, 277 V Isolated Ground Receptacles	27.92	8.17
16140-0054	EA	Locking 20 A, 120/208 V Isolated Ground Receptacles	37.57	9.81
16140-0055	EA	Locking 20 A, 277/480 V Isolated Ground Receptacles	31.22	9.81
16140-0056	EA	Locking 20 A, 347/600 V Isolated Ground Receptacles	38.33	9.81
16140-0057	EA	Locking 30 A, 120/208 V Isolated Ground Receptacles	45.25	9.81
16140-0058	EA	Locking 30 A, 277 V Isolated Ground Receptacles	46.90	13.07
16140-0059		Explosion Proof Receptacles (16140-0026)		
16140-0060	EA	20 A, 120 V, Simplex Receptacle, Explosion Proof.....	217.22	21.24
16140-0061	EA	1/2", 20 A, 2 Watt, 3 Phase Type CPS Receptacle Explosion Proof	266.71	16.34
16140-0062	EA	3/4", 20 A 2 Watt, 3 Phase Type CPS Receptacle Explosion Proof	252.50	17.97
16140-0063	EA	3/4", 30 A 2 Watt, 3 Phase Type CESS, CESD Explosion Proof Receptacle.....	356.01	32.68
16140-0064	EA	3/4", 30 A 3 Watt, 4 Phase Type CESS, CESD Explosion Proof Receptacle.....	378.27	32.68
16140-0065	EA	1-1/4", 60 A 2 Watt, 4 Phase Type CES, CESD Explosion Proof Receptacle.....	461.08	49.02
16140-0066	EA	1-1/4", 60 A 3 Watt, 4 Phase Type CES, CESD Explosion Proof Receptacle.....	505.86	49.02
16140-0067		Ground Fault Interrupter (16140-0026)		
16140-0068	EA	15 Amp GFI, Duplex Receptacle	17.77	8.17
16140-0069	EA	20 Amp GFI, Duplex Receptacle	26.60	9.81
16140-0070		Locking Receptacle (16140-0026)		
16140-0071	EA	Locking, 15 A, 250 V, NEMA L15-15 Power Receptacles, 2 Phase.....	36.62	8.17
16140-0072	EA	Locking, 15 A, 250 V, NEMA L16-15 Power Receptacles, 2 Phase.....	37.82	8.17
16140-0073	EA	Locking, 20 A, 125 V, NEMA L5-20 Power Receptacles	27.34	9.81
16140-0074	EA	Locking, 20 A, 250 V, NEMA L6-20 Power Receptacles	27.38	9.81
16140-0075	EA	Locking, 20 A, 480 V, NEMA L8-20 Power Receptacles	28.99	9.81
16140-0076	EA	Locking, 20 A, 600 V, NEMA L9-20 Power Receptacles.....	32.70	9.81
16140-0077	EA	Locking, 20 A, 125/250 V, NEMA L10-20 Power Receptacles	30.49	9.81
16140-0078	EA	Locking, 20 A, 125/250 V, NEMA L14-20 Power Receptacles	31.05	9.81
16140-0079	EA	Locking, 30 A, 120 VAC, NEMA L5-30 Power Receptacles	34.99	13.07
16140-0080	EA	Locking, 30 A, 250 VAC, NEMA L6-30 Power Receptacles	35.50	13.07
16140-0081	EA	Locking, 30 A, 250 V, NEMA L15-30 Power Receptacles, 3 Phase.....	40.89	13.07
16140-0082		Hospital Grade Receptacle (16140-0026)		
16140-0083	EA	15 A Hospital Grade, NEMA 5-15, Duplex Receptacle.....	22.46	6.54
16140-0084	EA	20 A Hospital Grade, NEMA 5-20, Duplex Receptacle.....	25.40	6.54
16140-0085	EA	120 V Transient Voltage Surge Suppressor Receptacle	72.02	19.61
		Note: Hospital grade receptacle.		
16140-0086		Pin And Sleeve Receptacle (16140-0026)		
16140-0087	EA	Pin And Sleeve, 20 A, 120/208 V Power Receptacles And Box.....	80.26	16.34
	16MOD-0089	For Straight Plug, Add	70.21	
16140-0088	EA	Pin And Sleeve, 20 A, 277/480 V Power Receptacles And Box.....	80.26	16.34
	16MOD-0089	For Straight Plug, Add	70.21	
16140-0089	EA	Pin And Sleeve, 30 A, 120/208 V Power Receptacles And Box.....	97.89	19.61
	16MOD-0090	For Straight Plug, Add	103.06	
16140-0090	EA	Pin And Sleeve, 30 A, 277/480 V Power Receptacles And Box.....	97.89	19.61
	16MOD-0090	For Straight Plug, Add	103.06	
16140-0091	EA	Pin And Sleeve, 60 A, 120/208 V Power Receptacles And Box.....	198.72	32.68
	16MOD-0091	For Straight Plug, Add	128.99	
16140-0092	EA	Pin And Sleeve, 60 A, 277/480 V Power Receptacles And Box.....	198.72	32.68
	16MOD-0091	For Straight Plug, Add	128.99	
16140-0093	EA	Pin And Sleeve, 100 A, 120/208 V Power Receptacles And Box.....	270.09	40.85
	16MOD-0092	For Straight Plug, Add	210.48	
16140-0094	EA	Pin And Sleeve, 100 A, 277/480 V Power Receptacles And Box.....	270.09	40.85
	16MOD-0092	For Straight Plug, Add	210.48	
16140-0095	EA	Pin And Sleeve, 200 A, 120/208 V Power Receptacles And Box.....	403.71	49.02
	16MOD-0093	For Straight Plug, Add	317.87	
16140-0096		Corrosion Resistant Receptacle (16140-0026)		
16140-0097	EA	Corrosion Resistant, 15/20 A, 125 V Power Receptacles	31.24	6.54
16140-0098	EA	Corrosion Resistant, 15/20 A, 250 V Power Receptacles	59.29	8.17



MINOR CSI UOM DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
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16140-0099 Handy Box And Receptacle Assembly (16140-0001)

Note: Includes box, receptacle and cover.

16140-0100	EA 1-1/2" Deep Handy Box, With 15 A Single Receptacle - Complete	27.35	12.42
16140-0101	EA 1-1/2" Deep Handy Box, With 15 A Duplex Receptacle - Complete	27.47	12.42
16140-0102	EA 1-1/2" Deep Handy Box, With 20 A Single Receptacle - Complete	28.36	12.42
16140-0103	EA 1-1/2" Deep Handy Box, With 20 A Duplex Receptacle - Complete	29.76	12.42
16140-0104	EA 1-7/8" Deep Handy Box, With 15 A Single Receptacle - Complete	28.56	13.07
16140-0105	EA 1-7/8" Deep Handy Box, With 15 A Duplex Receptacle - Complete	28.69	13.07
16140-0106	EA 1-7/8" Deep Handy Box, With 20 A Single Receptacle - Complete	29.58	13.07
16140-0107	EA 1-7/8" Deep Handy Box, With 20 A Duplex Receptacle - Complete	30.97	13.07
16140-0108	EA 2-1/8" Deep Handy Box, With 15 A Single Receptacle - Complete	30.74	14.05
16140-0109	EA 2-1/8" Deep Handy Box, With 15 A Duplex Receptacle - Complete	30.86	14.05
16140-0110	EA 2-1/8" Deep Handy Box, With 20 A Single Receptacle - Complete	31.75	14.05
16140-0111	EA 2-1/8" Deep Handy Box, With 20 A Duplex Receptacle - Complete	33.15	14.05

16140-0112 Switches (16140)

16140-0113 Switches (16140-0112)

16140-0114 Switch Assemblies (16140-0113)

16140-0115	EA 1 Gang, 15 A, 120/277 V, SPST, Switch Assembly	54.15	15.03
Note: Includes box, switch and cover plate.			
16140-0116	EA 1 Gang, 20 A, 120/277 V, SPST, Switch Assembly	54.34	15.03
Note: Includes box, switch and cover plate.			
16140-0117	EA 2 Gang, 15 A, 120/277 V, SPST, Switch Assembly	86.64	22.06
Note: Includes box, switch and cover plate.			
16140-0118	EA 2 Gang, 20A, 120/277 V, SPST, Switch Assembly	90.93	24.02
Note: Includes box, switch and cover plate.			
16140-0119	EA 3 Gang, 15A, 120/277 V, SPST, Switch Assembly	101.16	30.40
Note: Includes box, switch and cover plate.			
16140-0120	EA 3 Gang, 20A, 120/277 V, SPST, Switch Assembly	107.62	33.33
Note: Includes box, switch and cover plate.			
16140-0121	EA 4 Gang, 15A, 120/277 V, SPST, Switch Assembly	129.35	38.72
Note: Includes box, switch and cover plate.			
16140-0122	EA 4 Gang, 20A, 120/277 V, SPST, Switch Assembly	137.95	42.64
Note: Includes box, switch and cover plate.			

16140-0123 Switch Components (16140-0113)

16140-0124	EA 15 A, 120/277 V, SPST Switch	15.86	6.54
16140-0125	EA 15 A, 120/277 V, 3-Way Switch	20.01	8.17
16140-0126	EA 15 A, 120/277 V, 4-Way Switch	36.79	13.07
16140-0127	EA 15 A, 120/277 V, DPST Switch	17.49	6.54
16140-0128	EA 15 A, 120/277 V, Thermal Switch	30.23	8.17
16140-0129	EA 20 A, 120/277 V SPST Switch	19.32	8.17
16140-0130	EA 20 A, 120/277 V 3-Way Switch	23.69	9.81
16140-0131	EA 20 A, 120/277 V 4-Way Switch	46.46	13.07
16140-0132	EA 20 A, 120/277 V DPST Switch	21.93	8.17
16140-0133	EA 20 A, 120/277 V DPDT Switch	23.08	8.17
16140-0134	EA 15A 120/277 V, Single Pole, Momentary Contact Switch, Toggle, Three Position, Center Off	41.59	8.19
16140-0135	EA 15A, 120/277 V, Momentary Contact Switch, Key Operated, Single Pole, Three Position, Center Off	52.25	8.19
16140-0136	EA Momentary Contact Switch With Separate Neon Pilot	40.18	9.83
Note: Neon Pilot is 125 V, 1 / 125W.			
16140-0137	EA 20 A 125 VAC, Single Pole, Maintained Contact Switch With Center Off	28.66	11.44
Note: Or 250 VAC 10 Amp, double throw BAT handle.			
16140-0138	EA 20 A 125 VAC, Double Pole, Maintained Contact Switch	34.57	13.07
Note: Or 250 VAC 10 Amp, with center off double throw BAT handle.			
16140-0139	EA 20 A 125 VAC, Three Pole, Maintained Contact Switch	46.49	13.07
Note: Or 250 VAC 10 Amp, with center off double throw BAT handle.			
16140-0140	EA 30 A 120/277 V, Single Pole Local Switch	42.18	13.09
16140-0141	EA 30A 120/277 V, Double Pole Local Switch	51.76	13.09
16140-0142	EA 30A 120/277 V, Three-Way Local Switch	54.34	16.37
16140-0143	EA 30A 120/277 V, Four-Way Local Switch	75.49	18.01
16140-0144	EA Local Switch With Neon Pilot, 120/277 V, 15Amp	21.42	10.71
16140-0145	EA Local Switch With Separate Neon Pilot, 120/277 V, 15Amp	21.42	10.71
Note: Neon pilot is 125V, 1/25W. Requires 2 gang installation.			
16140-0146	EA 15A, 120 V, Single Pole Lighted Toggle Switch, Clear Toggle, Lighted In On Position	21.42	10.71
16140-0147	EA 15A, 120 V, Lighted Toggle Switch, Ivory Toggle, Lighted In Off Position	21.42	10.71
16140-0148	EA Automatic Door Switch, Door Open-Light On, 6A, 125 V	10.61	5.31
16140-0149	EA Automatic Door Switch, Door Closed-Light On, 6A, 125 V	10.61	5.31
16140-0150	EA 15A, 120/277 V, Single Pole Momentary Contact Switch, Three Position, Center Off, Toggle	20.43	20.43
16140-0151	EA Momentary Contact Switch, Three Position, Center Off, Key Operated	64.49	20.43
Note: 15A, 120/277 V, Single Pole			

16140-0152 Specialty Switches (16140-0112)

16140-0153 Dimmers With SPST Switch (16140-0152)

16140-0154	EA 600 W Dimmers With SPST Switch	35.45	14.70
16140-0155	EA 1000 W Dimmers With SPST Switch	54.30	14.70
16140-0156	EA 1500 W Dimmers With SPST Switch	96.02	23.66
16140-0157	EA 2000 W Dimmers With SPST Switch	120.08	23.66
16140-0158	EA 600 W Fluorescent Dimmer Switch	69.54	17.45
16140-0159	EA 1000 W Fluorescent Dimmer Switch	90.24	17.45
16140-0160	EA 1500 W Fluorescent Dimmer Switch	160.02	26.33

16000 Electrical**16100 Basic Materials And Methods****16140 Wiring Devices**

MINOR CSI	UOM	DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16140-0161	EA	Remote Speed Switch For Paddle Fan	56.84	21.76
16140-0162	EA	600 W Combination Remote Speed Switch/Incandescent Dimmer.....	91.60	32.48
16140-0163		Time Switches <small>(16140-0152)</small>		
16140-0164	EA	40 A, SPST, 125 V, Standard Time Switch	60.98	19.61
16140-0165	EA	40 A, SPST, 277 V, Standard Time Switch	62.07	19.61
16140-0166	EA	40 A, DPST, 125 V, Standard Time Switch	60.98	19.61
16140-0167	EA	40 A, DPST, 277 V, Standard Time Switch	62.07	19.61
16140-0168	EA	40 A, SPST, 125 V, 7-Day Time Switch	68.24	19.61
16140-0169	EA	40 A, SPST, 277 V, 7-Day Time Switch	68.24	19.61
16140-0170	EA	40 A, DPDT, 125 V, 7-Day Time Switch	111.06	19.61
16140-0171	EA	40 A, DPDT, 277 V, 7-Day Time Switch	111.06	19.61
16140-0172	EA	20 A, SPST, 125 V, Programmable Time Switch	97.33	19.61
16140-0173	EA	20 A, SPST, 277 V, Programmable Time Switch	105.72	19.61
16140-0174	EA	20 A, SPST, 277 V, Programmable Time Switch - Weatherproof.....	105.72	19.61
16140-0175	EA	40 A, 4PST, 125 V, Astro Dial Time Switch.....	125.54	19.61
16140-0176	EA	40 A, 4PST, 277 V, Astro Dial Time Switch.....	128.88	19.61
16140-0177	EA	40 A, SPST, 125 V, Standard Time Switch - Weatherproof	60.98	19.61
16140-0178	EA	40 A, SPST, 277 V, Standard Time Switch - Weatherproof	62.07	19.61
16140-0179	EA	40 A, DPST, 125 V, Standard Time Switch - Weatherproof	60.98	19.61
16140-0180	EA	40 A, DPST, 277 V, Standard Time Switch - Weatherproof	62.07	19.61
16140-0181	EA	40 A, SPST, 125 V, 7-Day Time Switch - Weatherproof	68.24	19.61
16140-0182	EA	40 A, SPST, 277 V, 7-Day Time Switch - Weatherproof	68.24	19.61
16140-0183	EA	40 A, DPDT, 125 V, 7-Day Time Switch - Weatherproof	111.06	19.61
16140-0184	EA	40 A, DPDT, 277 V, 7-Day Time Switch - Weatherproof	111.06	19.61
16140-0185	EA	40 A, 4PST, 125 V, Astro Dial Time Switch - Weatherproof.....	125.54	19.61
16140-0186	EA	40 A, 4PST, 277 V, Astro Dial Time Switch - Weatherproof.....	128.88	19.61
16140-0187		Weatherproof Switches <small>(16140-0152)</small>		
16140-0188	EA	20 Amp, 120 V, SPST Switch, Weatherproof	22.40	9.81
16140-0189	EA	20 Amp, 120 V, 3-Way Switch, Weatherproof	29.81	13.07
16140-0190	EA	20 Amp, 120 V, 4-Way Switch, Weatherproof	43.33	16.34
16140-0191	EA	20 Amp, 120 V, Thermal Switch, Weatherproof	42.84	13.07
16140-0192		Low Voltage Switching <small>(16140-0152)</small>		
16140-0193	EA	36 Pin Male Or Female Connector	83.47	6.54
16140-0194		Other Switches <small>(16140-0152)</small>		
16140-0195	EA	Pull Chain Switch 120/277 VAC Installed In Light Fixture	20.96	9.81
16140-0196	EA	Locking Switch, SPST Concealed Devices	61.63	26.14
16140-0197	EA	Locking Switch, 3-Way Concealed Devices	62.23	26.14
16140-0198	EA	Emergency Off Switch, With 1 Non-Closing Contact, Circular, Red, With Guard	65.49	24.44
16140-0199	EA	15A Momentary Contact Switch	63.11	24.44
16140-0200	EA	20A Momentary Contact Switch	65.61	24.44
16140-0201	EA	2-1/4" Handy Box Cover Units Fuseholder Switch	65.92	29.48
16140-0202	EA	2-3/4" Handy Box Cover Units Fuseholder Switch	66.62	29.48
16140-0203	EA	4" Square Box Cover Units With 2 Fuseholders And 2 Switches	81.81	36.02
16140-0204	EA	4" Square Box Cover Units With 1 Fuseholder And 1 Switch.....	74.38	32.75
16140-0205	EA	4" Octagon Box Cover Units With 1 Fuseholder And 1 Switch.....	74.56	32.75
16140-0206		Plates And Covers <small>(16140)</small>		
16140-0207		Wall Plates <small>(16140-0206)</small>		
16140-0208		Nylon Wall Plates <small>(16140-0207)</small>		
16140-0209	EA	1 Gang Nylon Switch Plate.....	1.00	0.33
16140-0210	EA	2 Gang Nylon Switch Plate.....	1.68	0.49
16140-0211	EA	3 Gang Nylon Switch Plate.....	2.38	0.65
16140-0212	EA	4 Gang Nylon Switch Plate.....	3.41	0.81
16140-0213	EA	1 Gang Duplex Nylon Wall Plate	1.01	0.33
16140-0214	EA	2 Gang Duplex Nylon Wall Plate	1.72	0.49
16140-0215		Plastic Wall Plates <small>(16140-0207)</small>		
16140-0216	EA	1 Gang Plastic Switch Plate	0.93	0.33
16140-0217	EA	2 Gang Plastic Switch Plate	1.54	0.49
16140-0218	EA	3 Gang Plastic Switch Plate	2.40	0.65
16140-0219	EA	4 Gang Plastic Switch Plate	3.41	0.81
16140-0220	EA	1 Gang Duplex Plastic Wall Plate	0.93	0.33
16140-0221	EA	2 Gang Duplex Plastic Wall Plate	1.54	0.49
16140-0222		Brass Wall Plates <small>(16140-0207)</small>		
16140-0223	EA	1 Gang 0.04" Brass Switch Plate	9.51	1.48
16140-0224	EA	2 Gang 0.04" Brass Switch Plate	17.68	1.70
16140-0225	EA	3 Gang 0.04" Brass Switch Plate	25.76	1.90
16140-0226	EA	4 Gang 0.04" Brass Switch Plate	39.93	2.06
16140-0227	EA	5 Gang 0.04" Brass Switch Plate	48.59	2.19
16140-0228	EA	6 Gang 0.04" Brass Switch Plate	56.19	2.29



MINOR CSI UOM DESCRIPTION	TOTAL DIRECT UNIT COST	DEMOLITION UNIT COST
16140-0229 EA 1 Gang 0.04" Brass Duplex Receptacle Wall Plate.....	9.51	1.48
16140-0230 EA 2 Gang 0.04" Brass Duplex Receptacle Wall Plate.....	20.67	1.70
16140-0231 EA 3 Gang 0.04" Brass Duplex Receptacle Wall Plate.....	29.70	1.90
16140-0232 Stainless Steel Wall Plates (16140-0207)		
16140-0233 EA 1 Gang, 302 Stainless Steel Switch Plate With Satin Finish	5.19	1.48
16140-0234 EA 2 Gang, 302 Stainless Steel Switch Plate With Satin Finish	8.24	1.70
16140-0235 EA 3 Gang, 302 Stainless Steel Switch Plate With Satin Finish	11.42	1.90
16140-0236 EA 4 Gang, 302 Stainless Steel Switch Plate With Satin Finish	16.65	2.06
16140-0237 EA 5 Gang, 302 Stainless Steel Switch Plate With Satin Finish	19.56	2.19
16140-0238 EA 6 Gang, 302 Stainless Steel Switch Plate With Satin Finish	23.60	2.29
16140-0239 EA 1 Gang, 302 Stainless Steel Duplex Receptacle Wall Plate With Satin Finish.....	5.67	1.48
16140-0240 EA 2 Gang, 302 Stainless Steel Duplex Receptacle Wall Plate With Satin Finish.....	9.35	1.70
16140-0241 EA 3 Gang, 302 Stainless Steel Duplex Receptacle Wall Plate With Satin Finish.....	15.13	1.90
16140-0242 EA 4 Gang, 302 Stainless Steel Duplex Receptacle Wall Plate With Satin Finish.....	18.26	2.06
16140-0243 Chrome Wall Plates (16140-0207)		
16140-0244 EA 1 Gang 0.040" Chrome Switch Plate With Chromium Finish.....	18.81	1.48
16140-0245 EA 2 Gang 0.040" Chrome Switch Plate With Chromium Finish.....	35.10	1.70
16140-0246 EA 3 Gang 0.040" Chrome Switch Plate With Chromium Finish.....	51.35	1.90
16140-0247 EA 1 Gang 0.040" Chrome Duplex Receptacle Wall Plate With Chromium Finish	18.80	1.48
16140-0248 Weatherproof Covers (16140-0206)		
16140-0249 EA Heavy Cast Aluminum Weatherproof Covers, One Gang, Vertical Duplex Receptacle	33.02	4.74
16140-0250 EA Heavy Cast Aluminum Weatherproof Covers, Duplex Receptacle, Two Doors Horizontal	39.93	4.74
16140-0251 EA Thermoplastic Weatherproof Cover, Duplex Receptacle, For Vertical FS/FD Mounting	51.74	4.74
16140-0252 EA Thermoplastic Weatherproof Cover, Duplex Receptacle, For Vertical Device Mounting.....	51.74	4.74
16140-0253 Removal And Reinstallation Of Wiring Devices (16140)		
Note: Includes storage and cleaning.		
16140-0254 EA Remove And Reinstall Receptacle, Switch, Outlet Or Special System Device	43.00	
16140-0255 EA Remove And Reinstall Receptacle Or Switch Outlet Cover Plate	5.45	
16140-0256 In Line Midget Fuseholders (16140)		
16140-0257 EA Single Pole Water Resistant In Line Midget Fuseholder	44.53	
16140-0258 EA Double Pole Water Resistant In Line Midget Fuseholder	98.28	

END OF SECTION 16

16000 Electrical

16100 Basic Materials And Methods

16140 Wiring Devices



MINOR
CSI UOM DESCRIPTION

TOTAL DIRECT DEMOLITION
UNIT COST UNIT COST

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