

SPECIAL SPECIFICATION
SECTION 25110S
TELECOMMUNICATIONS EQUIPMENT ROOMS

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SPECIAL SPECIFICATION

SECTION 25110S

TELECOMMUNICATIONS EQUIPMENT ROOMS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Section Includes: Material and installation of telecommunications equipment in Main Distribution Rooms (MDRs) and Intermediate Distribution Rooms (IDRs) at Sandia National Laboratories, New Mexico (SNL/NM).

Install equipment as described in Statement of Work in its entirety.

- B. Drawings shall delineate locations and types of equipment in MDRs and IDRs including rack frame and cabinet locations.

Raceway and cable routing shown on Drawings are not intended to show all support or mounting hardware, or raceway bends, kicks, offsets, and couplings.

- C. Project may contain both Red - Sandia Classified Network (SCN), and Black - Sandia Restricted Network (SRN) and Sandia Open Network (SON) systems.

Red systems require special security procedures. Contact The MESA Protected Transmission System (PTS) Coordinator through the Sandia Designated Representative (SDR) for information supplementing this specification. All work performed on Red Systems shall comply with United States Department of Energy (DOE) requirements, which may or may not be explicitly indicated or noted in the Contract documents.

- D. Project may have Contractor-furnished material and/or Sandia-furnished material (SFM) as detailed in Statement of Work and/or elsewhere in Contract documents.

- E. All or part of Work may be included in Project, as stated in Contract documents.

- F. Related Sections: Refer to the following sections for related work.

1. Division 1, Section "Descriptive Submittals."
2. Division 1, Section "Environment, Safety and Health for construction and Maintenance Service Contracts."
3. Division 25, Section "Administration Requirements."
4. Division 25, Section "Quality Assurance and Documentation."

5. Division 25, Section “Main Distribution Frames and Service Entrances.”
6. Division 25, Section “Interior Telecommunications Pathways”
7. Division 25, Section “Exterior Telecommunications Pathways”
8. Division 25, Section “Telecommunications Cabling.”

1.02 REFERENCES

- A. Electronics Industries Association/Telecommunications Industries Association (EIA/TIA)
 - 569-A Commercial Building Standard for Telecommunications Pathways and Spaces
- B. American Society for Testing and Materials (ASTM)
 - B3 Standard Specification for Soft or Annealed Copper Wire
 - B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
 - B33 Standard Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes
 - B152 Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar
 - B187 Standard Specification for Copper Bar, Bus-Bar, Rod, and Shapes
 - B189 Standard Specification for Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes
- B. National Fire Protection Association (NFPA)
 - 70 National Electrical Code (NEC)
- C. Occupational Safety and Health Administration (OSHA)
 - 29 CFR Part 1910 Permit-Required Confined Spaces for General Industry; Final Rule
- D. Supplementary References: Publications listed below are not referenced in this specification. Publications are listed as they contain design and technical criteria that are pertinent to Project. Commencement of work shall indicate a working familiarity on the part of the Contractor with each of these standards.
 1. Building Industry Consulting Service International (BICSI)
 - Telecommunications Distribution Methods Manual
 - Customer-Owned Outside Plant Design Manual

2. Electronics Industries Association/Telecommunications Industries Association (EIA/TIA)

607 Commercial Building Grounding and Bonding Requirements for Telecommunications

7. Underwriters Laboratories, Inc. (UL)

467 Grounding and Bonding Equipment

1.03 DEFINITIONS

- A. Intra-Building Cable: Network Cable within building.
- B. Inter-Building Cable: Network Cable between buildings.

1.04 SUBMITTALS

- A. General: Submit the following in accordance with conditions of Contract documents and Division 1, Section “Descriptive Submittals.”
- B. Site Investigation Report: Submit as required in Part 3 for renovation work.
- C. Manufacturer’s Data: Provide manufacturer’s data for specified materials and all equipment not listed in Tables 1, 2, or 3 of this specification.
- D. Test Equipment: Provide list of proposed test equipment to be used for Contractor-performed tests.
 - 1. Provide detailed, written description of test procedures and equipment usage specific to SNL optical fiber (OF) and unshielded twisted pair (UTP) testing activities.
 - 2. Provide complete technical specifications for OF and UTP test equipment, if Contractor uses equipment other than Sandia-preferred equipment.
 - 3. Provide software revision level number for test equipment that use software or firmware.
 - 4. Provide current copy of manufacturer’s calibration certificate for each piece of test equipment, with traceability to National Institute of Standards and Testing (NIST) requirements.
- E. Quality Control
 - 1. Test Reports: Submit certified copies of test reports for Contractor-performed tests within one week after performance of test. Large-scale tests require progressive submittals on weekly basis.
 - 2. Procedures: Provide the following, prior to beginning Work.
 - a. Written, detailed procedures including techniques for securing, protecting, and dressing transitions from OF and enhanced unshielded twisted pair (EUTP) cable to conductor to connector.

- b. Written, detailed termination procedures for OF and EUTP conductors.
 - c. Written company quality policy including measures to be taken throughout Contract to ensure delivery of quality work to SNL.
3. Contractor Qualifications: Provide certification that Contractor meets Quality Assurance requirements specified in Division 25, Section "Quality Assurance and Documentation" prior to beginning Work.
- F. As-Built Drawings: Submit dated as-built drawings for review with SDR at two-week intervals, beginning at Project start date, or as specified elsewhere in Contract documents.
- 1. Call attention to entry by circling affected area.
 - 2. If as-built work is not complete, Contractor will be so advised by SDR, and Contractor shall complete work as required.

1.05 QUALITY ASSURANCE

- A. Material and installation shall meet requirements of NFPA 70.
- B. Material, when applicable, shall be approved by a Nationally Recognized Testing Laboratory (NRTL).
- C. Monitor and maintain quality control over manufacturers, suppliers, subcontractors, work force, site conditions, products, and services to ensure Work is of specified quality.
- D. Workmanship: Install material and equipment in neat and workmanlike manner, in accordance with NEC Section 800-6.

Specified requirements represent minimum acceptable quality for Work. Comply with industry standards except when more stringent requirements are specified herein, and tolerances indicate higher standards or more precise workmanship.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Provide equipment necessary to handle, transport, and deliver materials, including SFM, from storage site to work area.
- B. Store components in original wrappings, and protect from dirt, weather and construction work traffic.
- C. Coordinate with SDR at least three days in advance for pick up of SFM. Emergency supply situations will be handled by the SDR on a case-by-case basis.
- D. Thoroughly inspect materials for damage before taking custody, including SFM. Inform SDR within one workday if SFM are found to be damaged. Failure to do so may result in material replacement at Contractor's expense as determined by SDR.
- E. Return unused SFM with an inventory to SDR immediately after product usage is complete.

1.07 WARRANTY

Contractor shall supply a warranty as specified in Section "Quality Assurance and Documentation."

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide products that are new and currently in production.
- B. Do not use materials and equipment that have been removed from existing premises, except as specifically and expressly permitted by Contract documents or SDR.
- C. Products will be specified by industry standard names, unless specifically noted otherwise.
- D. Devices and equipment submitted for approval shall be used for the purpose intended. No deviation from SNL requirements and standards shall be permitted.

2.02 INTRA-BUILDING TELECOMMUNICATION CABLING AND TERMINATION COMPONENTS

Refer to Division 25, Section "Telecommunications Cabling" for cabling placement and termination requirements. Refer to Division 25, Section "Quality Assurance and Documentation" for termination testing and documentation requirements.

2.03 LABELS

Refer to Division 25, Section "Administration Requirements" for labeling requirements.

2.04 GROUNDING AND BONDING

- A. Grounding and bonding products, whether or not indicated on the Contract documents, shall be of sizes and ratings to comply with the NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.
- B. Grounding and bonding conductors shall be copper. Equipment ground conductors run with circuit conductors and grounding electrode conductor shall be insulated with green outer finish, unless noted otherwise on the Contract documents.
- C. Unless noted otherwise, all conductors No. 8 AWG and larger shall be stranded, Class B in accordance with ASTM B8.
 - 1. Uninsulated conductors shall be bare copper in accordance with ASTM B3, tinned in accordance with ASTM B33, or alloy-coated in accordance with ASTM B189.
 - 2. Use tinned or alloy-coated in corrosive environments.

- D. Grounding connectors shall be listed and labeled for grounding application. Connectors shall be high-conductivity, heavy-duty units.

Exothermic welded connections shall be provided in kit form, and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

- E. Ground bus bars shall be 110 Alloy copper in compliance with ASTM B152 and B187. Size of ground bus bars shall be as delineated on drawings.
- F. Ground rods shall be copper-clad steel with high-strength steel core and electrolytic-grade copper outer sheath, molten welded to core. The minimum rod size shall be 3/4 inch by 10 feet (19.1 mm by 3.05 m) long.

PART 3 - EXECUTION

3.01 GENERAL

- A. Consult with SDR to verify areas that are confined spaces as defined in OSHA 29 CFR Parts 1910, requiring special permits for access. Comply with requirements of OSHA 29 CFR Part 1910, Section 146 when working in permit-required confined spaces.
- B. Locations of hazardous materials areas are shown on Drawings.
1. Avoid disturbance of hazardous materials in making acceptable modifications of raceway routing, mounting of equipment, and other work.
 2. Do not mount conduit, equipment, hangers, and other accessories on surface materials known to contain asbestos or other hazardous materials without written authorization from SDR outlining method of installation.
 3. If hazardous materials or conditions not shown on Drawings are encountered, stop work immediately and vacate area. Take the following actions:
 - a. Immediately notify SDR of condition encountered.
 - b. Do not enter area or work in area until receiving written authorization from SDR.
- C. Do not install damaged or defective components.
1. If SFM are found to be defective, immediately report problem to SDR and provide documentation with sufficient engineering data to confirm defect.
 2. Contractor shall receive replacement SFM materials only after defective materials have been returned to SDR and defect has been confirmed.
 3. If SFM are rendered unusable due to Contractor error or improper installation as determined by SDR, materials shall be replaced at Contractor's expense.
- D. Conduit entrances into IDR or Main Distribution Room (MDR) shall be perpendicular to cable tray (and/or ceiling).

Do not use horizontal conduit entrances, unless pre-approved by SDR in writing. Special measures to protect cabling must be undertaken in this case, at the direction of SDR.

- F. Secure products in place with positive anchorage devices, designed and sized to withstand stresses, vibration, and distortion.

3.02 CABLE INSTALLATION

Install system components and appurtenances in accordance with manufacturer's instructions, as shown in Drawings, and as described in Division 25, Section "Telecommunications Cabling."

3.03 LABELING

Refer to Division 25, Section "Administration Requirements" for labeling requirements.

3.04 TERMINATION AND TESTING OF TELECOMMUNICATION CABLE

Perform termination and testing of cabling as described in Division 25, Section "Telecommunications Cabling" and Division 25, Section "Quality Assurance and Documentation."

3.05 GROUNDING AND BONDING

- A. As a minimum, grounding and bonding shall comply with NFPA 70 (NEC), and as shown on Drawings. Grounding and bonding shall also comply with the following:
 - 1. UL 467
 - 2. EIA/TIA 607
- B. Grounding electrode shall include ground rods, driven exterior to the facility or as shown on Drawings.
 - 1. Top of ground rods shall be driven to a minimum depth of 2 feet (0.61 m), unless noted otherwise. Locate a minimum of one-rod length from each other and at least the same distance from any other grounding electrode.
 - 2. Interconnect ground rods with bare ground conductors.
 - 3. An additional equipment ground conductor shall be run with circuit conductors. See Standard Drawing No. 73740/E1, General Note 8 for more grounding requirements.
- C. Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to assure high conductivity, and make contact points closer in order of galvanic series.
 - 2. Make connections with clean bare metal at point of contact.

3. Coat and seal connections involving dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- D. Terminate insulated equipment grounding conductors for feeders and branch circuits with UL-approved grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing.
1. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing.
 2. Electrically bond noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.

END OF SECTION