

SECTION 27 11 16
COMMUNICATIONS CABINETS, RACKS, FRAMES AND ENCLOSURES

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications sections "General Conditions to the Construction Contract", "Special Conditions" and "Division 01 – General Requirements" form a part of the Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 SUMMARY

- A. This section includes the minimal requirements for communications cabinets, racks, frames and enclosures installed in the telecommunications rooms.
- B. Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
 - 1. Equipment Racks
- C. Equipment Enclosures

1.3 REFERENCES

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.
- B. Related Documents and Sections:
 - 1. Division 01 – General Requirements
 - 2. Section 27 00 00 – Communications General
 - 3. Section 27 05 26 – Grounding and Bonding for Communications Systems
 - 4. Section 27 05 28 – Pathways for Communications Systems
 - 5. Section 27 11 23 – Communications Cable Management and Ladder Rack
 - 6. Section 27 13 13 – Communications Copper Backbone Cabling
 - 7. Section 27 13 23 – Communications Optical Fiber Backbone Cabling
- C. The following codes, associations, acts and agencies, as required by law;
 - 1. NFPA-70, 2011 (National Electric Code)
 - 2. National Electrical Safety Code (NESC)
 - 3. Occupational Safety and Health Administration (OSHA)
- D. The current edition of the following standards:
 - 1. Refer to Section 27 00 00 – Communications General
- E. The current edition of the following guidelines:
 - 1. Refer to Section 27 00 00 – Communications General
- F. When a discrepancy arises between the above-mentioned codes, standards or guidelines and

the standards contained in this document, it shall be brought to the attention of the Owner immediately for resolution. The more stringent of the two guidelines shall be implemented.

1.4 SYSTEM DESCRIPTION

- A. This section includes specifications for network cabinets, racks, and telecommunications enclosure components utilized to house various telecommunications infrastructure components within technology distribution spaces.
- B. Open frame equipment racks shall be furnished and installed such that rear access is available for installation and maintenance. Racks shall be bolted to the floor. The tops of the racks shall be securely braced to rigid Cable Runway and bracketed to the wall.
- C. Contractors shall observe minimum clearance requirements as follows, unless otherwise directed by Owner's IT Group or the Technology Consultant.
 - 1. Racks shall be mounted to allow a minimum of 36" access space in both front and rear.
 - 2. The sides of a rack or group of racks situated against a wall shall have a minimum of 6" clearance from rack to the adjacent wall. Clearance for the access "walk around" end shall be 24" at minimum and 36" where code clearance is required.

1.5 SUBMITTALS

- A. Refer to Section 27 00 00 – Communications General
- B. Provide table of contents with all product names, manufacturer, and specific product number identified to accompany manufacturer's product information cut sheets or specifications sheets.

1.6 QUALITY ASSURANCE

- A. All cable and equipment shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner or Owner Representative. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed.
- B. Strictly adhere to all Building Industry Consulting Service International (BICSI), Electronic Industries Alliance (EIA) and Telecommunications Industry Association (TIA) recommended installation practices when installing data cabling.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. CommScope
- B. Middle Atlantic Products, Inc.
- C. Panduit Corporation
- D. Chatsworth Products Incorporated (CPI)

- E. Legrand
- F. Great Lakes Case and Cabinet
- G. Approved Equal

2.2 EQUIPMENT RACKS

- A. Racks shall be manufactured from aluminum extrusion.
- B. Each rack shall have two L-shaped top angles, two L-shaped base angles and two or four C-shaped equipment-mounting channels. The rack shall assemble with nut and bolt hardware. The base angles shall be pre-punched for attachment to the floor.
- C. Equipment mounting channels shall be 3 inches deep and punched on the front and rear flange with the EIA-310-D Universal hole pattern, 1-3/4 inches rack-mount spaces (RU), to provide 45RU for equipment. Each mounting space (RU) shall be marked and numbered on the mounting channel.
- D. When assembled with top and bottom angles, equipment-mounting channels shall be spaced to allow attachment of 19 inch EIA rack-mount equipment. Equipment attachment points shall be threaded with #12-24 roll-formed threads. The rack shall include assembly and equipment-mounting hardware. Racks shall include 24 each combination pan head, pilot point mounting screws.
- E. The assembled rack shall measure 84 inches high; 20.3 inches wide and 15 inches deep. The sides (webs) of the equipment-mounting channels shall be punched to allow attachment of vertical cable managers along the sides of the rack or for rack-to-rack baying.
- F. Assembly hardware shall electrically bond the top angles, side channels and base angles together when assembled, and there shall be a masked ground attachment point with 1/4-20 threaded studs spaced 5/8 inches apart on the inside of the side channel to attach a ground lug allowing easy attachment to the Telecommunications Ground.
- G. The rack shall be rated for 1,000 lb of equipment.
- H. The rack will be UL Listed.
- I. Finish shall be black powder coat.
- J. Furnish and install all necessary hardware for mounting equipment racks. Racks shall be securely mounted at both top and bottom. If this is not possible for any reason, the Owner shall be notified immediately.
- K. Furnish and install all necessary hardware for mounting, grounding, and bonding of equipment in equipment racks. Refer to Section 27 05 26 – Grounding and Bonding for Communications Systems.

2.3 EQUIPMENT ENCLOSURES

- A. Enclosures shall be manufactured from aluminum extrusion.
- B. Equipment mounting channels shall be 3 inches deep and punched on the front and rear flange with the EIA-310-D Universal hole pattern, 1-3/4 inches rack-mount spaces (RU), to provide 45RU

for equipment. Each mounting space (RU) shall be marked and numbered on the mounting channel.

- C. When assembled with top and bottom angles, equipment-mounting channels shall be spaced to allow attachment of 19 inch EIA rack-mount equipment. Equipment attachment points shall be threaded with #12-24 or #10-32 roll-formed threads. The rack shall include assembly and equipment-mounting hardware. Racks shall include 24 each combination pan head, pilot point mounting screws.
- D. The assembled rack shall measure 82-7/8 inches high; 23 inches wide and 27 inches deep. The sides (webs) of the equipment-mounting channels shall be punched to allow attachment of vertical cable managers along the sides of the rack or for rack-to-rack baying.
- E. The enclosure shall be rated for 3,000 lbs of equipment.
- F. The enclosure will be UL Listed.
- G. Finish shall be black powder coat.
- H. Furnish and install all necessary hardware for mounting equipment racks. Enclosure shall be securely mounted at both top and bottom. If this is not possible for any reason, Owners IT Group shall be notified immediately.
- I. Furnish and install all necessary hardware for mounting, grounding, and bonding of equipment in equipment racks. Refer to Section 27 05 26 – Grounding and Bonding for Communications Systems.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check actual site conditions prior to start of any work. Ensure all preceding trade work associated with the telecommunications system is accurate and complete before proceeding with installation or use of products specified in this section. Examples of work which must be checked include, but are not limited to:
 - 1. Electrical requirements (conduit installation and capacity)
 - 2. The TRs are the size indicated in the project drawings.
 - 3. Adequate clearances of doors, riser spaces and ceilings for all component of the telecommunications system.
 - 4. Examine and compare the telecommunications drawings and specifications with the drawings and specifications of other trades. Report any discrepancies between them to the A/E and obtain written instructions for changes or revisions.

3.2 INSTALLATION

- A. Comply with ANSI/TIA-569-D and BICSI TDMM for layout and installation of communications equipment rooms.
- B. Assemble racks according to manufacturer's instructions. Verify that equipment mounting rails are sized properly for rack-mounted equipment before attached the rack to the floor.
- C. All racks must be attached to the floor in four places using appropriate floor mounting anchors.

- D. All equipment racks shall be restrained and seismic rated as required by local code.
- E. Rear rack rails shall be installed as required to support heavy or deep equipment.
- F. Racks shall be grounded to the TGB using appropriate hardware provided by the contractor. The ground will meet local code requirements and will be approved by the Authority Having Jurisdiction (AHJ).
- G. Ladder rack may be attached to the top of the rack to deliver cables to the rack. The rack shall not be drilled to attach ladder rack. Use appropriate hardware from the ladder rack manufacturer.
- H. The equipment load will be evenly distributed and uniform on the rack. Place large and heavy equipment towards the bottom of the rack. Secure all equipment to the rack with equipment mounting screws.
- I. One vertical cable manager should be installed on each side of each equipment rack. In the event equipment racks are side by side, a single vertical cable manager may be used to bay the equipment racks together and shared for cable management (e.g. two equipment racks set side-by-side would only require three vertical cable managers).
- J. Horizontal cable managers shall be used as required and specified in the Contract Documents.
- K. Coordinate layout and installation of communications equipment with Owner's IT Group. Coordinate service entrance arrangement with Owner's IT Group.
 - 1. Meet jointly with Owner's IT Group to exchange information and agree on details of equipment arrangements and installation interfaces.
 - 2. Record agreements reached in meetings and distribute them to other participants.
 - 3. Adjust arrangements and locations of distribution frames, cross-connects, block fields, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of voice, video and network equipment.
 - 4. Adjust arrangements and locations of equipment with distribution frames, cross- connects, block fields, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
- L. Coordinate location of power raceways and receptacles with locations of communications equipment racks.
- M. Racks shall be thoroughly cleaned prior to turn over to the Owner.

3.3 GROUNDING

- A. Comply with requirements in Section 27 05 26 – Grounding and Bonding for Communications Systems within these standards.
- B. Comply with ANSI/TIA-607-C.
- C. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
- D. Bond the Shield of shielded cable to the grounding bus bar in communications room and spaces.

3.4 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-B.

END OF SECTION