

SECTION 27 11 00
COMMUNICATIONS EQUIPMENT ROOMS
Construction Specification

PART 1 GENERAL**1.1 SUMMARY**

- A. Section Includes: Buildout / fit-up of communications equipment rooms.
- B. Related Divisions and Sections
 - 1. Comply with the Related Sections paragraph of Section 270000.
 - 2. Review Seismic Calculation requirements, specifically in Section 270000, Article 1.05.
 - 3. Drawings, general provisions of the Agreement, and Division 01 apply to this Section.
 - 4. Consult other Divisions, determine the extent and character of related work, and properly coordinate work specified herein with that specified elsewhere to produce a complete and operable system.

1.2 REFERENCES

- C. Comply with the References requirements of Section 270000.
- D. In addition to those codes, standards, etc., list in Section 270000, comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:
 - 1. EIA/ECA-310-E, "Cabinets, Racks, Panels, and Associated Equipment"
 - 2. NFPA National Fire Protection Association (NFPA) 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials
 - 3. ASTM E 84-05 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 4. American Wood-Preservers' Association (AWPA) Standard C27 Plywood - Fire Retardant Treatment by Pressure Processes.

1.3 DEFINITIONS

- E. Definitions as described in Section 270000 shall apply to this section.

1.4 SYSTEM DESCRIPTION

- F. General: Communications rooms shall fall into one of the following space titles:
 - 1. Main Point of Entry
 - 2. Main Distribution Facility
 - 3. Intermediate Distribution Facility
 - 4. Main Point of Entry (MPOE) will serve the following functions:
 - a. Houses network equipment (i.e. core router, network switching, processing management/servers) and voice over IP equipment
 - b. House interbuilding and intrabuilding twisted pair and fiber optic backbone cabling and main cross-connect field

5. Main Distribution Facility (MDF)
 - a. House network equipment (i.e. access switches) serving the horizontal cabling
 - b. House horizontal termination field – for voice/data/CATV – outlets served from this room (refer to floor plans for area served)
 - c. Houses interbuilding singlemode fiber optic backbone and twisted pair OSP backbone cabling from MPOE
 - d. House horizontal termination field of data outlets served from this room (refer to floor plans for area served)
 6. Intermediate Distribution Facilities (IDF) will serve the following functions:
 - a. House intrabuilding multimode fiber optic backbone and twisted pair backbone cabling from MDF
 - b. House horizontal termination field of data outlets served from this room (refer to floor plans for area served)
 - c. House network equipment (i.e. access switch) serving users of the room's service area
- G. Work Covered Under Other Sections
1. Bonding
 2. Grounding busbars
 3. Power and cooling
 4. Conduit, device boxes, and sleeves
- H. Base Bid Work
1. The Work under this section includes materials, accessories, fasteners, etc., and the labor and associated services required for the buildout / fit-up of telecommunications equipment rooms, and includes coordination through the General Contractor with other trades
 2. In general, the Work includes the following:
 - a. Submittals
 - b. Plywood backboards
 - c. Rack bays (equipment racks, vertical management sections, anchoring)
 - d. Cable, wire and patch cord management
 - e. Overhead and vertical cable support
 - f. Seismic bracing
 - g. Identification tags and labeling
 - h. Record Documents
 - i. Warranty
- I. Coordination Requirements
1. Electrical: Coordinate layout with electrical contractor to ensure proper placement of lighting, sequencing of power service to rack bay, and other issues related to electrical trade.
 2. District: Coordinate room-ready requirements and schedule with District (to allow District to plan and execute installation of OFOI telecommunications/network equipment).

1.5 SUBMITTALS

- J. Comply with the Submittal requirements of Section 270000.
- K. Quantity: Furnish quantities of each submittal as noted in Section 270000.
- L. Submittal Requirements at Start of Construction:
 - 1. Product Data Submittal
 - 2. Shop Drawings Submittal: Consisting of any proposed changes to room plans.
 - 3. Sample Submittal: Submit sample of equipment rack label.
 - 4. Seismic Calculations: Rack anchorage into concrete flooring with overall rack bracing, based on maximum rated load capacity.
 - 5. Schedule Submittal: Submit proposed schedule of work (this schedule may be combined with the schedule developed for Division 27).
- M. Submittal Requirements at Close Out:
 - 1. As-Built Drawings Submittal

1.6 QUALITY ASSURANCE

- N. Comply with Quality Assurance requirements of Section 270000.

1.7 DELIVERY, STORAGE, AND HANDLING

- O. Comply with Delivery, Storage and Handling requirements of Section 270000.

1.8 WARRANTY

- P. Warrant Work to perform as described within this Section for a period of 1 year. Correct deficiencies within 24 hours of notification.

PART 2 PRODUCTS

2.1 SHEET HARDWOOD / PLYWOOD (AS BACKBOARD)

- A. A HP Grade A Type II (graded in accordance with AWI Premium)
- B. Materials shall comply with performance requirements in AWPA C27.
- C. The backboards must be virgin plywood sheets, free from defects, and be fire rated.
- D. Fire-Retardant Treatment Processes: Plywood shall be chemically treated and pressure impregnated, capable of providing a maximum flame spread classification of 26-75 and a smoke density no greater than 450, in accordance with ASTM E 84.

2.2 FASTENERS, FOR PLYWOOD

- A. Bolts:
 - 1. Bolts shall be steel and shall comply with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6).
 - 2. Hex nuts and flat washers shall comply with ASTM A 563 (ASTM F 563M).
- B. Concrete Anchors:

1. Expansion anchor bolt and sleeve assemblies shall have a capability to sustain, without failure, a load equal to 6 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing inspecting agency.
2. Materials:
 - a. Carbon-steel components, zinc plated to comply with ASTM B 633 Class Fe/Zn 5
 - b. Galvanized machine screws or bolts with standard expansion-shield type concrete anchors
3. Manufacturers:
 - a. Phillips Drill Co. "Red Head" masonry anchors
 - b. Wej-It Expansion Products Inc. "Wej-It" concrete anchors
 - c. Or equal

2.3 EQUIPMENT RACK – 2-CHANNEL TYPE

- A. Application: Suitable for the support of termination apparatus, cable and cord management apparatus, network equipment, and other similar equipment, within a telecommunications room.
- B. Material: High strength, lightweight 6061-T6 aluminum, extrusion construction.
- C. Channel:
 1. Size: 3" deep, with flanges on each side ("double sided")
 2. Flange: 1.265" wide by 0.25" thick, with mounting holes
 3. Mounting Holes: Threaded, spaced at 5/8" - 5/8" - 1/2", compatible with EIA-310
 4. Threading: #12-24 rolled, compatible with EIA-310
 5. RMU Markings: The RMU markings shall be permanently stamped on the 'outside' of both flanges on both channels.
- D. Assembled Rack: Rack shall be complete with two mounting channels, two base angles (3.5" high by 6" deep by .375" thick), two top angles (1.5" high by 1.5" deep by .375" thick), and hardware. Assembled rack shall be 8'-0" high (overall) by 19" mounting width (20.25" wide overall), and shall contain 45 EIA mounting spaces (1.75")
- E. Load Rating: 1,500 lbs, when evenly distributed for the height of the rack.
- F. Finish: Black, powder coat
- G. Manufacturer:
 1. CPI
 - a. #46353-703; 7'-0"H x 19" 2-channel equipment rack, 45 RMU, black
 2. Cooper B-Line
 - a. #SB556084XUFB; 7'-0"H x 19" equipment rack, black

2.4 SEISMIC GUSSET, FOR 2-CHANNEL EQUIPMENT RACK

- A. Application: Seismic gusset kit for stiffening and stabilization of critical joints in equipment racks.
- B. Manufacturer:

1. CPI
 - a. #11592-701; gusset kit, black
2. Cooper B-Line
 - a. #SB556 GUSSET KIT FB; gusset kit, black

2.5 VERTICAL MANAGEMENT SECTIONS

- A. Application: Suitable for cable routing, cord routing, and cord slack storage vertically (between the top and bottom) within a rack bay.
- B. The vertical management section shall be double-sided (i.e., the management section having covered cable guides on the front and flip-retainers on the rear).
- C. Size & Capacity: 8'-0" high by 10" wide, with 5-1/3" deep cable storage capacity in back and 6" cord storage capacity in front.
- D. Mounting: The vertical management section having matching bolt holes for attachment to the rack.
- E. Color: black (guides and cover).
- F. Manufacturer:
 1. CPI
 - a. #30163-715; 8'-0"H x 10"W, "CCS", black
 2. Or equal

2.6 HORIZONTAL MANAGEMENT PANEL

- A. Application: Suitable for installation into equipment rack for horizontal cord management. The horizontal management panel shall match (and fully integrate with) the vertical management sections.
- B. The horizontal management panel shall be double sided.
- C. Size: 1U by 19" mounting wide.
- D. Color: black (guides and cover).
- E. Manufacturer:
 1. CPI
 - a. #30139-719; horizontal cable manager, 1U, double sided.
 2. Or equal

2.7 CABLE TRAY

- A. Refer to Section 270536 for cable tray product requirements.

2.8 CABLE RUNWAY

- A. Refer to Section 270536 for cable runway product requirements.

2.9 LABEL PLATES, FOR EQUIPMENT RACKS

- A. Label plate shall be suitable to affix onto top angle of equipment rack or onto the top front of a frame/cabinet.

- B. Label plate shall be 'engrave-able' stock melamine plastic laminate substrate.
- C. Size (minimum): 1/2-inch high by 6 inches long by 1/16-inch thick.
- D. Color: Black.
- E. Lettering shall be white, engraved, 1/8-inch high.

PART 3 EXECUTION

3.1 GENERAL

- A. Comply with the Execution requirements of Section 270000.

3.2 EXAMINATION AND PREPARATION

- A. Prior to installation, verify equipment rooms are suitable for the construction scope of this section. Schedule work to prevent damage caused by other trades during the course of that other construction.
- B. Prepare surfaces, such as floors, for permanent installation of products, such as racks.

3.3 INSTALLATION

A. Plywood Backboards

1. General

- a. Complete installation work in a neat, high quality manner and conform to all applicable federal, state and local codes, and all telephone standards.
- b. Replace or repair work completed by others that is defaced or destroyed by Work associated with installation of the plywood backboards. Contractor shall pay for the full cost of this repair/replacement.

2. Preparation

- a. Condition wood materials to average prevailing humidity conditions in installation areas prior to installing.
- b. Discard all units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

3. Plywood

- a. Install plywood in accordance with WIC Custom or Premium Quality Standard, as scheduled. Ensure work complies with applicable codes and recognized standards.
- b. Install plywood in the MDF/IDF from +0'-6" AFF to ceiling.
- c. Plywood to be installed on all 4 walls
- d. Install plywood plumb, level, true, and straight with no distortions. Shim as required using concealed shims.
- e. Trim plywood around electrical and telecommunications outlets.
- f. Install plywood such that the fire rating stamp is visible.
- g. Install plywood to a tolerance of 1/8 inch in 8 feet for plumb and level; and with 1/16 inch maximum offset in flush adjoining, 1/8 inch maximum offsets in revealed adjoining surfaces.

4. Fasteners

- a. Install plywood using bolts, concrete anchors, or other fasteners suitable for the purpose.
 - b. Provide nails, screws, anchors and other anchoring devices of the type, size, material, and finish required for application/mounting substrate.
 - c. Do not use aluminum fasteners.
 - d. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.
5. Painting
- a. Paint plywood backboards with a low-gloss, white (or similar bright color) paint.
 - b. Mask the plywood's fire rated symbol/stamp from the paint such that the symbol/stamp is still visible after painting.
6. Cleaning, Finishing, and Protection
- a. Cleaning: Clean finish carpentry work on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.
 - b. Protection: Protect and maintain protection to ensure work will be without damage or deteriorating at time of acceptance.
- B. Rack Bays
1. Equipment Racks
 - a. Provide parts and accessories required to complete each rack. Completely assemble racks, according to manufacturer's instructions.
 - b. Anchoring/Bracing
 1. Use concrete anchors approved by structural engineer.
 2. Anchor racks to the structural floor at four points.
 3. If required for seismic bracing, provide bracing devices (e.g., brackets, threaded rod with strut, etc.) attached to the wall or structure above using appropriate fasteners.
 2. Vertical Management Sections
 - a. Provide vertical management sections as shown on Drawings. If not shown, provide a default of one vertical management section between each rack and at either end of the bay.
 - b. Bolt vertical management sections to the equipment racks at the points designed by the manufacturer and per the manufacturer's installation instructions.
 3. Tolerances:
 - a. Equipment Rack: Verify dimensions to establish proper clearances as follows:
 1. Front: 40" clearance from channel's front mounting flange.
 2. Back: 57" clearance from channel's back mounting flange.
 - b. Provide the correct amount of space between each rack for proper installation (according to manufacturer's written instructions) of the vertical management sections.
 4. Horizontal Management Panels
 - a. Provide horizontal management panels as shown on Drawings. If not shown, provide one management panel above each patch panel and on below the bottom patch panel in each rack bay where patch panels occur.

- b. Provide fasteners and parts required to complete the installation.
 5. Accessories
 - a. Provide rack mounting screws – 1 bag of screws per rack, as come packaged with the rack product. Attach the screws directly to the rack (visible for the punch walk). This shall constitute turn-over to the District.
 - b. Overhead Cable Support
 6. Provide support devices (e.g., brackets and threaded rod with strut) for overhead cable management system; install per the manufacturer's instructions and fastened to the wall or ceiling using appropriate fasteners.
 7. Provide parts required for complete installation (e.g., mounting brackets, splice kits, hardware, etc.).
 8. Tolerances
 - a. Install overhead cable support centered over the equipment rack, or as shown on the Drawings.
 9. Interface with Other Work: Coordinate the installation of the overhead cable support with other trades. Trapeze supports and 'hanger rods' ("all-thread"), for example, may be shared to lower overall construction cost.
- C. Vertical Cable Support
1. Provide cable runway installed vertically at the locations as shown on the Drawings for use to support cables routing vertically within telecommunications rooms.
 2. Provide parts required for complete installation (e.g., vertical mounting brackets, bolts, etc.).
 3. When using cable runway, install the runway such that the rungs are facing outward (the greater distance from the rung to the stringer edge is facing inward).

3.4 LABELING

- A. General Requirements: Labeling and identifier assignment shall conform to ANSI/TIA-606-B and as approved by District before installation.
- B. Equipment Rack Label Requirements: Provide one label plate per rack and IT cabinet. Permanently affix label plate and position as shown on the Drawings; if not shown on the Drawings, center the label plate on the rack's front top angle or the cabinet's top front frame.
- C. Identifier Assignment
 1. Equipment Racks and IT Cabinets
 - a. Prefix: "RACK" or "CABINET"
 - b. First field: the room's identifier; for example: "TDA".
 - c. Second field: the rack number (sequential numeral); for example: "01".
 - d. Example; "RACK TDA-01"

3.5 FINAL INSPECTION AND CERTIFICATION

- A. Punch the Work of this Section compliant to the requirements of Section 270000.
- B. Comply with system acceptance and certification requirements of Section 270000.

END OF SECTION