

SECTION 25110
TELECOMMUNICATION ROOMS

PART 1 - GENERAL

1.1 SUMMARY

A. SCOPE

1. This section includes the minimum installation requirements for equipment and cabling infrastructure in Telecommunication Rooms.

Minimum composition requirements and installation methods for the following:

- 1) Floor Mounted Racks
- 2) Wall Mounted Racks and Brackets
- 3) Wall Mounted Cabinets
- 4) Floor Mounted Cabinets
- 5) Cable Management Hardware
- 6) Cable Supports/Ladder Rack
- 7) Category 6 Patch Panels
- 8) Fiber Patch Panels
- 9) Back Boards
- 10) Punch down Blocks
- 11) Cross Connect Wire
- 12) Grounding Bars
- 13) Power Strips
- 14) Rack Mounted Shelves
- 15) Network Electronics
- 16) Optical Fiber Patch Cords

2. Related Sections include the following:

- a) 17150 Backbone Cabling Requirements
- b) 17160 Horizontal Cabling Requirements

1.2 QUALITY ASSURANCE

- A. All Telecommunications Room (TR) 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 Network & Telecommunications Department. Equipment and materials shall be of the quality and manufacturer indicated. The equipment specified is based on the

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acceptable manufacturers listed. Where "acceptable manufacturers" is stated, equipment shall be equivalent in every way to that of the equipment specified, and subject to approval.

B. Materials and work specified herein shall comply with the requirements of:

1. ANSI/TIA/EIA - 568-B Commercial Building Telecommunications Cabling Standard
2. ANSI/TIA/EIA - 569-A Commercial Building Standard for Telecommunications Pathway and Spaces
3. EIA/TIA-606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
4. EIA/TIA-607 Commercial Building Grounding and Bonding requirements for Telecommunications
5. NEMA - 250
6. Federal Communications Commission 47 CFR 68.
7. BICSI Telecommunications Distribution Design Manual (9th edition)
8. BICSI Customer Owned Outside Plant Design Manual (2nd edition)
9. BICSI Telecommunications Cabling Installation Manual (2nd edition)
10. ANSI/NECA/BICSI 568-2001 Standard for Installing Commercial Building Telecommunications Cabling
11. ADA - Americans with Disabilities Act
12. NFPA 70 - 2002, including:
 - a) NEC - Article 770
 - b) NEC - Article 800
13. Underwriters Laboratory

1.3 SUBMITTALS

A. Provide product data with bid for the following:

1. Floor Mounted Racks
2. Wall Mounted Racks and Brackets
3. Wall Mounted Cabinets
4. Floor Mounted Cabinets
5. Cable Management Hardware
6. Cable Supports/Ladder Rack
7. Category 6 Patch Panels
8. Fiber Patch Panels
9. Punch down Blocks

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10. Grounding Bars
11. Power Strips
12. Rack Mounted Shelves

PART 2 - PRODUCTS

2.1 FLOOR MOUNTED RACKS

A. Racks shall meet the following physical specifications:

1. 19" rack mounting space.
2. 7 foot high.
3. Lightweight aluminum construction.
4. Black polyurethane finish.
5. 15" deep base with four (4) ¾" bolt down holes.
6. Have double sided 12/24 tapped holes and 5/8" to 5/8" - ½" standard EIA hole pattern.

B. Acceptable Manufacturers:

1. Chatsworth mfg # 50120-703

2.2 WALL MOUNTED RACKS

A. Wall mounted racks shall meet the following physical specifications:

1. 19" rack mounting space.
2. 38.5" high with 19 mounting spaces.
3. Lightweight aluminum construction.
4. Black polyurethane finish.
5. Stationary mounting with 21" deep 14 gauge mounting brackets and 200 lb. capacity.
6. Racks shall have double sides 12/24 tapped holes and 5/8", 5/8" ½" standard EIA hole pattern.

B. Acceptable Manufacturers:

1. Chatsworth mfg # 11961-718

2.3 WALL MOUNTED CABINETS

A. Wall mounted cabinets shall meet the following specifications:

1. 19" equipment mounting space.
2. 38.5" high with 20 rack mount spaces.

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3. Universal mounting rails with 10/32 and 12/24 tapped holes-5/8", 5/8", 1/2" EIA standard hole pattern.
 4. Black polyurethane finish.
- B. Racks shall:
1. Have a two hinge design for front access.
 2. Have louvered sides for ventilation
 3. Have knockouts in top and bottom for cable access.
 4. Have front access.
 5. Be lockable.
- C. Acceptable Manufacturers
Chatsworth mfg # 12324-722 or mfg # 12325-722

2.4 FLOOR MOUNTED CABINET AND FRAME

- A. Floor mounted cabinets shall meet the following specifications:
1. Universal mounting rails with 10/32 and 12/24 tapped holes-5/8", 5/8", 1/2" EIA standard hole pattern.
 2. 16 gauge Aluminum (maximum strength) construction
 3. Nominal 78"x19"x30"
 4. Lockable plexiglass® hinged door on front and steel hinged door in rear.
 5. Vented roof
 6. Removable side panels.
 7. Leveling feet
- B. Acceptable Manufacturers
1. Chatsworth mfg # M-1130-71x; x refers to shipping method

2.5 CABLE MANAGEMENT

- A. Cable management panels shall be plastic with integral wire retaining fingers.
- B. Cable management panels shall have front and back channels.
- C. Cable management panels shall have removable front and back covers.
- D. Horizontal Cable managers shall be 3"wide x 3"deep on front channel and 2"X4" on rear channel.
- E. Vertical managers shall be 3"wide x 3"deep on front channel and 2"w x 4"d on rear channel 4"w x 5"d on front channel and 4"w x 4"d on rear channel.
- F. Design Make: Panduit
1. Horizontal - mfg # WMPF1 ; Vertical – mfg # WMPV20

2.6 LADDER RACK

- A. Provide 18" ladder rack in TR as shown on drawings for horizontal cable support.
- B. Include connecting and support hardware to suit installation. Including but not limited to:
 - 1. Rack to runway mount plate
 - 2. Wall angle support bracket
 - 3. Butt splice swivel
 - 4. Connect junction
 - 5. Grounding Kit.
- C. Rack shall be a hollow or solid side bar nominally 3/8" thick by 1 1/2" high with rungs 9" on center.
- D. Shall be painted black.

2.7 CATEGORY 6 UTP PATCH PANELS

- A. Shall meet the following specifications:
 - 1. Shall meet or exceed all Category 6 component performance standards as specified in TIA 568-B.2-1
 - 2. Provide 48 ports per panel.
 - 3. Paired punch down sequence to allow pair twists within 1/2" of the termination.
 - 4. Shall be UL listed.
 - 5. Shall have 110 IDC terminations
 - 6. Sized for standard 19" equipment rack and shall in all cases have 48 ports.
 - 7. Shall be equipped with rear cable support bars.
- B. Design Make: AVAYA mfg # 700-173-743 (PM-GS3-48)

2.8 FIBER OPTIC PATCH PANELS

- A. Shall meet or exceed all TIA 568-B.3 requirements.
- B. Provide 36/48 port or 72/96 port panels as called for on drawings.
- C. Shall be rack mounted.
- D. Shall accept 6 and 8 Pack SC adapter panels.
- E. Multimode fiber shall be connected to orange bulkheads and Single mode fiber shall be connected to yellow bulkheads.
- F. Design Makes: Siecor LANscape
 - 1. CCH-03U : 36 fiber total capacity ; using six 6 fiber panels
48 fiber total capacity ; using six 8 fiber panels
 - 2. CCH-04U : 72 fiber total capacity; using twelve 6 fiber panels

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96 fiber total capacity; using twelve 8 fiber panels

2.9 BACKBOARDS

- A. Shall be 4 x 8 x 3/4" BCX, fire rated plywood.
- B. Shall be painted – gray, acrylic, interior, fire retardant paint.

2.10 PUNCHDOWN BLOCKS

- A. Shall be 110 IDC style blocks.
- B. Shall be 300 pair blocks.
- C. Blocks shall include means to identify cables per ANSI/TIA/EIA-606-A
 - 1. Provide connecting clip, designation strip, plastic covers and retaining clip necessary to terminate cables.
- D. Acceptable manufacturers
 - 1. Siemens mfg # S110AB2-300

2.11 UTP CROSS CONNECT

- A. Provide modular 110 cross connect blocks for all backbone UTP terminations.
- B. Cross-connects shall be made with wire of equal gauge to that of the feed cable, which it is being connected to.
- C. Shall be UL listed
- D. Provide (1) roll of 1 pair and (1) roll of 2 pair per TR
- E. Acceptable manufacturers
 - 1. Avaya
 - a) 1 pair description: wh/bl-bl/wh (mfg # 105 597 264)
 - b) 2 pair description: wh/bl-bl/wh, o/wh-wh/o (mfg # 105 617 955)

2.12 GROUNDING BARS

- A. Provide telecommunication grounding bar (TGB) assembly as shown on drawings and #6 grounding wire from ground bar telecommunications grounding system.
- B. Grounding wire shall be appropriately bonded to the telecommunications main grounding bar (TMGB). The TMGB shall be grounded to the main electrical service grounding electrode system.
- C. NEMA approved Ground Bar Assembly to be constructed with following materials (See drawing details for additional information):
 - 1. Copper Ground Bar (1/4"x4"x10") with 9/32" holes spaced 1 1/8" apart.
 - 2. Insulators
 - 3. 5/8" Lock washers
 - 4. Wall Mounting Brackets
 - 5. 5/8-11"x1" HHCS bolts

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2.13 POWER STRIP

- A. Shall be 20 amp, 115V.
- B. Shall be Rack mounted.
- C. Shall be Non-switched.
- D. Shall be Surge suppressed.
- E. Shall have 6 outlets – transformer spaced.
- F. Must have 20 amp twist lock plug.
- G. Power cord shall be 10' in length.
- H. Must meet UL 1363 and 1449 requirements.
- I. Design Make
 - 1.
- J. Acceptable Manufacturers
 - 1. Perma Power mfg # JT06B2B20

2.14 EQUIPMENT SHELVES

- A. Equipment shelves shall be made of .090 aluminum.
- B. Color shall be black.
- C. Shall be 19" rack mountable.
- D. Acceptable Manufacturers:
 - 1. Chatsworth mfg # 40117-719

2.15 NETWORK ELECTRONICS

- A. Network Switches: Cisco Systems switches shall be used exclusively unless otherwise specified by the Network & Telecommunications Department.
- B. Media converters: Transition Networks media converters shall be used exclusively unless otherwise specified by the Network & Telecommunications Department.

2.16 OPTICAL FIBER PATCH CORDS

- A. Shall be a duplex fiber cable meeting the transmission characteristics of the optical fiber horizontal cable.
- B. Connectors shall be duplex 568SC with an optical axial pull strength of 33 N at 0 degree angle and 22 N at 90 degree angle with a maximum .5 dB increase in attenuation.
- C. Cables shall be 2 meters in length orange in color for multi-mode connections and yellow for single mode connections.
- D. The following configurations may be required:
 - 1. ST/ST
 - 2. SC/SC
 - 3. SMA/SMA

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4. ST/SC
 5. ST/MTRJ
 6. SC/MTRJ
 7. Biconic/Biconic
- E. Acceptable Manufacturers:
1. Leviton
 2. Compulink

(Note: The above or any others meet the following requirements:

a) 100% Corning Fiber, b) Heat epoxied)

PART 3 - EXECUTION

3.1 FLOOR MOUNTED RACKS

- A. All racks shall be anchored to the floor.
- B. Provide vertical and horizontal cable as shown on drawing.
- C. Mount with a minimum of 36" feet clear access behind and front of rack from the wall to a rack.
- D. Ground the rack to the equipment ground bar with a #6 copper wire.

3.2 WALL MOUNTED RACKS

- A. Secure wall mounted racks to building structure with approved anchoring means
- B. Verify all existing wall construction and submit proposed anchoring methods for approval.
- C. Provide vertical and horizontal cable management both front and rear.

3.3 LADDER RACK

- A. Install as shown on the drawings.
- B. Ladder Rack to be secured to walls and top of equipment rack.

3.4 CABLE MANAGEMENT [<PIC 1>](#) [<PIC 2>](#)

- A. Provide (1) racked mounted 3.5" horizontal cable manager at TOP OF EACH RACK INSTALLED. ALSO, provide 2 vertical cable managers for each rack installed. If two or more racks are installed side by side, install cable manager between the racks and cable managers on the outside or ends of racks.
- B. Provide one 3.5" horizontal cable manager above each 48 UTP port panel and fiber patch panel installed.
- C. Provide two 3.5" horizontal cable managers, one (1) above and one (1) below electronics, as shown on drawing.

3.5 PATCH PANELS

1. Install and label as shown on drawings.
2. Install per manufacturer's recommendations.

3.6 OPTICAL FIBER PATCH PANELS

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1. Install as shown on drawings.
2. Furnish and Install labels for each strand, as per Network & Telecommunications department management instruction in the field or as shown on drawings.
3. Install blank adapter panels in all positions not used at time of installation for fiber terminations.

3.7 VIDEO PATCH PANELS

- A. Load all panels with one coax insert.
- B. Position the panel as indicated on drawings

3.8 CABLE SUPPORTS

- A. Provide 8 inch "D" rings 2 ft. on center for all exposed wall mounted vertical cable runs.
- B. Keep horizontal wall mounted cable runs to a minimum. In general, horizontal runs shall be on wall mounted ladder rack.
- C. Provide category 6 cable brackets 3' on center supported to building structure for all cable runs not supported by cable tray.

3.9 BACKBOARDS

- A. Linear wall space used for anchoring equipment shall be lined for the full closet width with fire treated BCX grade exterior plywood 3/4" and 8' high.
- B. Plywood for mounting termination equipment on shall be installed vertically side by side a minimum of 6" above finished floor. Mounting of said plywood shall be sufficient to support the equipment.
- C. Plywood for supporting riser cables shall be installed vertically resting directly on the finished floor. Anchoring and mounting techniques of plywood used to support backbone riser cables shall be sufficient to support a minimum of 1500 pounds of weight.
- D. In no cases shall the heads of mounting screws protrude past the face of the plywood.
- E. Contractor shall install distribution rings for the cross-connect fields above all wall mounted blocks. Two rings per vertical row of blocks. Mount rings with two hex head screws per ring.

3.10 MISCELLANEOUS REQUIREMENTS

- A. All cables shall be neatly "dressed out" in equipment rooms.
- B. Fire stop all sleeves and conduit openings after the cable installation is complete.
- C. Cable pathways shall incorporate the fire rated pathway :
Manufacturer : Specified Technologies, Inc.
Product : 3M / EZ Path product line

3.11 PUNCH DOWN BLOCKS

- A. Installed on plywood backboard so that top of 300 pair block is 5'6" AFF
- B. Mount Blocks with steel, zinc plated 5/16" slotted hex head #10 x 3/4" drill screws.

- A. Install Designation Strips color-coded with industry standard coded field as follows:

<u>Description</u>	<u>Color</u>
Common Equipment - PBX, Muxes	Yellow
Back Bone Cable	Orange/Yellow; Black/White
Horizontal Wiring	Blue
Inter-building Campus Backbone	Black

- C. Install Red Insulator Clips on all special circuits in the TR and at the MDF. See Section 25120 for circuit count information.

3.12 GROUNDING AND BONDING

- A. Copper bus provided in each Telecommunication Room.
B. Bond metallic equipment racks, conduits, cable tray, ladder racks to the ground bar.
C. All connectors and clamps shall be mechanical type made of silicon bronze.
D. Terminals shall be solderless compression type, copper long-barrel NEMA two bolt.
F. Bond the shield of shielded cable to the ground bar in communications rooms and spaces.

3.13 CROSS CONNECT

- A. Cross connects shall be made with 1 pair and 2 pair wire as required by circuit being connected. Coordinate cross connect colors.

END OF SECTION

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Cable Management picture 1

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Cable Management 2

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