Section 27 11 00

COMMUNICATION EQUIPMENT ROOM FITTINGS

Section 27 11 23

Communications Cable Management and Ladder Rack

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Provide all labor, materials, and equipment for the complete installation of work called for in the Contract Documents.

1.2 SCOPE OF WORK

A. This section includes the minimum requirements for the equipment and cable installations in communications equipment rooms (Telecommunications Closets).

B. Included in this section are the minimum composition requirements and installation methods for the following:

1. Cable Management

1.3 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. Where “approved equal” is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.

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 communications/data cabling.

C. Material and work specified herein shall comply with the applicable requirements of:

1. ANSI/TIA/EIA – 568-B *Commercial Building Telecommunications Cabling Standard*, 2000-2004

2. TIA – 569-B *Commercial Building Standard for Telecommunications Pathways and Spaces*, 2004

3. ANSI/TIA/EIA – 606-A *Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*, 2002

4. ANSI-J-STD – 607-A *Joint Standard for Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications*, 2002

5. NFPA 70 – *National Electric Code*, 2005

6. ANSI/NECA/BICSI 568-2001 – *Standard for* Installing Commercial Building Telecommunications Cabling

1.4 SUBMITTALS

A. Provide product data for the following:

1. Manufacturers data/cut sheets, specifications and installation instructions for all products (submit with bid).

PART 2 – PRODUCTS

2.1 CABLE MANAGEMENT

A. Vertical Cable Management for Racks/Frames (Evolution™ Cable Management)

1. Every rack/frame shall have a minimum of one vertical cable manager. The vertical cable manager shall create a space for storing and organizing cables along the side of the rack/frame. The cable manager shall maintain separation between patch/equipment/jumper cords and premise cables.

2. The vertical cable manager shall match the height of the rack(s)/frame(s).

3. The vertical cable manager shall bolt to the side of racks/frames with included hardware.

4. The cable manager shall be sized to match cabling requirements. Maximum cable fill shall be calculated by dividing 50% of the usable area within the cable manager by the area of a single cable.

5. A single vertical cable manager may be used in between bayed racks/frames if it is sized to match cable requirements for both racks/frames.

6. The single-sided vertical cable manager shall be a C-shaped trough with a front door. The single-sided trough shall provide a single cable pathway. The front sides of the cable manager shall have T-shaped cable guides separated by openings that align with each U space on the rack. The back of the manager shall be mostly open to allow easy cable pass-through. Three fixed position accessory mounting panels shall allow attachment of cable management accessories at the back of the manager.

7. The double-sided vertical cable manager shall be a double-sided H-shaped trough with a front door and a rear door. The double-sided trough shall provide independent front and rear cable pathways. The front and rear sides of the cable manager shall have T-shaped cable guides separated by openings that align with each U space on the rack. The middle of the managers shall be mostly open to allow easy cable pass-through. Three movable mid-sections shall allow attachment of cable management accessories inside the cable manager. The movable mid-sections shall

adjust front-to-rear to allow a 40/60, 50/50 or 60/40 front/rear split of the interior cable management space.

8. The combination vertical cable manager shall be a single-sided C-shaped trough with a front door and individual cable rings on the rear side. The single-sided trough and cable rings shall provide independent front and rear cable pathways. The front sides of the cable manager shall have T-shaped cable guides separated by openings that align with each U space on the rack. The back of the manager shall have individual rings with plastic spin-open latches. The rings will provide attachment points for cable management accessories inside the cable management trough. Openings between the rings will allow easy cable pass-through.

9. The door shall be removable, hinged to open from the right or left side, with a two-point latch and a single knob on the right and left side to secure the door in the closed position. The front door shall have a two-tone finish: black with a vertical aluminum panel at the center. The rear door on double-sided cable managers shall be flat with a black finish.

10. The T-shaped cable guides shall be made from a composite plastic material (not metal) and shall have rounded edges to protect cables. Openings between the T-shaped guides will be evenly spaced. When the cable manager is attached to a rack/frame, each cable opening shall align with a rack-mount space (U) on the rack/frame. Each opening shall pass a minimum of 24 each .25" OD patch cords.

11. The cable manager shall be delivered individually boxed, and available in several widths as specified below and in the contract documents.

12. The vertical cable manager shall be manufactured from steel, aluminum and plastic.

13. Finish shall be epoxy-polyester hybrid powder coat paint in the color as specified below and in the contract documents. T-shaped cable guides and latch hardware is black.

14. Optional internal cable management accessories will include cable management spools that attach to the panels/mid-sections to provide slack management for patch cords; a cable lashing bar kit to provide tie points for cable bundles at the rear/mid of the manager; and a fiber segregation kit that creates a separate pathway inside the manager to separate fiber from other cables.

15. Design Make shall be:
    Chatsworth Products, Inc. (CPI),
    Evolution™ Cable Management:

    Part Number 35511-701, Evolution g1 Single-Sided Vertical Cable Manager, 6' High x 6" Wide x 13.2" Deep (1.8 m x 150 mm x 335 mm), Black.
    Part Number 35512-701, Evolution g1 Single-Sided Vertical Cable Manager, 6' High x 8" Wide x 13.2" Deep (1.8 m x 200 mm x 335 mm), Black.
    Part Number 35513-701, Evolution g1 Single-Sided Vertical Cable Manager, 6' High x 10" Wide x 13.2" Deep (1.8 m x 250 mm x 335 mm), Black.

Part Number 35514-701, Evolution g1 Single-Sided Vertical Cable Manager, 6’ High x 12” Wide x 13.2” Deep (1.8 m x 300 mm x 335 mm), Black.
Part Number 35515-701, Evolution g1 Single-Sided Vertical Cable Manager, 6’ High x 15” Wide x 13.2” Deep (1.8 m x 380 mm x 335 mm), Black.

Part Number 35511-703, Evolution g1 Single-Sided Vertical Cable Manager, 7’ High x 6” Wide x 13.2” Deep (2.1 m x 150 mm x 335 mm), Black.
Part Number 35512-703, Evolution g1 Single-Sided Vertical Cable Manager, 7’ High x 8” Wide x 13.2” Deep (2.1 m x 200 mm x 335 mm), Black.
Part Number 35513-703, Evolution g1 Single-Sided Vertical Cable Manager, 7’ High x 10” Wide 13.2” Deep (2.1 m x 250 mm x 335 mm), Black.
Part Number 35514-703, Evolution g1 Single-Sided Vertical Cable Manager, 7’ High x 12” Wide x 13.2” Deep (2.1 m x 300 mm x 335 mm), Black.
Part Number 35515-703, Evolution g1 Single-Sided Vertical Cable Manager, 7’ High x 15” Wide x 13.2” Deep (2.1 m x 380 mm x 335 mm), Black.

Part Number 35511-715, Evolution g1 Single-Sided Vertical Cable Manager, 8’ High x 6” Wide x 13.2” Deep (2.4 m x 150 mm x 335 mm), Black.
Part Number 35512-715, Evolution g1 Single-Sided Vertical Cable Manager, 8’ High x 8” Wide x 13.2” Deep (2.4 m x 200 mm x 335 mm), Black.
Part Number 35513-715, Evolution g1 Single-Sided Vertical Cable Manager, 8’ High x 10” Wide x 13.2” Deep (2.4 m x 250 mm x 335 mm), Black.
Part Number 35514-715, Evolution g1 Single-Sided Vertical Cable Manager, 8’ High x 12” Wide x 13.2” Deep (2.4 m x 300 mm x 335 mm), Black.
Part Number 35515-715, Evolution g1 Single-Sided Vertical Cable Manager, 8’ High x 15” Wide x 13.2” Deep (2.4 m x 380 mm x 335 mm), Black.

Part Number 35521-701, Evolution g2 Double-Sided Vertical Cable Manager, 6’ High x 6” Wide x 24.5” Deep (1.8 m x 150 mm x 622 mm), Black.
Part Number 35522-701, Evolution g2 Double-Sided Vertical Cable Manager, 6’ High x 8” Wide x 24.5” Deep (1.8 m x 200 mm x 622 mm), Black.
Part Number 35523-701, Evolution g2 Double-Sided Vertical Cable Manager, 6’ High x 10” Wide x 24.5” Deep (1.8 m x 250 mm x 622 mm), Black.
Part Number 35524-701, Evolution g2 Double-Sided Vertical Cable Manager, 6’ High x 12” Wide x 24.5” Deep (1.8 m x 300 mm x 622 mm), Black.
Part Number 35525-701, Evolution g2 Double-Sided Vertical Cable Manager, 6’ High x 15” Wide x 24.5” Deep (1.8 m x 380 mm x 622 mm), Black.

Part Number 35521-703, Evolution g2 Double-Sided Vertical Cable Manager, 7’ High x 6” Wide x 24.5” Deep (2.1 m x 150 mm x 622 mm), Black.
Part Number 35522-703, Evolution g2 Double-Sided Vertical Cable Manager, 7’ High x 8” Wide x 24.5” Deep (2.1 m x 200 mm x 622 mm), Black.
Part Number 35523-703, Evolution g2 Double-Sided Vertical Cable Manager, 7’ High x 10” Wide x 24.5” Deep (2.1 m x 250 mm x 622 mm), Black.
Part Number 35524-703, Evolution g2 Double-Sided Vertical Cable Manager, 7’ High x 12” Wide x 24.5” Deep (2.1 m x 300 mm x 622 mm), Black.
Part Number 35525-703, Evolution g2 Double-Sided Vertical Cable Manager, 7’ High x 15” Wide x 24.5” Deep (2.1 m x 380 mm x 622 mm), Black.

Part Number 35521-715, Evolution g2 Double-Sided Vertical Cable Manager, 8’ High x 6” Wide x 24.5” Deep (2.4 m x 150 mm x 622 mm), Black.
Part Number 35522-715, Evolution g2 Double-Sided Vertical Cable Manager, 8’ High x 8” Wide x 24.5” Deep (2.4 m x 200 mm x 622 mm), Black.
Part Number 35523-715, Evolution g2 Double-Sided Vertical Cable Manager, 8’ High x 10” Wide x 24.5” Deep (2.4 m x 250 mm x 622 mm), Black.
Part Number 35524-715, Evolution g2 Double-Sided Vertical Cable Manager, 8’ High x 12” Wide x 24.5” Deep (2.4 m x 300 mm x 622 mm), Black.
Part Number 35525-715, Evolution g2 Double-Sided Vertical Cable Manager, 8’ High x 15” Wide x 24.5” Deep (2.4 m x 380 mm x 622 mm), Black.

Part Number 35571-701, Evolution g3 Combination Vertical Cable Manager, 6’ High x 6” Wide x 20.2” Deep (1.8 m x 150 mm x 513 mm), Black.
Part Number 35572-701, Evolution g3 Combination Vertical Cable Manager, 6’ High x 8” Wide x 20.2” Deep (1.8 m x 200 mm x 513 mm), Black.
Part Number 35573-701, Evolution g3 Combination Vertical Cable Manager, 6’ High x 10” Wide x 20.2” Deep (1.8 m x 250 mm x 513 mm), Black.
Part Number 35574-701, Evolution g3 Combination Vertical Cable Manager, 6’ High x 12” Wide x 20.2” Deep (1.8 m x 300 mm x 513 mm), Black.
Part Number 35575-701, Evolution g3 Combination Vertical Cable Manager,6’ High x 15” Wide x 20.2” Deep (1.8 m x 380 mm x 513 mm), Black.

Part Number 35571-703, Evolution g3 Combination Vertical Cable Manager, 7’ High x 6” Wide x 20.2” Deep (2.1 m x 150 mm x 513 mm), Black.
Part Number 35572-703, Evolution g3 Combination Vertical Cable Manager, 7’ High x 8” Wide x 20.2” Deep (2.1 m x 200 mm x 513 mm), Black.

Part Number 35573-703, Evolution g3 Combination Vertical Cable Manager, 7' High x 10" Wide x 20.2" Deep (2.1 m x 250 mm x 513 mm), Black.
Part Number 35574-703, Evolution g3 Combination Vertical Cable Manager, 7' High x 12" Wide x 20.2" Deep (2.1 m x 300 mm x 513 mm), Black.
Part Number 35575-703, Evolution g3 Combination Vertical Cable Manager, 7' High x 15" Wide x 20.2" Deep (2.1 m x 380 mm x 513 mm), Black.

Part Number 35571-715, Evolution g3 Combination Vertical Cable Manager, 8' High x 6" Wide x 20.2" Deep (2.4 m x 150 mm x 513 mm), Black.
Part Number 35572-715, Evolution g3 Combination Vertical Cable Manager, 8' High x 8" Wide x 20.2" Deep (2.4 m x 200 mm x 513 mm), Black.
Part Number 35573-715, Evolution g3 Combination Vertical Cable Manager, 8' High x 10" Wide x 20.2" Deep (2.4 m x 250 mm x 513 mm), Black.
Part Number 35574-715, Evolution g3 Combination Vertical Cable Manager, 8' High x 12" Wide x 20.2" Deep (2.4 m x 300 mm x 513 mm), Black.
Part Number 35575-715, Evolution g3 Combination Vertical Cable Manager, 8' High x 15" Wide x 20.2" Deep (2.4 m x 380 mm x 513 mm), Black.

Part Number 15008-001, Cable Distribution Spools, Pack of 4, Black. (Note: 3 spools are included with 10"W, 12"W and 15"W cable managers.)
Part Number 35475-701, Fiber Segregation Kit, for Evolution Vertical Cable Managers, 3.8" Wide x 4.3" Deep (97 mm x 109 mm), Black.
Part Number 35473-703, Cable Lashing Bar Kit, for Evolution Vertical Cable Managers, Zinc-Plate (Silver-Colored).

B. Horizontal Cable Management for Racks/Frames (Evolution™ Cable Management)

1. Place horizontal cable managers above and below each patch panel on/in each rack/frame. The horizontal cable manager will guide patch/equipment cords between the vertical cable manager and individual network port connections.

2. The horizontal cable manager shall match the rack-mount width of the rack(s)/frame(s).

3. The horizontal cable manager shall attach to the front or rear of the rack/frame with screws and shall be sized to fit in standard EIA-310-D or EIA-310-E Universal rack-mount spacing (1-3/4" high U).

4. The horizontal cable manager shall be sized to match cabling requirements. Provide a minimum of 1U of horizontal cable management for every 2U of connectivity. Cables must be able to access the cable manager so that no ports are blocked by the cables.

5. A single horizontal cable manager may be used to support multiple patch panels as long as it is sized to match cable fill requirements. Cables must be able to access the cable manager so that no ports are blocked by the cables.

6. The horizontal cable manager shall be a single-sided C-shaped trough with a cover. 2U and 3U high cable managers shall have three edge-protected oval openings at the rear to facilitate front-to-rear cabling through the horizontal manager. The front of the cable manager shall have T-shaped cable guides along the top and bottom surfaces of the cable manager. Evenly spaced cable openings in between the T-shaped cable guides shall allow cables to enter/exit the cable manager from/into the rack-mount space. The cover shall be removable, hinged to open up or down and shall snap on to secure the cover in the closed position.

7. The horizontal cable manager shall be delivered individually boxed, and available in the width(s) and height(s) as specified below and in the contract documents.

8. The horizontal cable manager shall be manufactured from steel, aluminum and plastic.

9. Finish shall be epoxy-polyester hybrid powder coat paint in the color as specified below and in the contract documents. Edge-protectors, T-shaped cable guides and latch hardware is black.

10. Design Make shall be:
    Chatsworth Products, Inc. (CPI),
    Evolution™ Cable Management:

    Part Number 35441-701, Evolution Single-Sided Horizontal Cable Manager, 1U x 19”EIA x 8.2” Deep (208 mm), Black.
    Part Number 35441-702, Evolution Single-Sided Horizontal Cable Manager, 2U x 19”EIA x 8.2” Deep (208 mm), Black.
    Part Number 35441-703, Evolution Single-Sided Horizontal Cable Manager, 3U x 19”EIA x 8.2” Deep (208 mm), Black.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Vertical Cable Managers

1. Attach vertical cable managers to the side of the rack/frame using the manufacturer’s installation instructions and included hardware.
2. When a single vertical cable manager is used in between two racks/frames, attach the vertical cable manager to both racks/frames.
3. When more than one cable manager is used on a rack/frame or group of racks/frames, use the same make, style and size of vertical cable manager on the rack/frame or in between racks/frames.
4. The color of the rack(s)/frame(s) and cable manager(s) must match.
5. Doors shall be attached to the cable manager and in the closed position after cabling is complete.

B. Horizontal Cable Managers

1. When more than one horizontal cable manager is used on a rack/frame or group of racks/frames, use the same make and style of cable manager on the rack/frame or racks/frames.
2. The color of the rack(s)/frame(s) and cable manager(s) must match.
3. Attach horizontal cable managers to the rack/frame with four screws according to the manufacturer's installation instructions. Each cable manager shall be centered within the allocated rack-mount space (U).
4. Horizontal managers shall be located so that the number of ports (cables) that each manager supports shall not exceed each cable manager's cable fill capacity.
5. Covers shall be attached to the cable manager and in the closed position after cabling is complete.