

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
(Velocity™ 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 bolt to the side of racks/frames with included hardware. When placed between two racks, the cable manager shall bolt to the sides of both racks/frames with included hardware. The vertical cable manager and the included hardware must not utilize nor interfere with the front and rear EIA rack mount surfaces of the rack(s).
 3. The cable manager shall be sized to match cabling requirements. The maximum quantity of cables in the cable manager shall not exceed a whole number value equal to 50% of the interior storage area of the cable manager divided by the area of one cable. 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.
 4. The vertical cable manager shall be a single-sided C-shaped trough with a two-piece cover or a double-sided H-shaped trough with front and rear two-piece covers. The single-sided trough shall provide a single pathway. The sides of the manager shall be made of plastic (not metal). Four fixed position metal mid panels at the back of the manager shall allow attachment of cable management accessories (cable spools and management bars). The double-sided trough shall provide independent front and rear cable pathways. The sides of the manager shall be made of plastic (not metal). Four fixed position metal mid panels will separate the front and rear cable pathways and will hold cable management accessories. The back/middle of both managers shall be mostly open to allow easy cable pass-through.
 5. The vertical cable manager shall have cable openings along both sides of the trough. The openings shall be formed by evenly-spaced T-shaped cable guides. The T-shaped cable guides shall be made from a composite plastic

material (not metal) and shall have rounded edges to protect cables. 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 inch (6 mm) OD patch cords.

6. The covers shall be removable, shall snap onto the vertical manager and shall hinge open 95° to the right or left side. The covers on vertical managers that are 6 inches wide (152 mm) or less will be made from extruded black plastic. The covers on vertical managers that are 10 inches wide (254 mm) or wider will be made from steel sheet with plastic edge protectors.
7. The vertical cable manager shall feature a snap-together design that combines the sides and mid panels to form a top and bottom section and then connects the top and bottom sections together.
8. The cable manager shall be delivered unassembled and individually boxed and shall be available in several widths and heights as specified below and in the contract documents.
9. The vertical cable manager shall be manufactured from steel and plastic.
10. Finish shall be black epoxy-polyester hybrid powder coat paint on metal components and black plastic.
11. Optional internal cable management accessories will include cable management spools that attach to the mid-panels to provide slack management for patch cords; a cable lashing bar kit to provide tie points for cable bundles at the rear/middle of the manager; and a cable ring kit that creates a separate pathway on the back of single-sided managers.
12. Design Make shall be:
Chatsworth Products, Inc. (CPI),
Velocity™ Cable Management:

Part Number 13901-701, Velocity Single-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 3.6" Wide x 9.7" Deep (1778 mm x 91 mm x 246 mm), Black.

Part Number 13902-701, Velocity Single-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 6" Wide x 9.8" Deep (1778 mm x 152 mm x 249 mm), Black.

Part Number 13904-701, Velocity Single-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 10" Wide x 10.3" Deep (1778 mm x 254 mm x 262 mm), Black.

Part Number 13905-701, Velocity Single-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 12" Wide x 10.4" Deep (1778 mm x 305 mm x 264 mm), Black.

Part Number 13901-703, Velocity Single-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 3.6" Wide x 9.7" Deep (2045 mm x 91 mm x 246 mm), Black.

Part Number 13902-703, Velocity Single-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 6" Wide x 9.8" Deep (2045 mm x 152 mm x 249 mm), Black.

Part Number 13904-703, Velocity Single-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 10" Wide x 10.3" Deep (2045 mm x 254 mm x 262 mm), Black.

Part Number 13905-703, Velocity Single-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 12" Wide x 10.4" Deep (2045 mm x 305 mm x 264 mm), Black.

Part Number 13901-715, Velocity Single-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 3.6" Wide x 9.7" Deep (2311 mm x 91 mm x 246 mm), Black.

Part Number 13902-715, Velocity Single-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 6" Wide x 9.8" Deep (2311 mm x 152 mm x 249 mm), Black.

Part Number 13904-715, Velocity Single-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 10" Wide x 10.3" Deep (2311 mm x 254 mm x 262 mm), Black.

Part Number 13905-703, Velocity Single-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 12" Wide x 10.4" Deep (2311 mm x 305 mm x 264 mm), Black.

Part Number 13911-701, Velocity Double-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 3.6" Wide x 16.4" Deep (1778 mm x 91 mm x 417 mm), Black.

Part Number 13912-701, Velocity Double-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 6" Wide x 16.6" Deep (1778 mm x 152 mm x 422 mm), Black.

Part Number 13914-701, Velocity Double-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 10" Wide x 17.5" Deep (1778 mm x 254 mm x 445 mm), Black.

Part Number 13915-701, Velocity Double-Sided Vertical Cable Manager, For 6' High (1.8 m) 38U Racks, 70" High x 12" Wide x 17.8" Deep (1778 mm x 305 mm x 446 mm), Black.

Part Number 13911-703, Velocity Double-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 3.6" Wide x 16.4" Deep (2045 mm x 91 mm x 417 mm), Black.

Part Number 13912-703, Velocity Double-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 6" Wide x 16.6" Deep (2045 mm x 152 mm x 422 mm), Black.

Part Number 13914-703, Velocity Double-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 10" Wide x 17.5" Deep (2045 mm x 254 mm x 445 mm), Black.

Part Number 13915-703, Velocity Double-Sided Vertical Cable Manager, For 7' High (2.1 m) 45U Racks, 80.5" High x 12" Wide x 17.8" Deep (2045 mm x 305 mm x 446 mm), Black.

Part Number 13911-715, Velocity Double-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 3.6" Wide x 16.4" Deep (2311 mm x 91 mm x 417 mm), Black.

Part Number 13912-715, Velocity Double-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 6" Wide x 16.6" Deep (2311 mm x 152 mm x 422 mm), Black.

Part Number 13914-715, Velocity Double-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 10" Wide x 17.5" Deep (2311 mm x 254 mm x 445 mm), Black.

Part Number 13915-715, Velocity Double-Sided Vertical Cable Manager, For 8' High (2.4 m) 51U Racks, 91" High x 12" Wide x 17.8" Deep (2311 mm x 305 mm x 446 mm), Black.

Part Number 13935-701, Cable Spool Kit, For Velocity Cable Management, Vertical Cable Managers, Pack of 4, Black.

Part Number 13928-001, Cable Lashing Bar Kit, For Velocity Cable Management, Vertical Cable Managers, Zinc-Plate (Silver-Colored).

Part Number 13934-716, Cable Ring Kit, 3.6" Wide (91 mm), Pack of 6, For 70" High (1778 mm) Velocity Single-Sided Vertical Cable Manager P/N 13901-701, Black.

Part Number 13934-717, Cable Ring Kit, 3.6" Wide (91 mm), Pack of 7, For 80.5" High (2045 mm) Velocity Single-Sided Vertical Cable Manager P/N 13901-703, Black.

Part Number 13934-718, Cable Ring Kit, 3.6" Wide (91 mm), Pack of 8, For 91" High (2311 mm) Velocity Single-Sided Vertical Cable Manager P/N 13901-715, Black.

Part Number 13934-726, Cable Ring Kit, 6" Wide (152 mm), Pack of 6, For 70" High (1778 mm) Velocity Single-Sided Vertical Cable Manager P/N 13902-701, Black.

Part Number 13934-727, Cable Ring Kit, 6" Wide (152 mm), Pack of 7, For 80.5" High (2045 mm) Velocity Single-Sided Vertical Cable Manager P/N 13902-703, Black.

Part Number 13934-728, Cable Ring Kit, 6" Wide (152 mm), Pack of 8, For 91" High (2311 mm) Velocity Single-Sided Vertical Cable Manager P/N 13902-715, Black.

Part Number 13934-746, Cable Ring Kit, 10" Wide (254 mm), Pack of 6, For 70" High (1778 mm) Velocity Single-Sided Vertical Cable Manager P/N 13904-701, Black.

Part Number 13934-747, Cable Ring Kit, 10" Wide (254 mm), Pack of 7, For 80.5" High (2045 mm) Velocity Single-Sided Vertical Cable Manager P/N 13904-703, Black.

Part Number 13934-748, Cable Ring Kit, 10" Wide (254 mm), Pack of 8, For 91" High (2311 mm) Velocity Single-Sided Vertical Cable Manager P/N 13904-715, Black.

Part Number 13934-756, Cable Ring Kit, 12" Wide (305 mm), Pack of 6, For 70" High (1778 mm) Velocity Single-Sided Vertical Cable Manager P/N 13905-701, Black.

Part Number 13934-757, Cable Ring Kit, 12" Wide (305 mm), Pack of 7, For 80.5" High (2045 mm) Velocity Single-Sided Vertical Cable Manager P/N 13905-703, Black.

Part Number 13934-758, Cable Ring Kit, 12" Wide (305 mm), Pack of 8, For 91" High (2311 mm) Velocity Single-Sided Vertical Cable Manager P/N 13905-715, Black

B. Horizontal Cable Management for Racks/Frames
(Velocity™ 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 attach to the front or rear of the rack/frame with included screws and shall be sized to fit in standard 19" wide (482.6 mm) EIA-310-D (1-3/4" high U) rack-mount spacing.

3. 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. 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 other cables.
4. The horizontal cable manager shall be a single-sided C-shaped trough with a cover. Each manager will have two edge-protected openings at the rear to facilitate front-to-rear cabling. 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.
5. The horizontal cable manager shall be delivered assembled and individually boxed, and available in the height(s) as specified below and in the contract documents.
6. The horizontal cable manager shall be manufactured from black plastic and will include installation hardware.
7. Design Make shall be:
Chatsworth Products, Inc. (CPI),
Velocity™ Horizontal Cable Management:

Part Number 13930-701, Velocity Single-Sided Horizontal Cable Manager, 1U x 19"EIA x 5.9" Deep (150 mm), Black.
Part Number 13930-702, Velocity Single-Sided Horizontal Cable Manager, 2U x 19"EIA x 5.9" Deep (150 mm), Black.
Part Number 35441-703, Evolution Single-Sided Horizontal Cable Manager, 3U x 19"EIA x 5.9" Deep (150 mm), Black.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Vertical Cable Managers

1. 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.
2. The color of the rack(s)/frame(s) and cable manager(s) must match.
3. Attach vertical cable managers to the side of the rack/frame using the manufacturer's installation instructions and included hardware.
4. When a single vertical cable manager is used in between two racks/frames, attach the vertical cable manager to both racks/frames.
5. Dress cables through the openings in between the T-shaped guides on the manager so that cables make gradual bends as they exit or enter the cable manager into the rack-mount space (U). Do not twist, coil or make sharp bends in cables.
6. 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. Dress cables through the openings in between the T-shaped guides on the cable manager so that cables make gradual bends as they exit or enter the cable manager into the rack-mount space (U). Do not twist, coil or make sharp bends in cables.
6. Covers shall be attached to the cable manager and in the closed position after cabling is complete.