

## **271116-TC**

### Cabinets, Racks, Frames and Enclosures for Telecommunications Systems

#### **Part 1 - General**

##### **1.1 Work Included**

- A. Provide all labor, materials, tools and equipment required for the complete installation of work called for in the Construction Documents

##### **1.2 Scope of Work**

- A. This document describes the products and execution requirements relating to furnishing and installing Telecommunications Cabling. Communication Equipment Room Fittings of cabinets, racks, frames and enclosures are covered under this document.
- B. The Communication Equipment Room shall support a minimum of (4) 4-pair Unshielded Twisted Pair (UTP) Copper Cables to each work area outlet unless otherwise noted for specific locations. The cables shall be installed from the Work Area Outlet to the Telecommunications Room (TR) located on the same floor, and routed to the appropriate rack serving that area and terminated as specified in this document.
- C. This section includes minimum requirements for the following:
  - Cabinets
  - Racks and Rack Cable Management
  - Frames
  - Enclosures
- D. All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the telecommunications contractor as detailed in this document.
- E. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types will be provided as an attachment to this document. If the bid documents are in conflict, this specification shall take precedence. MAA/OT will assist in the design, layout and specification detail needed to clarify any ambiguity between this document and other

construction documentation. The successful vendor shall meet or exceed all requirements for the cable system described in this document.

### 1.3 Regulatory References

- A. The following industry standards are the basis for the structured cabling system described in this document.

#### **TIA/EIA**

TIA/EIA-568-B	Commercial Building Telecommunications Cabling Standard
TIA/EIA-569-A	Commercial Building Standard for Telecom Pathways and Spaces
TIA/EIA-606	Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
TIA/EIA-607	Commercial Building Grounding/Bonding Requirements

#### **NFPA**

NFPA-70	National Electric Code (NEC)-1999
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#### **ISO/IEC**

ISO/IEC 11801	Generic Cabling for Customer Premises
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- B. The most recent versions of all documents apply to this project. If there is a conflict between applicable documents, the order above shall dictate the order of precedence in resolving the issue unless an enforceable local or national code is in effect.

## 1.4 Racks

The Cable Management System shall be used to provide a neat and efficient means for routing and protecting fiber and copper cables and patch cords on telecommunication racks and enclosures. The system shall be a complete cable management system comprised of vertical cable managers, horizontal cable manager, and cable management accessories used throughout the cabling system. The system shall protect network investment by maintaining system performance, controlling cable bend radius and providing cable strain relief.

- A. Provide rack as shown on the Drawings and as specified in this section.
- B. The Rack system shall meet all EIA requirements as defined in EIA-310-D.
- C. Provide all mounting components and accessories to securely fix racks to floor and supporting walls. Provide overhead ladder rack fixed to the top of each rack and running from the top of the rack to the telephone backboard where the feeder and distribution cables run, as shown on the drawings. Provide cable bend management fixtures to maintain the proper bend radius as the cables drop into the rack. Do not allow cables to be unsupported as they run from conduit or cable tray to equipment cabinets. Racks to be seismically braced in accordance with local seismic bracing requirements. Racks are to be braced against sway on all three axes. Horizontal cable tray or other cable support that is also rated as a seismic brace may be used to meet some of the seismic bracing requirements.
- D. Each rack shall be UL listed for a load-carrying capacity of 1000 lbs. (454 kg.).
- E. Provide patch management ring runs in each rack. Provide (1) 2U high horizontal patch management between each panel of each rack.
- F. Provide side-mounted vertical cable management with covers on both sides of each rack. The cable management shall be with cover plates and bracket kits as needed to attach to adjacent racks.
- G. Provide strain relief and cable management at the rear of each rack to ensure uniform routing of all feeder and distribution cables.
- H. Each rack to have a minimum of eight power sockets mounted on a strip at the rear of the rack. The power outlets on the connector strip shall be NEMA 5-20R compatible. The plug shall be NEMA 5-20P compatible.

- I. The rack shall be manufactured from extruded aluminum and marked with Rack Unit spacing.
- J. Provide all racks with grounding kits and wires.
- K. Provide Raised Floor Rack Supports from rack manufacturer for all equipment racks mounted on raised "access" floor in the Server Room. Racks installed on raised floors are to be bolted through the raised floor directly into the concrete flooring below.
- L. The rack system solution shall provide integral cable management including vertical channels, pass through holes and slots for additional cable management accessories.
- M. Pass through holes shall be located on the front, back and side of the rack for maximum flexibility.
- N. Racks are to be threaded for #12-24 threads.

Part Number	Description	Rack Spaces
	19"x 7' 0" Rack	45
	Horizontal patch management at top of rack	1

Vertical cable managers shall include components that aid in routing, managing and organizing cable to and from patch panels and/or equipment. Managers shall protect network equipment by controlling cable bend radius and providing cable strain relief. Managers shall be a universal design mounting to EIA 19" or 23" racks and constructed of a base with cable management fingers.

The fingers shall include retaining tabs to keep cables in place during cover removal. The covers shall be hinged to open in either direction allowing for quick moves, adds, and changes (MAC).

Part Number	Type	Rack Spaces	Type	Max. Side Extension (in.)
	Front and Rear	45	High Capacity	6.55
	Center mount bracket kit	-	-	-
	Side Mount Kit	-	-	-

Horizontal cable managers shall include components that aid in routing, managing and organizing cable to and from patch panels and/or equipment. Panels shall protect network equipment by controlling cable bend radius and providing cable strain relief. Panels shall be a universal design mounting to EIA 19" racks and constructed with cable management fingers. The fingers shall include retaining tabs to keep cables in place during cover removal. The covers shall be easily removed or hinged to allow for quick moves, adds, and changes. The cable managers shall be provided with wire retainers to retain the cables during cover removal and #12-24 English and M6 metric mounting screws.

Part Number	Type	Rack Spaces	Max. Front Extension (in.)
	Front & Rear Duct	2	3.1

- 1.5 **Enclosures** – Wall mounted fiber optic enclosures.  
Rack mounted fiber optic

## Part 2 - Execution

### 2.1 Horizontal Distribution Cable Installation

Shall be installed in accordance with manufacturer's recommendations and best industry practices.

A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.

Cable raceways shall not be filled greater than the TIA/EIA-569-A maximum fill for the particular raceway type or 40% whichever greater.

Cables shall be installed in continuous lengths from origin to destination (no splices).

Where transition points, or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.

The cable's minimum bend radius and maximum pulling tension shall not be exceeded.

If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels.

Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.

Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the contractor shall install appropriate carriers to support the cabling.

Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.

Cables shall be identified by a self-adhesive or heat shrink label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA-606.

The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.

Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.

Pulling tension on 4-pair UTP cables shall not exceed 25-lbf for a four-pair UTP cable.

## **2.2 Horizontal Cross Connect Installation**

Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-B standard, manufacturer's recommendations and best industry practices.

Pair untwist at the termination shall not exceed 0.5”.

Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.

Cables shall be neatly bundled with no more than 48 cables per, and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.

The cable jacket shall be maintained as close as possible to the termination point, no more than 1”.

Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle velcro ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

### 2.3 Racks

Racks shall be securely attached to the concrete floor using minimum 3/8" hardware or as required by local codes.

Racks shall be placed with a 36-inch (minimum) clearance from the walls on all sides of the rack. When mounted in a row, maintain a minimum of 36 inches from the wall behind and in front of the row of racks and from the wall at each end of the row.

All racks shall be grounded to the telecommunications ground bus bar in accordance with Section Ground and Bonding for Communications Systems of this document.

Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.

Wall mounted termination block fields shall be mounted on 4' x 8' x .75" void free fire treated plywood. The plywood shall be mounted vertically 24" above the finished floor.