SECTION 27-11-16

COMMUNICATIONS CABINETS, RACKS, FRAMES AND ENCLOSURES

PART 1 – GENERAL

1.01 DESCRIPTION

A. The work covered by this section of the Specifications shall include all labor necessary to perform and complete such construction, all materials and equipment incorporated or to be incorporated in such construction and all services, facilities, tools and equipment necessary or used to perform and complete such construction. The work of this section shall include, but is not limited to, the following:

1. Fixed 2 Post 19” x 7’ equipment racks complete with all necessary installation hardware.

2. Fixed 19” equipment cabinets complete with all necessary installation hardware.

1.02 QUALITY ASSURANCE

A. Refer to Section 27-00-00 for general details.

1.03 CODES AND STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations in Section 27-00-00.

B. ANSI/EIA-310-D (Racks, Panels, and Associated Equipment).

C. NEBS-Telcordia GR-63-CORE Zone 4

1. Tested with 500 lbs. of equipment installed and 100 lbs. of simulated cable weight on the top.

1.04 SUBMITTALS

A. Refer to Section 27-00-00 for general details.

B. Shop Drawings:

1. Shop drawings shall show the position of the equipment racks in the TR/ER. Racks shall be dimensioned and the position of the rack or cabinet shall be dimensioned from (2) walls in each ER/TR. All TR/ER equipment rack layouts shall be reviewed and approved by the Cal Poly ITS Telecomm group prior to the ordering and/or installation of any product.

2. Shop drawings for equipment racks shall also show the method of attachment to the floor and to any overhead ladder rack. All cable management raceways for equipment racks shall be shown on the shop drawings.

C. Submit Manufacturer’s Cut Sheets for the following:

1. Any products not specifically listed in the PRODUCTS section shall require a submittal of the manufacturer’s cut sheets for approval by the Cal Poly ITS Telecomm group.
1.05 IDENTIFICATION
A. Each rack shall require a ½” white, permanent, polyester label with black ink denoting the rack designation.
B. Refer to Section 27-05-53 for additional details.
C. Refer to the Cal Poly Labeling, Design & Syntax Standard in Appendix B.

1.06 DEFINITIONS
A. N/A

1.07 WARRANTY
A. Refer to Section 27-00-00 for general details.
PART 2 – PRODUCTS

2.01 PRODUCT CONSISTENCY

A. Product Consistency: Any given item of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item will not be permitted.

2.02 EQUIPMENT RACKS SHALL BE AS FOLLOWS:

A. Racks shall be manufactured from aluminum extrusions.

B. Each rack shall have two L-shaped top angles, two L-shaped base angles and two C-shaped equipment-mounting channels. The rack shall assemble with bolt hardware. Equipment-mounting channels shall be threaded for easy assembly. The base angles shall be 3.88" x 6.0" x .375" thick, and will be pre-punched for attachment to the floor.

C. Equipment mounting channels shall be 3" deep x 1.265" wide x .25" thick and punched on the front and rear flange with the EIA-310-D Universal hole pattern.

D. When assembled with top and bottom angles, equipment-mounting channels shall be spaced to allow attachment of 19" EIA rack-mount equipment. Attachment points shall be threaded with 12-24 roll-formed threads. The rack will include assembly and equipment-mounting hardware. Each rack shall include 50 each combination Phillips type, pan head, pilot point mounting screws.

E. Top angle shall be 1.25" x 1.25" x .25" thick.

F. The assembled rack shall measure 7' (84") high, 20.32" wide, and 15" deep. The sides of the equipment-mounting channels shall have threaded mounting points to allow attachment of vertical cable managers along the sides of the rack.

G. The rack shall be rated for 1,000 lb. of equipment (minimum).

H. The rack shall be UL Listed.

I. Finish shall be (bare aluminum) silver/gray in color.

J. Manufacturer/Product: Chatsworth Universal Rack or Cal Poly ITS Telecomm group approved equal.

2.03 VERTICAL RACK MOUNT WIRE MANAGEMENT SHALL BE AS FOLLOWS:

A. Vertical Wire Manager

1. A combination, double-sided vertical cable manager

2. Front accessible side shall employ T-shaped cable fingers with rounded edges and include a contoured front door with easy-open knobs.

3. Rear accessible side shall consist of adjustable rear cable rings with spin open latches

4. Cable openings shall align with each rack-mount unit on the specified rack and pass 48 patch cords.

5. Color is to be black.
6. **Install one (1) 12” W x 20.2” D vertical wire manager between each rack in every rack row.**

7. **Install two (2) 6” W x 20.2” D vertical wire manager, one at each end of every rack row.**

8. Approved Manufacturer: Chatsworth 12” W x 20.2” D or Cal Poly ITS Telecomm group approved equal.

9. Approved Manufacturer: Chatsworth 6” W x 20.2” D or Cal Poly ITS Telecomm group approved equal.

10. **Vertical wire management shall be coordinated to be easily mountable to equipment rack selected.**

2.04 **HORIZONTAL RACK MOUNT WIRE MANAGEMENT SHALL BE AS FOLLOWS:**

A. **Fiber/Copper Jumper Crossover Trough**

1. Double-sided, 4RU, 19” EIA rack mount horizontal jumper trough for patch cables. One Trough shall be installed at the top of every 19” rack cabinet.

2. Radiused drop offs on each end of the tray.

3. Color is to be black.

4. Manufacturer/Product: ADC/Krone or Cal Poly ITS Telecomm group approved equal.

B. **Copper Cable Wire Manager**

1. **Provide single-sided, 2RU, 19” EIA rack mount, horizontal Cable Managers as required. One shall be installed in the 2U just under the Jumper Cross-over Trough and one additional cable manager under every station patch panel.**

2. Provides a side-to-side pathway that aligns with specified vertical managers.

3. Color is to be black.

4. Manufacturer/Product: Hubbell or Cal Poly ITS Telecomm group approved equal.

2.05 **WALL MOUNTED EQUIPMENT RACKS AND CABINETS (REQUIRES PRIOR ITS TELECOMM APPROVAL)**

1. In new construction projects wall mounted equipment racks and cabinets shall not be used. All telecommunications related resource requirements shall be provided by and from an established EF/TR/ER.

2. When the remodeling of existing structures is required, a TR/ER shall be constructed/established to exclusively house all telecommunications related equipment. In cases where the Cal Poly ITS Telecomm group agrees that it is not possible to create a separate TR/ER, the use of wall mounted and/or enclosed and lockable rack infrastructure may need to be considered. If so, such installations shall only be constructed using Cal Poly ITS Telecomm group reviewed and approved drawings and/or specifications. Final acceptance of the approved installation shall be the sole responsibility of the Cal Poly ITS Telecomm group.
PART 3 – EXECUTION

3.01 GENERAL

A. Location and placement of equipment racks shall be as shown on the Drawings, defined in the specifications and schedules and preapproved by the Cal Poly ITS Telecomm group.

B. Usage

1. 2 Post racks are the only rack type that shall be used within designated ERs/TRs.

2. Two post racks shall be used in all other secured, dedicated, locked, and environmentally controlled areas.

3. Enclosed and lockable cabinets shall be used in environmentally controlled but public areas.

C. Equipment racks and cabinets shall be assembled and installed as per the manufacturers’ printed instruction and meet all Seismic Zone 4 requirements.

D. Any excess length of bolts or threaded rods shall be trimmed to no more than ½” past the nut and de-burred. Preferred style of attachment is “drop-in” style threaded inserts if allowed.

E. Project designs requiring enclosed and/or lockable cabinets shall be submitted to the Cal Poly ITS Telecomm group for review and approval prior to the purchase and/or installation of material.

3.02 QUANTITIES

A. Quantities and sizes of rack equipment and components shown on the Drawings are illustrative only and are meant to indicate the general configuration of the work. The Contractor is responsible for providing the correct quantities of all materials necessary to accommodate the equipment and to terminate, cross connect and patch the volume of cable described in these specifications and schedules and shown on the Drawings.

B. Quantities of Wire Managers

1. Vertical Wire Managers

   a. Rooms with 2 racks will have two 6” and one 12” vertical wire managers.

   b. Rooms with 3 racks will have two 6” and two 12” vertical wire managers.

   c. Rooms with 4 racks will have two 6” and three 12” vertical wire managers.

   d. Rooms with 5 racks will have two 6” and four 12” vertical wire managers.

2. Horizontal Wire Managers

   a. Each 2 post rack shall include a minimum of two, 2RU Horizontal wire managers and one Fiber Radiused Cross-over Trough installed at the top

   b. Wall cabinet or wall rack installations shall use 1RU wire management in such quantities as required by the Cal Poly ITS Telecomm group.
3.03 INSTALLATION

A. Follow manufacturer’s installation instructions for compliance with referenced Seismic Zone 4 requirements.

B. If any part of the project requires equipment racks to be installed in a raised floor application or requires auxiliary supports for which no Manufacturer’s installation details are available allowing for compliance with the referenced seismic standards, the Contractor must provide an alternate installation approved by a structural engineer.

C. Equipment racks and wall cabinets must be mounted and approved by the AHJ, as to appropriateness for anticipated equipment loads. Any proposed reinforcement shall be the responsibility of the Contractor.

D. Wall cabinets and wall racks shall be mounted such that there are no obstructions or impediments to the full opening radius of the enclosure.

E. Wall cabinets and wall racks shall be mounted such that they do not obstruct access to any other junctions, pull boxes, control panels, cabinets, etc.

3.04 GROUNDING & BONDING

A. All racks and cabinets shall be individually grounded to the TGB/TMGB with a #6 AWG copper bonding conductor.

B. Refer to Section 27-05-26 for additional details.

3.05 TESTING

A. None required unless specified by AHJ or other contract requirements.

3.06 ACCEPTANCE

A. Once the installation has been completed and the Cal Poly ITS Telecomm group representative is satisfied that all work is in accordance with the Contract Documents, the representative shall notify the Contractor and/or Cal Poly Project Manager in writing or via email.

3.07 RECORD (AS-BUILT) DRAWINGS

A. The Project Record Drawings shall show the types and locations of installed equipment racks and (if allowed by the Cal Poly ITS Telecomm group) wall cabinets.

END OF SECTION
## DOCUMENT VERSION CONTROL

<table>
<thead>
<tr>
<th>REVISION</th>
<th>DATE</th>
<th>AUTHOR</th>
<th>REASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09/10/2013</td>
<td>R. VOLK</td>
<td>INITIAL DOCUMENT DEVELOPMENT</td>
</tr>
<tr>
<td>2</td>
<td>09/20/2013</td>
<td>DW &amp; MH</td>
<td>PRIMARY REVIEW COMPLETE</td>
</tr>
</tbody>
</table>