SECTION 27-11-20

COMMUNICATIONS FIBER CABINETS, ADAPTERS AND CONNECTORS

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. ER/TR fiber optic termination system complete with all necessary installation hardware.

1.02 QUALITY ASSURANCE

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

B. As noted in Section 27-00-00, all contractors and installers working on structured cabling system elements shall hold a current manufacturer’s certification for each individual component they install.

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/TIA-568-C.3

C. The Cal Poly ITS Telecomm Labeling, Design & Syntax Standards in Appendix B.

1.04 SUBMITTALS

A. Also refer to Section 27-00-00.

B. Shop Drawings:

1. Shop drawings shall show the locations of fiber optic terminations and the end points of each cable.

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 and approval of the Cal Poly ITS Telecomm group.

1.05 IDENTIFICATION

A. Fiber Cabinets shall be labeled with ½” white permanent polyester with black labeling. Detail shall be provided in the Cal Poly I.T.S. Telecomm Labeling, Design & Syntax Standards in Appendix B.
1.06 DEFINITIONS
   A. N/A

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

B. Refer to Section 27-05-53 for additional 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 FIBER OPTIC TERMINATION CABINET (RACK MOUNT) SHALL:

A. Be constructed of 16 gauge steel with black powder coat finish
B. Be fully enclosed 19” rack mountable cable management type patch cabinets.
C. Have a Plexiglas locking front panel. Labeling and connectors shall be clearly visible with front panel open or closed.
D. Have a lockable, removable rear access panel.
E. Be modular and accept a variety of inter-changeable bulkheads as well as attenuators, capable of holding “ST”, “SC” and “LC” barrel connectors.
F. Have an integrated front cable management trough.
G. Employ Trays and modules that provide a means to avoid exceeding the cable manufacturer’s minimum bending radius to protect against crimping or over bending.
H. Provide full rubber grommets for dust protection at all cable entry and exit points.
I. Provide accommodation for labels identifying optical fiber splices and terminations.
J. Approved Manufacturer: Panduit or Cal Poly ITS Telecomm approved equal.
K. Approved Manufacturer: Panduit or Cal Poly ITS Telecomm approved equal.

2.03 FIBER OPTIC TERMINATION CABINET FOR HARSH ENVIRONMENTS SHALL: (WALL MOUNT-REMODEL ONLY)

A. Constructed of 16 gauge steel with black powder coat finish
B. Accommodate snap-in adapter plates and cassette modules
C. Provide removable, a lockable hinged door
D. Provide two-tier fiber storage hoops for fiber management
E. Provide top and bottom accesses have cable tie-downs/strain relief and full grommets
F. Provide lockable inner door that is removable.
G. Meet NEMA 12 rated requirements.
H. Approved Manufacturer/Product: Submit product for approval by the Cal Poly ITS Telecomm group.
2.04 FIBER OPTIC TERMINATION CABINET FOR SPACE CONSTRAINED TERMINATION SHALL:
A. Be constructed of 16 gauge steel with white or black powder coat finish
B. Accommodate snap-in bulkhead adapter plates
C. Include a lockable hinged door
D. Provide top and bottom access, have a cable tie-down/strain relief and full grommets
E. Approved Manufacturer: Lucent Technologies or Cal Poly ITS Telecomm approved equal.

2.05 BULKHEADS - BARREL CONNECTORS SHALL:
A. Barrel connectors shall have ceramic alignment sleeves for single-mode and phosphor bronze sleeves for multimode.
B. Bulkheads shall be removable from the front of the cabinet, and shall be of a tool-less design.
C. Barrel connectors shall provide dust caps for every connector.
D. Barrel connectors shall be type LC, ST, or SC as defined in ANSI/TIA/EIA-568. E. Max insertion loss across mated pair shall be less than .5db.
F. Approved Manufacturer: Panduit (50µm Multimode) or Cal Poly ITS Telecomm group approved equal.
G. Approved Manufacturer: Panduit (Single Mode) or Cal Poly ITS Telecomm group approved equal.

2.06 CONNECTORS (RISER/TIE/OSP/STATION FIBER OPTIC CABLE)
A. Factory applied connectors on pigtails shall be available in 12 colors and shall be 6 feet in length each.
B. All pigtails shall be fusion-spliced
C. Shall have a maximum insertion loss across mated pair: less than .5db.
D. Shall consist of optical Fiber: ST (62.5 µm) Multimode: Color shall be Beige
   LC (50 µm) Multimode: Color shall be Aqua
   SC Single Mode: Color shall be Blue
E. Approved Cable Manufacturers: Commscope, Corning, Pirelli, Belden or Cal Poly ITS Telecomm group approved equal.
F. Approved Pigtail Manufacturers: Gruber, Infinity or Cal Poly ITS Telecomm group approved equal.

2.07 FIBER FUSION SPLICE CASE W/ SPLICE TRAYS (OSP TO RISER FIBER)
A. Shall require no special tools.
B. Shall be re-enterable mechanical cable and O-ring equipped closure sealing system
C. Shall provide multiple, expandable, split grommets, and wide opening cable ports.
D. Shall accept a range of cable sizes.
E. Approved Manufacturer: Preformed Line Products or Cal Poly ITS Telecomm approved equal.

2.08 GENERAL
A. The Contractor shall place all optical fiber backbone cabling in accordance with these specifications, and as indicated on the cable schedules and the Drawings.
B. Rack mounted cabinets shall be used in ERs/TRs. Wall mounted cabinets shall be used outside of ERs/TRs if design is approved by the Cal Poly ITS Telecomm group.
C. Provide 50’ slack loops at the ER/TR end of all OSP cables over 12 strands, and 20’ slack loops at the ER/TR end of all other cables.
D. Provide 72” of stripped fiber wrapped neatly at each fiber cabinet.
E. Provide 72” of stripped fiber at the outlet end of any station fiber.
F. All fiber terminations are to utilize color coded (blue for SC single mode and aqua for 50µm multimode duplex LC) connectors unless otherwise noted.
G. Multiple fiber cables shall be installed into fiber cabinets as directed and approved by the Cal Poly ITS Telecomm group.
H. Termination of fiber optic cables for use by the Fire Alarm System shall not to be terminated in an ER/TR/EF. Termination of fiber for the FACP end of Fire Alarm System cable shall be done directly in the fire alarm panel or other non-telecomm space location if directed by the AHJ.
I. No patch cables shall be installed until after the fiber optic test reports have been reviewed and accepted by the Cal Poly ITS Telecomm group.

2.10 QUANTITIES
A. Quantities of system elements 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 materials to construct a system that meets the intent of these Specifications and the relevant codes.

2.11 INSTALLATION
A. Cabinets
1. Rack location details (including elevation) for fiber cabinet mounting shall be approved by a Cal Poly ITS Telecomm group representative prior to installation.
2. After dressing the cable to its final destination, the sheath shall be removed to a point that allows the optical fiber strands to be splayed and terminated in a neat and uniform fashion.
3. All fiber cabinets shall employ factory provided, appropriately sized grommets for all openings.
4. All unused bulkhead openings shall be filled with blank plates.
B. Connectors
   1. **Terminations of fiber pigtails shall be by fusion splices only.** Fibers will be terminated in strict compliance with the manufacturer’s printed instructions.
   2. Maximum length deferential between terminated strands per bundle shall be 6”. If the length does not meet this requirement the entire bundle must be re-terminated.

C. Gel Filled Cables
   1. All gel filled cables will require use of a gel blocking sealant at any point that the gel is exposed.
   2. Follow all manufacturers’ specifications for proper application of gel block sealant.

D. Fiber Optic Splices
   1. In general, optical fiber cables shall not to be spliced unless otherwise noted.
   2. Where splicing is indicated, all optical fiber cable splicing shall be fusion spliced.
   3. Fiber optic cables shall never to be spliced in any outside or underground structure.
   4. Only one type of fiber (SM or MM) shall occupy each individual fiber splice tray.
   5. Mount splice case so it is fully supported on the wall, and available at a working height.
   6. Maintain sufficient slack to enable splice case to be removed from the wall for service.

2.12 GROUNDING & BONDING
   A. Any use of armored cable shall require the bonding of that shield to the TGB/TMGB with a #6 AWG copper bonding conductor.
   B. Refer to Section 27-05-26 for additional details.

2.13 TESTING
   A. Refer to Specification Section 27-08-23.

2.14 ACCEPTANCE
   A. The fiber cabinet shall be labeled per specifications. See Cal Poly I.T.S. Telecomm Labeling, Design & Syntax Standards in Appendix B.
   B. Once the installation and testing 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 will notify the Contractor and/or Cal Poly Project Manager in writing or via email.

2.15 RECORD (AS-BUILT) DRAWINGS
   A. None Required.

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>12/20/2013</td>
<td>R. VOLK</td>
<td>INITIAL DOCUMENT DEVELOPMENT</td>
</tr>
<tr>
<td></td>
<td>12/20/2013</td>
<td>DW&amp;MH</td>
<td>PRIMARY REVIEW COMPLETE</td>
</tr>
</tbody>
</table>