

SECTION 27-15-23 FIBER OPTIC STATION CABLES

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. Optical fiber station cabling

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, STANDARDS AND GUIDELINES

- 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. The Cal Poly ITS Telecomm group, Telecommunications Standards Document and the Labeling, Design & Syntax Standards in Appendix B.

1.04 SUBMITTALS

- A. Refer to Section 27-00-00 for general details.
- B. Shop Drawings:
 - 1. Shop drawings shall show the locations where cables are to be routed and where terminating hardware is to be installed.
- C. Submit Manufacturer's Cut Sheets for the following:
 - 1. Any products not specifically listed/approved in the PRODUCTS section shall require a submittal of the manufacturer's cut sheets and approval by the Cal Poly ITS Telecomm group.

1.05 IDENTIFICATION

- A. The label shall be 1" white (permanent) polyester/nylon with black ink.
- B. Labels containing a unique cable ID designator shall be placed on both ends of all cables, 6 inches from the termination and/or patch panel.
- C. Subsequent to placing and terminating cables, the Contractor shall place all cable labels as noted above.

- D. If at any time during the job the cable tag becomes illegible or removed for whatever reason, the Contractor shall immediately replace it with a duplicate pre-printed cable label at the Contractor's expense.
- E. All cable labels shall be easily accessible, both physically and visually, upon completion of the job.
- F. Refer to Section 27-05-53 for additional details.

1.06 DEFINITIONS

- A. CMP: Communications Plenum Cable
- B. CMR: Communications Riser Cable
- C. MPP: Multipurpose Plenum Cable
- D. OFNP: Optical Fiber Nonconductive Plenum Cable
- E. OFCP: Optical Fiber Conductive Plenum Cable
- F. LSZR: Low Smoke Zero Halogen Rated Cable
- G. OM1: Defined by ISO 11801 & TIA-492-AAAA, 62.5/125 μm multimode fiber. (old Campus Standard)
- H. OM2: Defined by ISO 11801 & TIA-492-AAAB, 50/125 μm multi-mode fiber.
- I. OM3: Defined by ISO 11801 & TIA-492-AAAC, laser-optimized 50/125 μm multi-mode fiber
- J. OM4: Defined by TIA-492-AAAD, laser-optimized 50/125 μm multi-mode fiber (new Campus Standard)

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, unless specifically noted otherwise.

2.02 FIBER OPTIC CABLES – GENERAL

- A. Cable jacket marking: Shall be legible and shall contain the following information:
 - 1. Manufacturer's name and/or trade mark
 - 2. Strand count
 - 3. Cable Type
 - 4. UL listing
 - 5. Sequential distance markings, in one foot increments
- B. ***All multimode shall be OM4, 50 μm multimode fiber.***
- C. ***All single-mode shall be zero water peak single mode fiber.***

2.03 FIBER OPTIC STATION CABLE (2 STRAND MULTIMODE)

- A. Cable shall be plenum rated, tight buffered, 1.6mm zip cord with strippable jacket and high tensile strength yarn layer.
- B. Jacket color shall be **aqua**.
- C. Approved Manufacturer: Commscope or Cal Poly ITS Telecomm group approved equal

2.04 FIBER OPTIC STATION CABLE (2 STRAND SINGLEMODE)

- A. Cable should be plenum rated, tight buffered, 1.6mm zip-cord with strippable jacket and high tensile strength yarn layer.
- B. Jacket color shall be **yellow**.
- C. Approved Manufacturer: Commscope or Cal Poly ITS Telecomm group approved equal

2.05 FIBER OPTIC STATION CABLE – FLOOR OUTLET (2 STRAND MULTIMODE)

- A. Non-Armored Jacket shall be plenum and OSP rated.
- B. Cable shall have aramid yarn and zip-cord immediately underneath jacket.
- C. Internal structure shall include water barrier layer and a central dielectric strength member.
- D. Jacket color shall be **black**.
- E. Approved Manufacturer: Commscope or Cal Poly ITS Telecomm group approved equal

2.06 FIBER OPTIC STATION CABLE – FLOOR OUTLET (2 STRAND SINGLEMODE)

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- B. Cable shall have aramid yarn and zip-cord immediately underneath jacket.
- C. Internal structure shall include water barrier layer and a central dielectric strength member.
- D. Jacket color shall be **black**.
- E. Approved Manufacturer: Commscope or Cal Poly ITS Telecomm group approved equal

PART 3 – EXECUTION

3.01 GENERAL

- A. Fiber optic station cables shall be used between the TR/ER and outlets serving user spaces or end user devices.
- B. Location, fiber count and placement detail for all fiber optic cables shall be as shown on the Drawings. C. Provide 20' slack loops at the TR end of all fiber optic cables.
- C. Provide 72" of stripped strands fiber wrapped neatly at each fiber cabinet.
- D. Provide 36" of stripped strands fiber wrapped neatly at each fiber outlet.
- E. Insure all fiber optic cables, as installed, are not subject to strain, and that correct bend radii are maintained at all times.
- F. Fiber optic station cables and copper cables may share conduit with approval of the Cal Poly ITS Telecomm group.

- G. ***Do not terminate fiber until after the rack locations and elevations of fiber cabinets have been reviewed and approved by the Cal Poly ITS Telecomm group representative.***

3.02 QUANTITIES

- A. Quantities of system elements shown on the Drawings are illustrative only and shall indicate the general configuration of the work. The Contractor shall be responsible for providing the correct quantities of materials to construct a system that meets the intent of these Specifications and the relevant codes.

3.03 INSTALLATION

- A. Optical Fiber Station Cables:
1. Provide support for vertical runs of fiber optic riser cables.
 2. Route fiber optic cables over telecom ladder racking.
 3. Route fiber optic station cables together as a single bundle, not to be combined with copper or coax cabling.
 4. Installation of all fiber optic cables shall require the use of a breakaway swivel rated to the cable manufacturer's written specifications for pull strength.
 5. Follow all manufacturers' specifications for installation.
- B. Connector Installation
1. Terminate both ends of each fiber cable with an appropriate fusion spliced factory terminated pigtail type connector. Fiber strands shall be terminated in strict compliance with the manufacturer's printed instructions.
 2. ***Maximum length deferential between terminated strands shall be 1". If the length does not meet this requirement the cable shall be re-terminated.***
 3. Connectors for cables utilizing aramid yarn as a strength member shall integrate the yarn into the termination per manufacturer's written specifications.
 4. Connector type for single mode fiber shall be SC with LC connectors used for multimode cable.
 5. ***Fiber optic cable shall only be terminated using fusion splices with pig-tails. Field polished direct connections shall not be allowed.***
- C. Slack Loop
1. Slack loop at faceplate/outlet shall utilize integrated slack loop hardware.
 2. Slack loop in EF/TR/ER shall be mounted on the wall.
 3. ***Slack loop storage location shall be designated by the Cal Poly ITS Telecomm group representative.***

3.04 GROUNDING & BONDING

- A. None Required

3.05 TESTING

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

3.06 ACCEPTANCE

- A. 100% of the fiber tested shall meet requirements for the whole of the fiber installation to be accepted.
- B. Upon receipt of the Contractor's documentation of cable testing, the Cal Poly ITS telecomm group representative will review/observe the installation and randomly request tests of the cables installed. 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.

3.07 RECORD (AS-BUILT) DRAWINGS

- A. The Project Record Drawings shall show the types and locations of all fiber optic cabling and fiber optic termination points. Drawings shall include identifying information as stated on the cable labels.

END OF SECTION

DOCUMENT VERSION CONTROL

REVISION	DATE	AUTHOR	REASON
1	02/20/2014	R. VOLK	INITIAL DOCUMENT RECREATION
	02/20/2014	DW & MH	PRIMARY REVIEW COMPLETE