

SECTION 271700 – INTERIOR FIBER OPTIC CABLE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. This Section specifies the fiber optic cabling system for buildings and structures.
 - 2. Provide all labor, materials, and equipment as necessary to complete all work as indicated on the drawings, and as specified herein.
 - 3. The Contractor shall furnish and install a complete fiber optic cabling system with all necessary components for a complete system as described in the specification and shown on the drawings.
- B. Related Sections include the following:
 - 1. Applicable sections of Division 26 - Electrical

1.3 SYSTEM DESCRIPTION

- A. Installation of new fiber optic communication cable including all terminations and outlets for a complete system.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Fiber optic cables
 - 2. Equipment racks, enclosures, patch panels, and all related components
 - 3. Outlets

1.5 QUALITY ASSURANCE

- A. The fiber optic cables shall be installed under the supervision of an installer having a minimum of five years experience in fiber optic cable installation under this type of application.

- B. All fiber optic connections and terminations shall be made by a fiber optic technician with a minimum of two years experience in similar installations.
- C. The contractor assumes responsibility for ensuring the electrical and mechanical integrity of the combination of components used in the system. Any components which are not engineered suitably for the devices to which they are attached shall be subject to exchange before or after installation at the Contractor's expense. All components shall be operated within the manufacturer's specifications without modification.
- D. The Contractor shall test each fiber to be used in the system using an OTDR. The test shall be performed at the installation site with cables on reels. An authorized Owner representative shall be present during the entire testing phase. The test data shall be submitted to the Project Representative prior to cable installation.
- E. On-reel tests shall consist of OTDR traces for each multi-mode fiber at 850 and 1300 nm. Photographic or hardcopy traces shall be submitted to the Owner for approval.
- F. After installation, Proof-of-Performance tests shall be performed and documented as described in Section 260800.

Use the following paragraph when new cable is installed adjacent to existing broadband cable and/or installed in existing broadband outlet boxes.

- G. In some cases the new cable will be installed in the vicinity of the existing broadband cable. The broadband cable system is fully functional with no abnormalities. At the conclusion of the project, the Owner will test the broadband system and if any problems are identified the Owner will repair the system at the Contractors expense

PART 2 - PRODUCTS

2.1 FIBER OPTIC CABLES

- A. All fiber optic cables not installed in conduit shall have as a minimum the rating required by the NEC for the space in which they are to be installed.
- B. The new fiber optic cable shall be Belden LANLite, six fiber, 62.5 micron fibers, 900 micron buffers, non-breakout, with a Kevlar central strength member and Kevlar strength member over the fibers, and overall PVC jacket, catalog number 550265.
- C. All fibers in the cable must be usable fibers and meet or exceed the fiber specifications contained in the project document.
- D. All optical fibers shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification.

2.2 FIBER OPTIC PIGTAILS AND CONNECTORS

- A. Pigtails shall be defined as a length of fiber with a connector on only one end. Pigtails shall be:
 - 1. Siecor Fiber Optic Cable Assembly, part number 5000-01K3141-003M (multi- mode)
- B. All new pigtails and jumpers shall have a length of at least 3 meters or be sufficient to reach the entire length of the fiber optic rack or cabinet, whichever is greater.
- C. All pigtails shall be labeled with a durable label in accordance with the labeling scheme described in Execution and as shown on the drawings.
- D. Pigtails shall be factory assembled production units.
- E. The maximum loss of any pigtail's connector shall be 0.30 dB.
- F. The optical return loss for each pigtail's connector shall be greater than 30 dB.
- G. Pigtails shall be fusion spliced to the fiber optic cable.
- H. The maximum loss of any splice shall be 0.20 dB.
- I. Splice procedure shall be suitable for the cable used and as recommended by the cable manufacturer.
- J. All splices shall be contained in splice trays.
- K. Provide dust caps for all connectors and adapters. Leave dust caps on site after connections are made.

2.3 EQUIPMENT

- A. All hardware installed in plenums shall be approved by the Underwriters' Laboratory (UL) for safe use in environmental air spaces without conduit.
- B. Fiber optic connector/splice panels shall be mounted in existing racks or new racks as provided for Category 5 cables.

Include items from 264113 Lightning Protection as necessary and modify above paragraph.

2.4 CONNECTOR PANELS AND SPLICE TRAYS

- A. Connectors shall terminate in a combination splice/connector panel. Connector panels shall be Siemon FCP-DWR-1 with one fusion splice tray and all necessary manufacturer recommended components for a complete and secure installation.

- B. Provide one splice/connector panel for each patch panel rack and main telephone rooms.
- C. Connector panels shall accommodate up to 16 ST adapters. Adapters shall be labeled and documented accordingly.

PART 3 - EXECUTION

3.1 GENERAL

- A. All equipment shall be installed and firmly secured in place per manufacturers recommendations.
- B. Consideration shall be given for operational efficiency and aesthetic factors in the installation of equipment and cables.
- C. The minimum bend radius of the fiber optic cable shall be 10 times the cable O.D. or as rated by the manufacturer; which ever is greater. Minimum bend radius shall be observed at all times.
- D. Cable manufacturer's recommendations shall be followed during installation of cable. Pull force shall be monitored and shall not exceed manufacturer's ratings.
- E. Precautions shall be taken to avoid imparting twist or torque to the cable during installation. Implement the use of pulling swivels and figure-eighting the cable as required.
- F. Cable endcaps shall be used at all times possible to prevent moisture from entering cable.
- G. Following cable pull-in, the cable end to which the cable puller is fastened shall be removed and discarded. A minimum of two meters of cable shall be removed.
- H. Cable pulling compounds shall be compatible with the fiber optic cable in accordance with cable manufacturers recommendation.

3.2 CABLE

- A. Cables located inside buildings shall be installed in conduit to the designated communication rooms.
- B. A new cable tray shall be installed in each communication room to train the cables over to the communication racks. Ends of trays shall be supported from the wall. Trays longer than 10' shall also be supported at tray midspan from the deck above. The fiber optic cable shall be installed in the tray separate from the twisted pair cable to avoid having the twisted pair cable bear any weight on the fiber optic cable.
- C. A 30' service loop of cable shall be provided in the cable tray above each fiber optic cabinet.

- D. The cable shall be properly secured at the Fiber Splice Center using manufacturers recommended means for attachment.
- E. All fiber must be looped in the splice trays between the point of fiber entry and the splice. Sufficient spare fiber must be provided to permit replacement of the splice at a future date.
- F. Arrangement of the components in the fiber rack and cabinets shall be approved by the Owner prior to installation.
- G. Install one new connector/splice panel in each communication room in the communication rack.
- H. Each new fiber end shall be fusion spliced to a pigtail. Pigtails shall be used for linking to the connector panel.
- I. In each connector/splice panel, each pigtail shall be labeled with the color codes of the fiber to which it is spliced. (Example: ORG/GRN for orange tube/green fiber.) The labels shall be near the connector.
- J. In each connector/splice panel, each cable shall be labeled with the room name from which the cable came.

END OF SECTION 271700