

SECTION 27 13 00
COMMUNICATION SYSTEMS BACKBONE CABLING

PART 1 - GENERAL

DESCRIPTION OF WORK **NOTE: BACKBONE CABLING ~~IS~~ SHALL BE DELETED AS PART OF ALTERNATE 4. RACEWAYS SHALL BE PROVIDED PER SECTION 27 05 33, REACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS.**

1.1

- A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.
- B. The Contractor shall provide all equipment, materials, labor, and services necessary to complete the backbone cabling system, and to ensure that it is in compliance with requirements stated or reasonably inferred by the Specifications and the Contract Drawings.
- C. Backbone cabling includes inter-building (Outside Plant) and intra-building (Premise) copper and fiber optic cabling.
- D. This section includes minimum requirements for the following.
 - 1. Multimode Loose Tube Fiber Optic Cabling - Indoor/Outdoor
 - 2. Multi-Pair Copper Cabling - Premise.

1.2 RELATED SECTIONS AND DOCUMENTS

- A. See Specification Section 27 11 00 "Communication Equipment Rooms" for backbone fiber cable termination cabinets and backbone copper patch panels.

1.3 REGULATIONS AND CODE COMPLIANCE

- A. Materials and work specified herein shall comply with the requirements of Specification Section 27 01 00 1.4 and in particular the following code requirements
 - 1. ANSI/TIA-568-C.0 - Generic Telecommunications Cabling for Customer Premises.
 - 2. ANSI/TIA-568-C.1 - Commercial Building Telecommunications Cabling Standard.
 - 3. ANSI/TIA-568-C.3 - Optical Fiber Cabling Components Standard.
 - 4. ANSI/TIA-606-A -- The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
 - 5. ANSI-J-STD-607-A -- Commercial Building Grounding (Earthing) and Bonding ANSI/NFPA-70, 2005 -- National Electrical Code (NEC).
 - 6. Underwriter's Laboratories, Inc. (UL).

1.4 QUALITY ASSURANCE

- A. All materials shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the Specifications shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacturer indicated. The equipment specified is based upon the acceptable manufacturers listed.
- B. All fiber optic cabling and related fiber termination equipment shall be installed by a trained technician with a minimum of (2) years experience in the termination of fiber optic cabling. The technician will have received training through a nationally recognized program offered by BICSI, Corning, AT&T, 3M or equivalent. The contractor shall provide all specialized tools required for proper installation.

1.5 SUBMITTALS

- A. Submit manufacturers' data sheets for the following.
 - 1. Multimode Loose Tube Fiber Optic Cabling - Indoor/Outdoor
 - 2. Multi-Pair Copper Cabling - Premise.

- B. Bill of Materials: Submit a detailed bill-of-materials listing all manufacturers, part numbers, and quantities proposed for use on this project.
- C. Submit all factory test information of cables prior to installation of the product.

1.6 DELIVERY, STORAGE & HANDLING

- A. Visually examine cable spools and boxes for damage after delivery to the jobsite prior to installation. Visibly damaged goods are to be returned to the supplier and replaced at no additional cost to the Owner.

1.7 GUARANTEE

- A. The outside plant (OSP) and premise fiber optic cabling including fiber termination cabinets, fiber connectors, fiber optic patch cords, etc. shall be covered by a 25-year system warranty from Corning LANScape, AFL Telecommunications or equal.

PART 2 - PRODUCTS

2.3 MULTIMODE LOOSE TUBE FIBER OPTIC CABLING - INDOOR/OUTDOOR

- A. Provide cables with fiber strand counts as shown on the drawings.
- B. Fiber optic cables shall be loose tube with a 50/125µm-core/cladding diameter.
- C. Fiber optic cables shall have an aqua colored jacket.
- D. Fiber optic cabling shall be indoor/outdoor rated and suitable for underground duct installation.
- E. Fiber optic cable shall be laser optimized and rated for 10 Gigabit Ethernet at a distance of 300 meters.
- F. Fiber optic cable shall comply with the requirements of ANSI/TIA/EIA-568-B.3 Addendum 1 "Additional Transmission Performance Specifications for 50/125 µm Optical Fiber Cables".
- G. Maximum attenuation and bandwidth characteristics.
 - 1. Maximum attenuation 3.0/1.0 dB/Km @ 850/1300 nm.
 - 2. Bandwidth 3000 MHz-km @850 nm.
 - 3. Bandwidth 500 MHz-km @1300 nm.
- H. Physical Characteristics.
 - 1. Cable will have 900 µm buffer with mechanically strippable PVC jacket.
 - 2. The designation "UL" and either "OFNP" or "OFNR" shall be printed on the jacket with length markings every 2'-0".
 - 3. The cable shall have individual fiber tube colors per TIA/EIA-606 and overall orange jacket.
 - 4. The cable shall contain an aramid yarn strength member with cables stranded around center.
 - 5. The cable shall be suitable for temperatures of -20° to +70° C.
- I. Acceptable Products:
 - 1. Corning LANScape Freedom LST Gel Free Cable P/N 048SSF-T4180D20.
 - 2. AFL Telecommunications LV048LC5101N1.
 - 3. Or equal.

2.4 MULTIMODE FIBER OPTIC CONNECTORS

- A. Fiber connectors shall be factory installed with 12F MM pigtails and shall be fusion spliced to the backbone cabling. Connectors shall be provided with duplex LC adapter panels compatible with the fiber termination cabinets. Provide quantity of connectors and adapters to terminate all backbone fiber optic cabling.
- B. Provide duplex LC style connectors with a zinc body and ceramic tip suitable for use with specified multimode optical fiber.
- C. Provide quantity of pigtails to terminate all backbone fiber optic strands.
- D. The maximum insertion loss across mated pairs of connectors shall be less than 0.5 dB at 1300 nm.

E. The connectors shall sustain a minimum of 500 mating cycles without degrading this performance.

F. Acceptable Products:

1. Premise 12-Strand 50/125 Laser Optimized MM Fiber - Corning LANscape P/N CCH-CP12-E4-P03SH.
2. AFL Telecommunications LC Duplex Pigtail PDL-XXX-RC-012-L-0003-N and Plate Adapter FM001302.

2.5 MULTI-PAIR COPPER BACKBONE CABLING - PREMISE

- A. Shall be Category 5E and consist of a core of 24 AWG solid annealed copper conductors, color-coded in accordance with telephone industry standards.
- B. Backbone cabling shall meet or exceed the Category 5E requirements listed in ANSI/TIA/EIA-568-B.
- C. Provide quantity of backbone cables to meet pair counts as shown on the drawings.
- D. Each 25 pairs shall be assembled in units and individually identified by color-coded unit binders.
- E. Cable shall be UL Listed suitable and marked for use in a riser application (CMR). Copper backbone cable routed exposed in plenum spaces shall have a plenum rated jacket (CMP).
- F. Acceptable Products:
 1. IBDN Plus Cat5E, Riser, 25-Pair, Gray. Belden/CDT Part Number 24576125.
 2. IBDN Plus Cat5E, Plenum, 25-Pair, Gray. Belden/CDT Part Number 24577125.
 3. Superior Essex Cat5E, Riser, 25-Pair, Gray P/N 51-478-35.
 4. Superior Essex Cat5E, Plenum, 25-Pair, White P/N 51-478-48.
 5. Or equal.

PART 3 - EXECUTION

3.1 BACKBONE CABLING

- A. Twenty feet of fiber cable slack shall be stored in wall mounted "re-closeable" storage rings at the telecom room for every installed cable. Additional cable slack will be installed within the vertical cable managers in a "drip loop" configuration.
- B. No more than 50'-0" of exposed outside plant cabling shall be permitted inside the building.
- C. Vertical runs of cable shall be supported to a messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
- D. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
- E. Three feet of fiber slack shall be neatly coiled within the fiber enclosure.
- F. Each optical fiber cable shall be individually attached to its enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure. Refer to manufacturer installation instructions.
- G. Each optical fiber cable shall be clearly labeled at the entrance to the enclosure. Cables labeled within the bundle where the label is obscured from view shall not be acceptable.
- H. Prior to installation of fiber optic backbone cable, test one fiber strand using an OTDR or light meter to verify continuity of the cable.
- I. All fiber optic cable shall be installed within fabric innerduct. Where the innerduct terminates at the telecom room wall or floor, install riser rated corrugated innerduct from that point to the fiber termination cabinet.

3.2 OPTICAL FIBER CONNECTORS

- A. Adhere to all manufacturer installation guidelines.
- B. Polarization for entire system shall be maintained as described in ANSI/TIA/EIA - 568-B.1 Section 10.3.2.

3.3 COPPER CABLE TERMINATIONS

- A. Terminate "exposed" premise backbone copper cabling on wall mounted Category 5E 110 blocks. Maintain cable pair twists up to 0.5 inch of the point of termination for "Category 5E" Backbone distribution cables. Under no circumstances shall cable pairs be untwisted or otherwise altered prior to termination.
- B. Terminate outside plant backbone copper cabling on UL listed building entrance terminals with primary protector modules. Bond metallic cable jackets to the integral ground bar on the building entrance terminals. Bond the building entrance terminal to ground with #6 green insulated ground conductor.

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