

SECTION 27 13 00

COMMUNICATIONS BACKBONE CABLING

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section and the other sections of Division 27.
- B. This section is inclusive to all Division 27 sections.
- C. Division 7 Sections for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.

1.02 DRAWINGS

- A. The drawings show the general arrangement and extent of the work only. Determine the exact location and arrangement of all parts as the work progresses.
- B. In all details, the work shall be subject to the Owner's direction and approval. All work shall conform to its surroundings in best possible manner.

1.03 SCOPE OF WORK

- A. General
  - 1. This project includes the installation of fiber and copper cables.
  - 2. All UTP terminations must follow 568B wiring schematic.
  - 3. All copper cabling shall be manufactured by Belden
  - 4. All fiber optic cabling shall be manufactured by Corning, General.
- B. The Contractor shall provide a complete structured cabling system that will accommodate voice, and data for all rooms defined in scope.
- C. Inter-Building Backbone Cabling
  - 1. Fiber Optic Cabling:
    - a. Install (1) new 24-strand single-mode (OS2) cable from the existing campus connection into the building MDF (1<sup>st</sup> floor).
- D. Intra-Building Backbone Cabling
  - 1. Fiber Optic Cabling:
    - a. Install (1) new 24-strand single-mode (OS2) and (1) new 48 strand multi-mode (OM4) cable from the building MDF to each IDF.

PART 2 PRODUCTS

2.01 GENERAL

- A. Available manufacturers are listed in subparagraphs for each Part article below.

- B. Proposed substitutions shall be submitted WITH THE BID and must be approved by the Owner and Technology Consultant.
- C. Request for substitutions are only permitted for materials with an “or approved equivalent” clause or other language of the same effect in the “Contract Documents.

## 2.02 BACKBONE CABLING

- A. Cables allowed for use in the inter-building backbone include fiber optic and 100Ω UTP multi-pair copper cables. The cable shall support voice, data, and imaging applications. The bending radius and pulling strength requirements of all backbone cables shall be observed during handling and installation.
- B. All UTP cables shall conform to ANSI/TIA-568-D Commercial Building Telecommunications Cabling Standard and ISO/IEC 11801 (International) Generic Cabling for Customer Premises standard.
- C. Campus outside plant fiber optic cables allowed in the backbone shall:
  - 1. Be manufactured by Corning or approved equivalent.
  - 2. Be indoor/outdoor rated with a dry water blocking compound.
  - 3. Be terminated using SC-type connectors in rack mounted enclosures equipped with sufficient ports, slack storage space and splice trays (if required) to secure and terminate all strands
  - 4. Be appropriate for the environment in which it is installed.
- D. Multimode 48-strand shall be:
  - 1. Corning, Part #048-TUC-T4190D20 or approved equivalent
- E. Single-Mode 24-fiber shall be:
  - 1. Corning, Part # 024-EWZ-T4101DAN for outdoor
  - 2. Corning, Part # 024-EUC-T4101D20 for indoor
- F. Fiber terminations shall be Corning and:
  - 1. Corning Patch Cabinet, Part #PCH-01U, PCH-02U, & PCH-04U
  - 2. Include mounting brackets, Strain-relief, Universal Cable Clamp, Jumper Management Panel, & Lock Kit, etc. for a complete package.

## PART 3 EXECUTION

### 3.01 SITE SURVEY

- A. Prior to placing any cable pathways or cable, the Contractor shall survey the site to determine job conditions will not impose any obstructions that would interfere with the safe and satisfactory placement of the cables. The arrangements to remove any obstructions with the Project Manager need to be determined at that time.

### 3.02 PHYSICAL INSTALLATION

- A. Industry requirements; The following installation, documentation, component and system industry specifications shall be met or exceeded:
  - 1. ANSI/TIA-526-7 “Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant”.

2. ANSI/TIA-526-14A “Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant”.
3. ANSI/TIA-568-D.1 and addenda “Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements”.
4. ANSI/TIA-568-D.2 and addenda “Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair”.
5. ANSI/TIA-568-D.3 and addenda “Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling and Components Standard”.
6. ANSI/TIA-569-D and addenda “Commercial Building Standard for Telecommunications Pathways and Spaces”.
7. ANSI/TIA-606-B and addenda “Administration Standard for the Telecommunications Infrastructure of Commercial Buildings”.
8. ANSI/TIA-607-C and addenda “Commercial Building Grounding and Bonding Requirements for Telecommunications”.
9. IEC/TR3 61000-5-2 - Ed. 1.0 and amendments “Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 2: Earthing and cabling”.
10. ISO/IEC 11801:2000 Ed1.2 and amendments “Information technology - Generic cabling for customer premises”.
11. CENELEC EN 50173:2000 and amendments “Information Technology - Generic cabling systems”.

B. Cable Pathways

1. Pathways shall be designed and installed to meet applicable local and national building and electrical codes or regulations.
2. Grounding and bonding of pathways shall comply with applicable codes and regulations.
3. Pathways shall not have exposed sharp edges that may come into contact with telecommunications cables.
4. The number of cables placed in a pathway shall not exceed manufacture specifications, nor, will the geometric shape of a cable be affected.

C. Cable Routing

1. In open ceiling cabling, cable supports shall be provided by means that is structurally independent of the suspended ceiling, its framework, or supports. These supports shall be spaced no more than 1.5m (5ft) apart.
2. Telecommunications pathways, spaces and metallic cables, which run parallel with electric power or lighting, which is less than or equal to 480 Vrms, shall be installed with a minimum clearance of 50mm (2in).
3. The installation of telecommunications cabling shall maintain a minimum clearance of 3m (10ft) from power cables in excess of 480 Vrms.
4. No telecommunications cross-connects shall be physically located within 6m (20ft) of electrical distribution panels, step down devices, or transformers, which carry voltages in excess of 480 Vrms.
5. In the telecommunications rooms where cable trays or cable racking are used, the Contractor shall provide appropriate means of cable management such as reusable color-coded hook and loop cable managers (ties) to create a neat appearance and practical installation.
6. In a false ceiling environment, a minimum of 9-inches shall be observed between the cable supports and the false ceiling.
7. Continuous conduit runs installed by the Contractor should not exceed 30.5m (100ft) or contain more than two (2) 90-degree bends without utilizing appropriately sized pull boxes.

8. Maximum conduit pathway capacity shall not exceed a 40% fill. However, perimeter fill is limited to 60% fill for move and changes.
- D. Backbone pathways shall:
1. Be installed or selected such that the minimum bend radius of backbone cables is kept within manufacturer specifications both during and after installation.
  2. Have adequate riser sleeve/slot space available with the ability to ingress the area at a later date in all Telecommunications Rooms, such that no drilling of additional sleeves/slots is necessary.
- E. Pulling Tension
1. The maximum cable pulling tensions shall not exceed manufacturer's specifications.
- F. Bend Radius
1. The maximum cable bend radii shall not exceed manufacturer's specifications.
  2. In spaces with UTP cable terminations, the maximum bend radius for 4-pair cable shall not exceed four times the outside diameter of the cable and ten times for multi-pair cable. This shall be done unless this violates manufacturer specifications.
  3. During the actual installation, bend radius on 4-pair cable shall not exceed eight times the outside diameter of the cable and ten times for multi-pair cable. This shall be done unless this violates manufacturer specifications.
- G. Slack/Service Loop
1. In telecommunications rooms a minimum of 6m (20ft) of slack should be left for all cable types. This slack must be neatly managed on plywood walls fields in locations as shown on drawings.
- H. Cable Wraps
1. Hook and loop cable managers should be used in the telecommunications rooms where reconfiguration of cables and terminations may be frequent.
- I. Grounding
1. Grounding and bonding shall be done per applicable codes and standards.
- J. Fire Protection
1. Properly installed firestop systems shall be installed to prevent or retard the spread of fire, smoke, water, and gases through the building. This requirement applies to openings designed for telecommunications use that may or may not be penetrated by cables, wires, or raceways.
  2. Fire stops shall comply with all applicable codes.
- K. Workmanship
1. All work shall be done in a workman like fashion of the highest standards in the telecommunications industry. All equipment and materials are to be installed in a neat and secure manner, while cables are to be properly dressed. Workers must clean any debris and trash at the close of each workday.

END OF SECTION