

## SECTION 27 15 00

### COMMUNICATIONS HORIZONTAL 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.
- B. This section is inclusive to all Division 27 sections.

##### 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. All work shall be subject to the Owner's direction and approval.

##### 1.03 SUBMITTALS

- A. The contractor shall provide product submittals for all system components as defined in Part 2 of this specification section. These components shall include all structured cabling and associated structured cabling components. The selected contractor will allow sufficient time in project scheduling for client and review by the Architect's Technology Consultant.

##### 1.04 SCOPE OF WORK

- A. The campus network cabling solution shall be based upon structured cabling system components manufactured by Panduit/Belden. This may include but not be limited to cable management, faceplates, copper modules, patch panels, racks, 110-type blocks, patch cords, labels and grounding hardware.
- B. All UTP terminations shall follow 568A wiring schematic
- C. All copper cabling shall be manufactured by Belden.
- D. The installed system shall meet all the requirements necessary to achieve certification for the Belden 25-year System Warranty.
- E. The Contractor shall provide a complete structured cabling system that will support voice, data, security and video applications for the building.
- F. Contractor shall provide outlets as identified in this specification or indicated on the drawings.

#### PART 2 PRODUCTS

##### 2.01 HORIZONTAL CABLING

- A. General
  - 1. Available manufacturers are listed in subparagraphs for each PART 2 article below.

2. Proposed substitutions shall be submitted WITH THE BID and must be approved by the Owner and Technology Consultant.
  3. Requests for substitutions are only permitted for materials specified with an “or approved equivalent” clause or other language of the same effect in the Contract Documents.
- B. The Horizontal Subsystem is the portion of the telecommunications cabling system that extends from the work area telecommunications outlet/connector to the horizontal cross-connect in the telecommunications room. It consists of the telecommunications outlet/connector, the horizontal cable and the patch panel or termination block in the telecommunications room.
- C. Cable Types
1. All telecommunications cables shall conform to ANSI/TIA 568-D Commercial Building Telecommunications Cabling Standard (latest amendment including all applicable addenda) and ISO/IEC 11801 (International) Generic Cabling for Customer Premises standard.
  2. Be appropriate for the environment in which it is installed.
  3. The copper 4-pair UTP Category 6A cables shall meet the following specifications:
    - a. Attenuation
    - b. Near End Crosstalk (NEXT)
    - c. Power Sum Near Crosstalk (PSNEXT)
    - d. Equal Level Far-End Crosstalk (ELFEXT)
    - e. Power Sum Equal Level Far-End Crosstalk (PSELFEXT)
    - f. Return Loss
    - g. Propagation Delay (ANSI/TIA-568-D1)
    - h. Delay Skew (ANSI/TIA-568-D1)
    - i. Attenuation to Crosstalk Ratio (ACR)
    - j. Power Sum Attenuation to Crosstalk Ratio (PSACR)
    - k. Near End Crosstalk (NEXT) Loss
    - l. Near End Crosstalk (NEXT) Loss
  4. Cable shall be:
    - a. Belden Category 6A, Part # 10GX13
      - (1) Colors shall be blue for primary and secondary data, violet for special purpose networking, & orange for building systems networking.

## 2.02 PATCH PANELS

- A. Patch panels shall:
1. Support Category 6A performance levels.
  2. Be angled to minimize or eliminate the use of horizontal cable managers to feed the patch panels.
  3. Be 48-port capacity and 2RU in height.
  4. Be 8-position /8-conductor with coherent pairing of IDC pins
  5. Be backwards compatible to allow lowering the performing categories of cables or connecting hardware to operate to their full capacity.
  6. Support industry standards for T568A wiring options on each individual outlet.
  7. Be made by an ISO 9001 and 14001 Certified Manufacturer.
  8. Be Panduit, Part #DPA486X88TGY.

## 2.03 INFORMATION OUTLET

- A. All Category 6A high density information outlets for 100Ω 22-24AWG copper cable shall:
1. Be available in black, white, gray, ivory, light ivory, blue and red.
  2. Be 8-position /8-conductor with coherent pairing of IDC pins
  3. Have available a 45-degree angled low profile as well as flush mount design.
  4. Provide universal application/multi –vendor support
  5. Utilize center tuned technology with optimized pair balance design and linear crosstalk response to address applications up to 250 MHz.
  6. Support industry standards for T568A wiring options on each individual outlet.
  7. Allow installation from the front or the rear of the faceplate and allow for the jack to pass through the faceplate without re-termination.
  8. Be side-stackable for high density solutions.
  9. Provide color-coded, slide-in icons available for circuit identification.
  10. Be constructed of high impact, flame-retardant thermoplastic.
  11. Be made by an ISO 9001 and 14001 Certified Manufacturer.
  12. Be ANSI/TIA 568-D.2-1 and ISO/IEC 11801 Category 6 compliant
  13. Be UL VERIFIED (or equivalent) for TIA Category 6 electrical performance.
  14. Be UL LISTED 1863 and CUL approved.
  15. Be Panduit, Part #CC6X88##.
    - a. Colors shall be blue for primary and secondary data, violet for special purpose networking, & orange for building systems networking.

## 2.04 FACEPLATES

- A. Face plates shall be:
1. Panduit Mini-Com Classic Faceplate, Part # CFPL2IWY.
  2. Panduit Mini-Com Classic Faceplate, Part # CFPL4IWY.
  3. Panduit Mini-Com Classic Faceplate, Part # CFPL6IWY.
  4. Panduit Faceplate, Part # KWPY for wall telephone applications.
- B. Blank inserts shall be used in unused faceplate openings.
1. Panduit, Part #CHB2IW-X

## 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. All horizontal cables, regardless of media type, shall not exceed 90 meters (295 ft.) from the telecommunications outlets in the work area to the horizontal cross-connect.
2. The combined length of jumpers or patch cords and equipment cables in the telecommunications room/closet and the work area shall not exceed 10 meters (33 ft.) unless used in conjunction with a multi-user telecommunications outlet.
3. Two horizontal cables shall be routed to each work area. At least one cable connected to an information outlet shall be 4-pair, 100Ω unshielded twisted-pair (UTP).
4. Horizontal pathways shall be installed or selected such that minimum bend radius of horizontal cables is kept within the manufacturer’s specification both during and after the installation.
5. 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.
6. 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).
7. The installation of telecommunications cabling shall maintain a minimum clearance of 3m (10ft) from power cables in excess of 480 Vrms.

8. 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.
  9. For voice or data applications, 4-pair UTP or fiber optic cables shall be run using a star topology from the telecommunications room serving that floor, to every individual information outlet.
  10. The Contractor shall observe the bending radius and pulling strength requirements of the 4-pair UTP and fiber optic cable during handling and installation.
  11. In the telecommunication room 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.
  12. In a false ceiling environment, a minimum of 9-inches shall be observed between the cable supports and the false ceiling.
  13. 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.
  14. Maximum conduit pathway capacity shall not exceed a 40% fill. However, perimeter fill is limited to 60% fill for move and changes.
- D. Work Area terminations:
1. All UTP cables wired to the telecommunications outlet/connector shall have 4-pairs terminated in eight-position modular outlets in the work area. All pairs shall be terminated.
  2. The telecommunications outlet/connector shall be securely mounted at planned locations.
  3. The height of the telecommunications faceplates shall be applicable to codes and regulations.
- 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