

## SECTION 27 15 00

### COMMUNICATIONS HORIZONTAL CABLING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. This Section includes specific requirements for horizontal cable within the Communications Cabling System. General requirements for horizontal cable are covered in Division 27 Specification Section *Communications - General Requirements*.

##### 1.02 RELATED SECTIONS

- A. The requirements of Division 27 Specification Section *Communications - General Requirements* shall serve as the basis for the requirements of this Section, and are incorporated by reference into this Section.

##### 1.03 SUBMITTALS

- A. Comply with the Submittal portion of Division 27 Specification Section *Basic Communications Requirements*. Provide submittal information for the following:
  - 1. Product Data

#### PART 2 - MATERIALS

##### 2.01 GENERAL

- A. Manufacturer: Unless otherwise indicated, equipment and materials in this Section shall be of the same manufacturer as that specified under Division 27 Specification Section *Communications - General Requirements*.
- B. Part Numbers: Refer to the Equipment Schedule(s) for specific manufacturers and part numbers. If no part number is provided, then any part meeting the manufacturer and requirements specified is acceptable.

##### 2.02 COPPER

- A. Horizontal Cable: Cable shall be 4 pair UTP, solid copper conductors. Copper cable Category rating shall be the same as that specified under Division 27 Specification Section *Communications - General Requirements*.
  - 1. Color shall be blue.

#### PART 3 - EXECUTION

##### 3.01 GENERAL

- A. Work Areas
  - 1. All partition wall workstation outlet locations shall have the cables routed in the void space inside the wall whenever possible.
  - 2. If conduit is provided at the location, the cables shall be routed therein to the outlet box.
  - 3. If a conduit is not provided at the specified location, the Contractor shall make access to the void space above the ceiling level. The preferred method for this access is to utilize stepper bit through the wall's top cap (header) and insert a stud grommet.
  - 4. The Contractor shall provide and install an outlet box at the standard electrical outlet height of 18" AFF. When practical the Contractor should match the orientation and height of the existing electrical outlets.
  - 5. The Contractor shall install approved fire stopping around the opening in the top of the wall.
  - 6. DPS standards are to install two outlet locations with two Category 6 cables each, one wireless access point cable, and one 18/4 for speaker in a typical classroom.

7. The structured cabling system is based on a structured wiring design of two - UTP Category 6 cables to each outlet location.
8. The cables shall be designated TR room, rack, row, and position (i.e., A.2.14.24, B.2.5.15). All cabling shall originate from Panduit jack panels in the TRs.
9. All twisted pair outlet cables shall be terminated on Panduit sloped horizontal or vertical type outlets.
10. Any other exceptions will be at the discretion of the DPS/DoTS project manager. All twisted pair workstation cables shall be terminated in consecutive order utilizing the station identification number.
11. All Category 6 cabling shall be configured to the 568B pin out.
12. Classroom outlet locations will consist of a two port sloped faceplate with two Category 6 cables.
13. All horizontal wiring must not exceed 295 ft. This is actual permanent link tested cable length, not the physical distance between the TR and the workstation outlet.
14. If any horizontal cabling is more than 295' it must be submitted to DOT's project manager for written exemption to this document prior to being installed.
15. All faceplates shall be white or ivory in color unless electrical outlets are stainless steel.

**B. Pulling Twisted Pair Station Cable**

1. The pulling tension of all twisted pair station cables shall not exceed 25 ft.-lbs.
2. Jacketed twisted pair workstation cables shall have a minimum bend radius of four (4) times the diameter of the cable.
3. The jacket of the twisted pair cable for IDC type connections shall be removed as needed for termination, but jacket shall be enclosed in the insulation displacement clips as TIA 568-C.0.
4. The terminated workstation cables shall have equal tension on all conductors. In addition, conductors within a pair should not be bent around the other conductor to reach its termination point (commonly referred to as knuckling).
5. The pairs shall be visually inspected after the conductors are punched. If a connector needs to be re-terminated, all conductors in that cable shall also be re-terminated to keep consistent length, pair twists, and equal tension on all conductors.
6. On Panduit TG-style jack terminations, jacket of UTP cable shall pass entirely into device and be locked in place with retaining clip per Panduit Copper Technician certification class. Jacks showing exposed twisted pairs will not be accepted and must be corrected at Contractor's expense.
7. The conductors of the twisted pair cable shall be untwisted a maximum of 0.25 in. from the point which the conductors are connected to the IDC (insulation displacement clips) of the termination device.
8. When pulling cable the cable shall not be bent around objects less than 4 inches in diameter, Contractor shall temporarily install a perpendicular, short length of 4 inch EMT or similar device to maintain cable integrity during installation.

**C. Modular Furniture Work Areas**

1. When modular furniture workstation outlets are required, all cables shall route through communications poles from the ceiling above the modular furniture (not preferred).
2. Any holes drilled that expose any metal edges will be bushed to prevent damage to the wire.
3. In the event communication poles are filled to capacity, the Contractor will be required to install new poles (the old poles must be removed by the Contractor during the cutover).

**D. Service Loops at Work Area**

1. DPS does not want “service loops” stored in wall boxes. When terminating the device end of the cabling, Contractor shall follow this procedure:
    - a. Pull 12” of wire out of the outlet box, trim and terminate the cabling.
    - b. After termination, push the cabling back up the conduit, leaving approximately 7” of wire in the box. “Box stuffing” and kinking of cable will not be acceptable.
    - c. Allow the remainder to remain slack as it exits the upper end of the conduit and caulk the conduit with fire caulking.
    - d. Speaker cable will require a 10’ service loop.
    - e. WAP location will require a 10’ service loop.
      - 1) Service coil needs to be secured by J-hook located 1’ above drop ceiling neatly coiled.
      - 2) If ceiling is greater than 12’ high, WAP cable must be moved to wall mount no higher than 10’. There will be NO service loop on any wall mounts.
- E. Separation of Horizontal Cable from EMI RFI Sources
1. All communications cabling shall be separated from sources of EMI/RFI according to by a minimum of six inches or according to guidelines in TIA 569-B, whichever is most stringent.
  2. These EMI sources include, but are not limited to fluorescent lights/ballasts, air handling units, power risers, etc.
  3. In any TR that is adjacent to an electrical room, mechanical room, elevator shaft, or other EMI/RFI source, the cables shall not be routed on the opposite sides of adjoining wall(s). Placement of cables in such situations shall follow guidelines in TIA 569-B and BICSI TDMM 13.
- F. Horizontal Cable Segregation
1. The Contractor shall segregate and bundle all workstation cables in the ladder rack as they enter the TR. All cables shall be bundled in groups of twenty-four (24) to forty-eight (48) individual twisted pair workstation cables.
  2. In horizontal TRs, the twisted pair workstation cables shall divide (right or left, top to bottom) depending upon the side of the patch panel to which the twisted pair workstation cables are terminated and from the direction the cables enter the racks.
  3. The cables shall be grouped together for cable bundles destined for the same side of a wire management rack. This procedure shall produce an orderly installation with no crossovers for all visible cabling.
  4. The cables routing into the patch panels must be neatly routed into appropriate position without crossing and or twisting with other cables. (dressed)
- G. Camera installation requirements
1. All category 6 cables installed for exterior cameras shall have a surge protector installed in the MDF/IDF. The category 6 cable will need to be terminated in a biscuit jack on the plywood wall field not on a patch panel (see picture). The protector will be installed and connected to this cable in series. Then a second cable needs to be installed from the backboard in a biscuit jack to the patch panel and properly labeled. The protector shall be properly grounded to the grounding buss bar. The cable from the camera will terminate on the line side of the protector. A category 6 cable will have to be terminated on the equipment side of the protector and routed to the appropriate position on the patch panel.
  2. The make and model of surge protector that DPS has specified for these installations is the SurgeGate 1 Gb CAT6-75.

**PART 4 - EQUIPMENT SCHEDULE**

4.01 -

<b>27 15 00 - HORIZONTAL CABLING (HC)</b>		
<b>DESCRIPTION</b>	<b>"PanGen"</b>	<b>Special Rqmt/Notes</b>
HORIZONTAL COPPER CABLE (ENHANCED CAT6, U/UTP)	PUP6004BU-UY	

**END OF SECTION 27 15 00**