

## DIVISION 27 00 00—STRUCTURED CABLE

### FORMAT

1. Technical specifications content and numbering system shall be based on the most current CSI Master Format.

### BASIS OF DESIGN

1. Design guidelines supplement building, fire, and other health, safety and welfare codes, and represent practices APSU has adopted regarding the built environment. Where conflicts arise between codes and guidelines, codes take precedent.
2. Coordinate deviation from guidelines with University Design & Construction and APSU Office of Information Technology (OIT).

### RELATED SECTIONS

07 84 13—Penetration Firestopping Devices

08 70 00—Hardware

09 91 00—Painting

### GENERAL PROVISIONS

1. The design and installation of structured communications cabling will be performed by APSU's contractor and coordinated with APSU OIT. Designers will be responsible for designing appropriate communications rooms and pathways for cable as described in this document.
2. Referenced Standards
  - a. Structured cabling and related infrastructure shall conform with the latest BICSI TDMM and NEC standards
    - BICSI – [www.bicsi.org](http://www.bicsi.org)
    - NEC - <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=70>
  - b. In renovations unwanted cable, accessories, and devices shall be removed by APSU's contractor and coordinated by APSU OIT. Designer shall ensure language addressing coordination between OIT and contractors is conspicuously posted on drawings and in the technical specifications.
  - c. Painting of IT cables voids the warranty. Scheduling of painting shall be coordinated with APSU OIT so cabling can be installed after painting. Contractor shall be responsible to protect existing cabling from paint and paint overspray. The following paragraph

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shall be conspicuously placed on the same sheet as the finish schedule and in the painting specification:

*“CONTRACTOR SHALL ENSURE ALL CABLING IS PROTECTED FROM PAINT AND PAINT OVERSPRAY. PAINTING SHALL OCCUR BEFORE CABLE INSTALLATION.”*

### COMMUNICATIONS ROOMS/CLOSETS

1. Design and Construction Considerations
  - a. Communications rooms shall be a minimum of 8' x 8'. A larger room may be required depending the amount of equipment planned for the room.
  - b. Communications closets shall be dedicated to communications only. Other low-voltage equipment may be installed only with the approval of APSU OIT.
  - c. If OIT permits other low-voltage equipment, (e.g., building automation, life safety, security, A/V and CATV systems) to utilize communication rooms, designer shall size room to accommodate all equipment and required clearances
  - d. The Communications closets shall be well ventilated, environmentally controlled on a 24 hours per day, 7 days per week basis, and not present a hostile environment to network or telephone equipment.
  - e. IT rooms shall not be used to run water, waste, or hydronic piping or contain water heaters, sinks, electrical distribution systems, devices with high potentials of EMI, heat or humidity, or any other mechanical or electrical device.
  - f. Designer shall calculate the heat loads and design the cooling needs in order to maintain an ambient temperature of 65-80 degrees Farenheit and 40-60% relative humidity.
  - g. Maintain minimum 36" clearances around low voltage cabinets and racks in all directions. If equipment protrudes from the wall then the distance shall start from the furthest protrusion.
  - h. Communications closet shall be centrally located and, in multi floor buildings, there shall be one closet on each floor. The closets on each floor shall be stacked where reasonably possible.
  - i. Doors shall be 3' x 7', installed to swing out (when permissable by life safety codes) and lockable.
  - j. Walls should extend to deck and ceilings shall be open to deck (no drop ceilings). Deck, structure, fire-proofing, and insulation shall be painted.
  - k. Floors shall be VCT tile or sealed concrete.
  - l. Lighting shall be installed at a minimum height of 8'-6" A.F.F. and provide approximately 50 fc at 3' A.F.F.

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- m. All penetrations in walls for cable entry shall be fire stopped and any mechanical penetrations shall be fire rated.
- n. The entrance facility (EF) is the location where the OSP enters the building. Designer shall attempt to make the EF and the MDF the same space. If the EF and the MDF are different, install 4" EMT conduits to the MDF.

### 2. Power

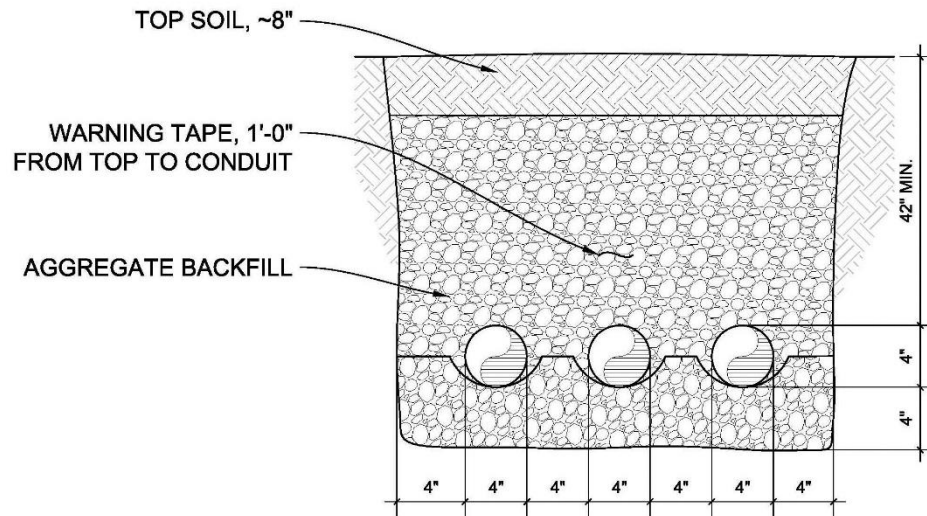
- a. One duplex electrical outlet shall be installed on each wall of the room with no more than two (2) duplex outlets per 20 amp dedicated non-switched circuit.
- b. If emergency or back-up power is available circuits shall be connected to that service.
- c. A multi-point ground, conforming to NEC Articles 800 and 250, with a minimum 6 AWG wire, shall be provided in this space to be used for grounding protection for devices and equipment.

### PATHWAY

#### 1. Outside Plant (OSP)

- a. New OSP conduit shall be tied in with APSU's existing underground conduit system.
- b. Contractor shall not backfill communications trench until approved in writing by APSU OIT personnel.
- c. Although the terrain and local codes will determine the type of conduit installed, generally schedule 40 PVC conduit with a sand or stone backfill is sufficient with a depth of 24" from the top of the pipe to grade.
- d. Road crossings or areas subject to heavy loading shall use schedule 80 PVC conduit.
- e. At least two 4" conduits shall be placed from each point of connection in the OSP pathway.
- f. One conduit shall be filled with a cellular (Maxcell) raceway for fiber.
- g. Hand holes without bottoms shall be placed with stone at the bottom.
- h. New conduits shall have a pull string installed and capped with a watertight closure.
- i. Hand holes shall be Quazite or approved substitute, minimum of 36" x 60" x 24".
- j. Conduits shall have no more than two 90 degree bends, in any conduit run. If more bends are required, pull boxes, hand holes or manholes (to be determined by the application) shall be installed.
- k. All bends shall be at least 36" radius.
- l. Conduit length between closets, manholes, hand holes, etc., shall not exceed 400', as determined by the application and number of bends in the conduit run.

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**TYPICAL COMMUNICATION TRENCH DETAIL**

### 2. Inside Plant (ISP)

- a. There should be a minimum of two 4" EMT sleeves (if rooms are stacked) or conduits (if rooms are not stacked) ran from the MDF (main communications closet) to each IDF (other communications closets) to be used for riser cables
- b. A minimum of two 4" conduits shall be installed into each communications closet to allow for installation of horizontal cable. Conduits shall be accessible on both ends.
- c. All other pathways shall be a minimum of 1" EMT conduit with sizing to be determined by the amount of cable to be installed.
- d. When possible conduit shall be concealed from view, either above ceilings or in walls.
- e. Interior pathway shall remain clear from sources of EMI.
- f. For new construction and major renovations or when conditions allow, cable tray shall be installed along corridors and in some cases in individual spaces if merited. Some installations may require enclosed wire ways. Cable tray and wire way installations shall be approved by APSU OIT.
- g. In ceilings open to view, solid bottom cable tray shall be used.
- h. Other systems are not allowed to share the same pathways or penetrations as structured cabling.
- i. Firestopping removed during construction shall be restored to its original condition.
- j. In rated partitions self-stopping sleeves (Hilti Speed Sleeve, STI EZ- Path, or equivalent) shall be used. Substitutions shall be approved by APSU OIT. If self-sealing sleeves are

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not used it will be the responsibility of the contractor that installed the sleeve to fire stop according to codes post cable installation.

- k. Station conduit shall be 1" minimum with 4x4 back box with a single gang plaster ring.
- l. No more than 2 back boxes may share a single 1" conduit.
- m. Conduit feed shall stub out above the outlet in the nearest accessible ceiling (this applies to both wall boxes and floor boxes) and shall have a plastic bushing placed on the end. If the conduit is placed in a rated wall the stub out shall be on the same side of the rated wall as the outlet.
- n. Conduits carrying ISP copper or fiber shall have no more than two 90 degree bends or a total of 180 degrees in any run or between pull boxes. A single run is defined as the distance to 180 degrees or 150' from pull box to pull box, whichever is less.
- o. When sizing sleeves and conduits consult BICSI standards at [www.bicsi.org](http://www.bicsi.org) for appropriate fill ratio charts.

### GLOSSARY

AWG .....	American Wire Gauge
BICSI .....	Building Industry Consulting Service International
CATV .....	Community Antenna Television
EF.....	Entrance Facility
EMI .....	Electromagnetic Interference
EMT .....	Electrical Metal Tubing
ISP.....	Inside Plant
IDF .....	Intermediate Distribution Frame
MDF.....	Main Distribution Frame
NEC.....	National Electrical Code
OSP .....	Outside Plant
TDMM .....	Telecommunications Distribution Methods Manual

**End of Section**