

## SECTION 270533 – CONDUITS AND OUTLET BOXES FOR COMMUNICATION SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division - 1 Specification sections, apply to the work of this section.

### PART 2 - PRODUCTS

#### 2.1 GENERAL REQUIREMENTS

- A. Materials. The materials used for this system are generally NOT manufacturer and part number specific. Equivalent, high quality materials may be utilized without submittals to NCSU ComTech. However, the university reserves the right to reject materials that are considered of substandard quality. See Section 27 06 00 Schedules for Communications Systems for a list of materials acceptable for use in NC State University projects.

### PART 3 - EXECUTION

#### 3.1 MATERIALS AND STANDARDS

- A. Construction details. Detail drawings describing various outlet box and conduit systems are available for download and modification by designers at the ComTech website.
- B. Standards. All work shall be in accordance with the latest edition of all applicable campus, State, and Federal regulations and codes. Special considerations should be made to comply with NEC, NFPA, and North Carolina State Construction Office requirements. All work shall also be in accordance with the latest versions of the BICSI TDMM manual and TIA-569 standard, and with manufacturer's recommendations.
- C. Fire safety considerations. The installation of outlet boxes and conduits shall comply will all applicable fire safety and electrical codes. In general, the North Carolina State Construction Office determines the compliance of these systems with codes, and they reserve the right to inspect and approve/disapprove their installation. The horizontal pathway system shall be a completely enclosed, metallic system from the BDF/IDF to the outlet. It will be used to house non-plenum rated cables. All conduit penetrations of rated walls and floors shall be firestopped per applicable UL assembly.
- D. Enclosed pathways. Each of these pathway systems shall be a completely enclosed, metallic system. Typically, the horizontal pathway system consists of outlet boxes at the work space location connected to a nearby wireway via 1" metal (EMT) conduit.

- E. Outlet placement. Typically, all outlets are installed at 18” AFF. For aesthetics purposes in new construction, the bottom of the outlet box should be installed even with the bottom of electrical receptacle boxes. Outlet boxes may be mounted higher if necessary to be located above furniture, counter tops, or equipment. Outlet boxes should not be located too close to wet areas (e.g. sinks) where faceplates or patch cords could come into contact with water. Boxes also should not be located too close to sources of excessive heat, dust, chemicals, or electromagnetic interference (EMI).

Outlet boxes should also be located so that they will be accessible to technicians for patch cord installation or for jack retermination even after furniture and equipment is installed. Boxes should not be installed behind heavy equipment or modular furniture panels. Ergonomics and egress factors should be considered when planning outlet locations. Outlets should be located so as not to require telephone or data patch cords to be installed across doorways, aisles, or other “people” traffic areas.

- F. Outlet box type. Wall construction type normally determines the type of outlet box to be installed.

Flush mounted outlet boxes should be installed in all walls of gypboard and standard stud (3 5/8” deep) construction. The top and bottom flanges (ears) of old work boxes should be adjusted so that the box itself does not protrude at all beyond the surface of the gypboard. In general, flush mounted outlet boxes should be installed exactly straight (perpendicular to walls and floor) and flush with the surface of the gypboard (after plaster ring installation). No visible gaps between the edge of the faceplate and the gypboard should be present after final installation. Conduit is to be installed so as to enter the top of the box, into one of the back knockouts.

Surface mounted outlets should be installed onto all other wall types (masonry, plaster, prefabricated wall panels, etc.). In most cases these outlets will consist of a standard surface mounted outlet box with a surface mounted 1” conduit routed up the wall to the nearest wireway. The conduit and outlet box should be painted to match the surrounding wall surface. In cases where aesthetics are of concern, the 1” conduit may be replaced with Wiremold 2400 metal raceway. The raceway and box may or may not be painted to match the surrounding wall surface. For cleanest appearance, a bead of latex caulk should be applied between the wall and each side of the 2400 raceway.

- G. Conduit requirements. The length of flexible conduit installed in the ceiling area should be minimized. Flex conduit should be transitioned to EMT immediately after it exits the hollow wall with the flex conduit supported at its exit from wall. Conduits should be installed with appropriate offsets (box kicks) where they are connected to outlet boxes and junction boxes to keep surface mounted conduits flush against walls and decks.

A maximum of 180 degrees between pull points shall be maintained in all conduit runs. This does not include the box kicks described above. No LB-type (or similar) condulets shall be used. Use junction boxes to create pull points. These should be placed in straight sections of conduits where possible, but may be used to replace conduit bends where bends are impractical. When junction boxes are used in lieu of bends, the conduits should be connected to the junction box with maximum separation to allow the maximum cable radius within the box as possible. Only compression connectors and couplings shall be used in all conduit runs. No set screw connectors and couplings shall be used.

- H. Support structures. Outlet conduits are usually fastened to nearby walls or decks with one-hole straps. Surface mounted conduit hangers “mineralac straps” will not be used where visible. Conduit hangers with threaded rod used for overhead support may be used.

Each conduit shall be supported within 3’ from where it connects to a wireway, junction box, or outlet box. The conduit shall be supported at intervals not exceeding 5’ in the remainder of its run. Multiple conduits may be supported by a trapeze. No conduit shall lie directly on top of an acoustic tile ceiling grid or be supported by the grid or the grid supports (wire).

- I. Direct conduit systems. By default, 1” conduit runs from outlets should be connected to the wireway system and not be directly routed to the IDF. However, for IDFs serving a very small number of outlets or a very small geographic zone, a wireway system may not be necessary. In these cases, all of the 1” conduits may be installed in a homerun fashion directly back to the IDF. The conduits should penetrate the wall of the IDF and be terminated with a conduit connector (no plastic bushing needed). As much as possible, the conduits should be terminated near the corners of the IDF to facilitate cable routing. Conduits that penetrate the IDF between 7’- 6” and 9’- 0” may be terminated horizontally on the wall. Conduits that penetrate above 9’- 0” should be turned down vertically and terminated above 7’- 6”. Conduits that penetrate below 7’- 6” should be turned up vertically and terminated above 7’- 6”.

Occasionally, with IDFs equipped with a wireway system, it is impractical to route particular 1” conduits to the wireway. These can be routed directly to the IDF per the above guidelines.

- J. SSI outlets. SSI-A outlets consist of two standard surface mount outlet box installed inside a 10”x 10”x 6”D screw cover junction box. Boxes are connected to each other via a conduit nipple. The upper outlet box is then connected to the nearest wireway via 1 ½” conduit. SSI-B boxes are similar except they house only one surface mount outlet box inside an 8”x 8”x 6”D junction box. The outlet box is connected to the wireway by 1” conduit.
- K. Aesthetics. Generally, all visible conduits should be painted to match surrounding surfaces. Conduits installed in locations not visible by building occupants do not require painting. Ideally, all elements of the horizontal pathway system except for the actual outlet boxes in work spaces will be completely hidden from view. However, if this is not possible, the designer should carefully determine routing and components used to minimize negative aesthetics impacts.

END OF SECTION 270533

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