

SECTION 27 05 28 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Optical-fiber Cabling Pathways (Innerduct).
- 2. Hooks.
- 3. Boxes, enclosures, and cabinets.

- B. Related Requirements:

- 1. Section 26 05 33 "Raceways and Boxes for Electrical Systems" for general box requirements, as well as specifications for enclosures, cabinets, junction boxes, pull boxes, and underground enclosures.
- 2. Section 26 05 43 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 ACTION SUBMITTALS

- A. Product data for the following: For cabling pathways, hooks, and communications outlet boxes.

1.4 UNIT PRICE

- A. Include on Bid Form a unit price for furnishing and installing a data outlet box. A data outlet box shall consist of a two gang outlet box, double gang plaster ring, blank wall plate and conduit stubbed up concealed in wall and turned out above accessible ceiling. Unit price shall reflect an outlet installed during the normal course of installation.

1.5 COORDINATION

- A. Provide all pathways, raceways, and boxes for communications cabling systems.
- B. Owner, through Architect, reserves the right to move any outlet or stubbed-up conduit, a distance of twenty-five feet before roughing-in, without additional cost to Owner.
- C. Backbone cabling, hardware and connecting blocks, to be provided under separate contract. Coordinate pathway installation with Owner before rough-in.

- D. All electronics, active networking hardware, and end-user devices (telephones, computers, monitors, etc) to be furnished and installed by Owner.
- E. Contact the Owner's telecommunications network representative for specific instructions prior to beginning work.
 - 1. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.
 - 2. All materials shall be provided and installation shall be completed in accordance with Owner's latest telecommunication standards.

PART 2 - PRODUCTS

2.1 OPTICAL-FIBER-CABLE PATHWAYS AND FITTINGS (INNERDUCT)

- A. Description: Comply with UL 2024; flexible-type corrugated pathway with a circular cross section, approved for riser installation unless otherwise indicated.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Anixter, Inc.
 - 2. Carlon; a brand of Thomas & Betts Corporation.
 - 3. Dura-Line.
 - 4. Endot Industries Inc.
 - 5. IPEX USA LLC.
- C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with TIA-569-D.

2.2 HOOKS

- A. Description: Prefabricated sheet metal cable supports, designed for supporting category-rated and fiber optic telecommunications cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. MonoSystems, Inc.
 - 2. nVent Erico.
 - 3. Panduit Corp.
 - 4. Wiremold / Legrand.
- C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with TIA-569-D.
- E. Construction:

1. Galvanized steel.
2. J shape, wide base.

- F. Provide mounting hardware as required by mounting location and surface.
- G. Provide brackets for ganging multiple hooks at a single location where required.

2.3 COMMUNICATIONS OUTLET BOXES

- A. Description: Outlet boxes for communications.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Arlington Industries, Inc.
 2. Crouse-Hinds, an Eaton business.
 3. EGS/Appleton Electric.
 4. Hubbell Incorporated.
 5. O-Z/Gedney; a brand of Emerson Industrial Automation.
 6. RACO; Hubbell.
 7. Thomas & Betts Corporation; A Member of the ABB Group.
 8. Wiremold / Legrand.
- C. General Requirements for Communications Outlet Boxes:
1. Comply with TIA-569-E.
 2. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- D. Refer to Section 26 05 33 "Raceways and Boxes for Electrical Systems" for general box types and requirements.
- E. Type: Standard Recessed Telecommunications Box.
1. Dimensions: 4 11/16-inch by 4 11/16-inch square, 2 1/8-inch depth.
 2. Galvanized steel construction.
 3. Single- or double-gang ring as required by outlet type.
 4. Provide with plaster rings where installed in plaster finish areas and to accommodate wall/ceiling depth.
 5. Provide with masonry rings where installed in masonry construction.
 6. Provide with tile bridge where installed recessed in ceiling.
- F. Type: Standard Surface Telecommunications Box.
1. Copper-free aluminum or rust-resisting alloy construction.
 2. Threaded hubs compatible with applicable conduit.
 3. Gasketed, watertight cover with stainless steel fasteners for exterior applications.
- G. Type: Recessed Combination Power/Telecommunications Box.
1. Basis of Design: Hubbell HBL 260 Series.
 2. Dimensions: 4 11/16-inch by 4 11/16-inch square, 3 1/4-inch depth.
 3. 66.7 cubic inch capacity.

4. Galvanized steel construction.
5. Concentric knockouts from 1/2-inch to 2-inch.
6. Low voltage partition to separate power and low voltage wiring.
7. Provide with single- or two-gang plaster ring as indicated on drawings, ring depth as required by wall finish.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

- A. Refer to Section 26 05 33 "Raceways and Boxes for Electrical Systems" for application schedule for raceways.

3.2 PATHWAY INSTALLATION

- A. General Requirements:
 1. Refer to Section 26 05 33 "Raceways and Boxes for Electrical Systems" for installation guidelines for raceways.
 2. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
 3. Comply with installation requirements in Section 27 15 13 "Communications Copper Horizontal Cabling".
- B. Additional Requirements: Comply with the following requirements for communications pathways in addition to the requirements found in the sections listed above.
 1. Comply with the following standards for installation requirements for communications pathways:
 - a. NECA/BICSI 568.
 - b. TIA-569-D.
 2. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches of changes in direction. Utilize long radius ells for all optical-fiber cables.
 3. Stub-outs to Above Recessed Ceilings:
 - a. Provide minimum one 1-inch conduit, unless noted otherwise, up from each communications outlet box concealed in wall and stub-out above accessible ceiling.
 - b. Use a conduit bushing or insulated fitting to terminate stub-outs not terminated in hubs or in an enclosure.
 4. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets.
 5. Install insulated bushings on conduits terminated with locknuts.
 6. Install all supports and hardware required to attach communications pathways to building structure. Communications pathways shall not be attached to or supported from conduits, boxes, piping, ceiling support systems, or the work of other trades. Install cabling in pathways, do not support cabling directly from building structure.
 7. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.

- C. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:
1. 3/4-Inch Trade Size and Smaller: Install pathways in maximum lengths of 50 feet.
 2. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.
 3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- D. Optical-Fiber Cable Pathway (Innerduct) Installation:
1. Install all interior fiber optic cabling in innerduct to within 12 inches of termination enclosure. Install all exterior fiber optic cabling in innerduct. Provide one 1 1/4-inch and two 1-inch innerduct in each 4-inch conduit, unless noted otherwise.
 2. Install pull string in all innerduct.
- E. Hooks:
1. Size to allow a minimum of 25 percent future capacity without exceeding design capacity limits.
 2. Shall be supported by dedicated support wires. Do not use ceiling grid support wire or support rods.
 3. Hook spacing shall allow no more than 6 inches of slack. The lowest point of the cables shall be no less than 6 inches adjacent to ceilings, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
 4. Space hooks no more than 4 feet o.c.
 5. Provide a hook at each change in direction.
 6. Do not install more than 50 cables per hook.
 7. Provide additional hooks for all pathways consisting of more than 40 communications cables.
 8. Cabling shall be bundled according to purpose. Provide separate hook for data and voice cabling from other communications cabling. Non-category-rated communications cabling shall be installed in separate hooks from category-rated communications cabling.
- F. Mounting Heights:
1. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
 2. Coordinate location and mounting heights of all outlets with Architect and Owner before rough-in.
 3. Height of communication outlet boxes shall be as follows, unless noted otherwise on drawings:
 - a. Standard Data and Telephone Outlets: 18 inches above finished floor.
 - b. Standard Data and Telephone Outlets, Mounted Above Counter: 6 inches above counter backsplash, unless noted otherwise. Coordinate height with Architectural elevations before rough-in.
 - c. Wireless Access Point Outlets: Install above ceiling at location shown for accessible ceiling areas, install flush recessed in ceiling for non-accessible ceiling locations.
 - d. Equipment Outlets: Coordinate location and mounting height with contractor responsible for supplying and installing equipment.

- e. Wall-Hung Monitors, Televisions, and Projectors: As indicated on drawings.
- f. Other System Outlets: As indicated on drawings.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

3.4 Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 05 44 "Sleeves and Sleeve Seals for Electrical Raceways and Boxes." FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 26 84 13 "Penetration Firestopping".

END OF SECTION