

SECTION 27 05 28
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 STIPULATIONS

- A. The specifications sections "General Conditions to the Construction Contract", "Special Conditions" and "Division 01 – General Requirements" form a part of the Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 SUMMARY

- A. This section includes the minimum requirements for communications cable pathway installations in the data center or common areas.
- B. Coordinate layout of work with other trades. Make minor adjustments in location required for coordination. Locations of structural systems, heating work and plumbing lines shall take preference over locations of conduit lines where conflict occurs. Structural systems, heating work, and plumbing lines shall not interfere with or otherwise impede the routing of communication cabling with cable tray, raceways, or other pathways dedicated to communications. All potential issues shall be brought to the attention of the General Contractor or Construction Manager immediately, before proceeding with installation.
- C. Other than minor adjustments shall be submitted to the General Contractor or Construction Manager for approval before proceeding with the work.

1.3 REFERENCES

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.
- B. Related Documents and Sections:
1. Division 01 – General Requirements
 2. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables
 3. Section 26 05 26 – Grounding and Bonding for Electrical System
 4. Section 26 05 29 – Hangers and Supports Electrical Systems
 5. Section 26 05 33 – Raceways and Boxes for Electrical Systems
 6. Section 26 05 36 – Cable Trays for Electrical Systems
 7. Section 26 05 44 – Sleeves and Sleeve Seals for Electrical Raceways and Cabling
 8. Section 26 27 26 – Wiring Devices
 9. Section 27 00 00 – Communications General
 10. Section 27 05 26 – Grounding and Bonding for Communications Systems
- C. The following codes, associations, acts and agencies, as required by law;
1. NFPA-70, 2011 (National Electric Code)
 2. National Electrical Safety Code (NESC)
 3. Occupational Safety and Health Administration (OSHA)

D. The current edition of the following standards:

1. NEMA VE 2 – 2013 – Cable Tray Installation Guidelines.
2. ANSI/TIA-569-C – Telecommunications Pathways and Spaces
3. ANSI C80.1 – American National Standard for Electrical Rigid Steel Conduit
4. ANSI C80.3 – American National Standard for Steel Electrical Metallic Tubing
5. UL 6 – Electrical Rigid Metal Conduit – Steel
6. UL 514B – Conduit, Tubing, and Cable Fittings
7. UL 797 – Standard for Electrical Metallic Tubing – Aluminum and Stainless Steel
8. ANSI/TIA-607-C – Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises

E. The current edition of the following guidelines:

1. BICSI, Telecommunications Distribution Methods Manual (TDMM)

F. When a discrepancy arises between the above-mentioned codes, standards or guidelines and the standards contained in this document, it shall be brought to the attention of the Owner immediately for resolution. The more stringent of the two guidelines shall be implemented.

1.4 SYSTEM DESCRIPTION

- A. This section includes secure support from the building structure for technology items by means for cable tray, hangers, supports, anchors, sleeves, inserts, and associated fastenings.
- B. All support shall utilize threaded fasteners for all technology/attachments.
- C. Supports, anchors, sleeves and seals furnished as part of factory-fabricated equipment, are specified as part of that equipment assembly or as specified in Division 26.
- D. Wire basket and trough cable tray support systems are defined to include, but are not limited to straight sections of continuous tray, field formed horizontal and vertical bends, tees, drop outs, supports and accessories.
- E. The work covered under this section consists of furnishing all necessary coordination, labor, supervision, materials, equipment, tests and services required to install complete cable basket systems within all areas, as indicated within project Drawings.

1.5 SUBMITTALS

- A. Refer to Section 27 00 00 – Communications General
- B. Shop drawings showing construction details and locations of components, and description and routing of cable tray.
- C. Provide table of contents with all product names, manufacturer, and specific product number identified to accompany manufacturer's product information cut sheets or specifications sheets.

1.6 QUALITY ASSURANCE

- A. All cable and equipment shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner or Owner Representative. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.
- B. Strictly adhere to all Building Industry Consulting Service International (BICSI), Electronic Industries Alliance (EIA) and Telecommunications Industry Association (TIA) recommended installation practices when installing data cabling.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. WBT
- B. Chatsworth Products Incorporated (CPI) – Universal Tray
- C. Panduit Corporation - FiberRunner
- D. Hoffman
- E. Hubbell Incorporated
- F. Raco
- G. Wiremold/Legrand
- H. Erico
- I. Cooper B-Line

2.2 CABLE TRAY AND SUPPORT SYSTEM

- A. Wire Basket Cable Tray
 - 1. Shall be made of high strength steel wires and formed into a standard 2 inch by 4-inch wire mesh pattern with intersecting wires welded together. All wire ends along wire basket sides (flanges) shall be rounded during manufacturing for safety of cables and installers.
 - 2. Straight sections shall be furnished in standard lengths.
 - 3. Wire basket shall have a minimal 2 inch usable loading depth by the width identified on the drawings.
 - 4. All fittings shall be field formed as needed.
 - 5. The installation and all fittings of all raceways shall allow Category cable and fiber optic cable to be pulled in and through in such a manner as to not exceed the pulling tension or minimum bending radius.
 - 6. All splicing assemblies shall be the bolted type using flange locknuts.
 - 7. Cable tray supports shall be end support hangers only (no center supports), trapeze hangers or wall brackets and shall be supported by 1/4 inch or 3/8 inch diameter rods, with rubber or plastic covers on all exposed all-thread to prevent cable damage.

8. Special accessories shall be furnished as required to protect, support and install all cable tray support systems.

2.3 NON-CONTINUOUS CABLE SUPPORT (J-HOOK) SYSTEM

- A. J-hook shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables and be UL Listed.
- B. J-hook shall have flared edges to prevent damage while installing cables.
- C. Provide drop wire supports and threaded rod assemblies in areas where structural mounting surfaces are non-functional or inaccessible.
- D. J-hook sized 1-5/16 inches and larger shall have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall be removable, reusable, and suitable for use in air handling spaces.

2.4 METAL CONDUITS AND FITTINGS

- A. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Galvanized Rigid Steel Conduit
 1. Shall be hot-dipped galvanized steel, including the threads.
- C. Electrical Metallic Tubing
 1. Shall be electro-galvanized steel.
- D. Fittings for Metal Conduits
 1. Galvanized Rigid Steel fittings shall be fully threaded and shall be the same material as the respective system.
 2. Electrical Metallic Tubing fittings shall be single screw indenter fittings for conduits up to 2 inches and double screw indenter fittings for conduits 2 inches and larger.

2.5 SURFACE METAL PATHWAYS

- A. Description:
 1. Anodized aluminum, nonmetallic, or steel raceway with snap-on covers, complying with UL.
 2. Single or multi-channel
 3. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. Comply with TIA-569.

2.6 BOXES, ENCLOSURES AND CABINETS

- A. Shall be constructed of no less than 14-gauge galvanized steel with trim for flush or surface mounting.

- B. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Provide screw-on type cover boxes to be installed in damp or wet locations. Shall be of rain-tight construction with gasketed cover and threaded conduit hubs.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cable tray where indicated; in accordance with manufacturer's instructions.
- B. Coordinate cable tray with other electrical and mechanical work as necessary to properly interface installation.
- C. Provide sufficient space encompassing cable tray to permit access for installing and maintaining cables.
- D. Should cable tray penetrate a wall that has an STC rating, the penetration shall be repaired to maintain specified STC rating.
- E. Install all raceways parallel to the wall or ceiling lines unless otherwise noted.
- F. Support cable raceways every 4 feet minimum and at 6 inches from ends.
- G. Route pathways a minimum of 6 inches of clearance from fluorescent light fixtures
- H. Separation guidelines for routing pathways from power lines and equipment:

Separation of Telecommunications Pathways from Power Lines			
Minimum Separation Distance			
Condition	<2KV	2-5KV	>5KV
Unshielded power lines or electrical equipment in proximity to open or non-metal raceways.	5 inches	12 inches	24 inches
Unshielded power lines in proximity to a grounded metal raceways.	2.5 inches	6 inches	12 inches
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal raceways.	N/A	3 inches	6 inches

- I. All technology conduits are to be provided with nylon bushings to allow for cable pulling without damage.
- J. In areas without suspended ceilings, install cable tray raceways 12 inches below the lowest obstruction unless otherwise directed.

- K. 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 elbows for all optical-fiber cables.
- L. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- M. J-hooks shall be located at intervals of 60 inches or less.
- N. J-hooks shall be selected to accommodate the immediate and anticipated future quantity and weight of cables. Size J-hooks to allow for a maximum of 25% future capacity.
- O. J-hooks shall be installed such that cable slack between supports is a minimum of 6 inches above ceilings.
- P. Provide adequate j-hooks to ensure telecommunications cabling is a minimum of 6 inches from light fixtures and power conduits.
- Q. Where telecommunications cabling is being supported by j-hooks, provide a j-hook at every change in direction.
- R. When telecommunications cables are being routed in an area that is exposed to the above structure route cables in conduits. Where ceiling is acoustical ceiling tiles j-hooks are permitted.
- S. 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. Cap underground pathways designated as spare above grade alongside pathways in use.
- T. Mount boxes at heights indicated on Drawings. 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.
- U. Horizontally separate boxes mounted on opposite sides of walls so that they are not in the same vertical channel.
- V. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- W. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- X. The standard outlet shall consist of:
 - 1. 1 inch EMT conduit in wall cavity
 - 2. 4-11/16 in square x 2-18 inch deep junction box with 1 gang plaster ring
 - 3. Exceptions:
 - a. Wall Phones – 1 gang with 3/4 inch EMT
 - 4. Refer to TA-Series Drawings for AV junction box gang size.
- Y. Conduits and cable tray shall be sized to occupy 40% fill for future growth.
- Z. Coordinate the location of floor boxes and poke-throughs with furniture layout. Provide coordination drawings for approval.

3.2 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage or deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
- B. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION