

SECTION 27 05 28  
COMMUNICATIONS BUILDING PATHWAYS  
Construction Specifications

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Pathway systems within buildings to support low voltage systems (telecommunications, television, paging, and other signal (low voltage) systems) - namely cable hangers and rated sleeves.
- B. Related Sections
  - 1. Comply with the Related Sections paragraph of Section 270000.
  - 2. Section 270533, "Communications Conduits and Boxes"
  - 3. Section 270536, "Communications Cable Trays"
  - 4. Section 270526, "Communication Grounding and Bonding"
  - 5. Section 271100, "Communication Rooms"

1.2 REFERENCES

- A. Comply with the References requirements of Section 270000.
- B. In addition to those codes, standards, etc., listed in 270000, comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:
  - 1. Underwriters Laboratories (UL)
    - a. UL 5, "Standard for Surface Metal Raceways and Fittings"
    - b. UL 5A, "Nonmetallic Surface Raceways and Fittings"
    - c. UL 5C, "Standard for Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits"
  - 2. Underwriters Laboratories (UL)
    - a. UL 467, "Grounding and Bonding Equipment"

1.3 DEFINITIONS

- A. Definitions of Section 270000 apply to this Section.
- B. In addition to those Definitions of Section 270000, the following list of terms as used in this Section defined as follows:
  - 1. "Cable Hanger": A cable support component often shaped (section view) similar to the letter J (thus gaining the nickname "J hanger"), metallic (most often steel) or non-

metallic (most often thermoplastic); available in different sizes (to support different quantities of cables) and with different attachment hardware suiting multiple installation methods (e.g., wire support, beam flange clip, etc.).

2. "Cable Strap": A flexible cable support that generally 'wraps' around cables and 'latches' into a fixed position, most often textile, available in different sizes (to support different quantities of cables) and with different attachment hardware suiting multiple installation methods (e.g., wire support, beam flange clip, etc.).
3. "J Hanger" and "J Hook": nickname for cable hanger
4. "NEC": National Electrical Code (NFPA 70)
5. "NFPA": National Fire Protection Agency
6. "UL": Underwriters Laboratories

#### 1.4 SYSTEM DESCRIPTION

##### A. Base Bid Work:

1. The Work of this section includes planning and coordination with General Contractor (and other trades) of inside plant pathway systems and components, furnishing necessary materials, and labor and associated services required to install pathways.

##### B. Cable Hanger Systems

1. Provide a complete cable hanger system compliant with requirements of the CEC (in particular, compliant with the requirements of Article 300.11), in accordance with NECA's "Standards of Installation" (pertaining to general electrical installation practices), compliant with applicable portions of NFPA 70B, in accordance with manufacturer's instructions, and in accordance with recognized industry practices. A "complete system" shall include cable hangers, supports, anchors, fasteners, and other required accessories.
2. Provide cable hangers between primary pathways (or telecommunications rooms) and work area pathways and/or outlet locations at intervals up to 48 inches on center per a given route, at transitions downward/upward, and within 24 inches of an outlet stub/outlet location.
3. Supports:
  - a. Provide dedicated supports for cable hangers. Do not support cable hangers on ceiling grid support wires. Do not share supports with other trades. Do not support hangers from ductwork, piping, or other equipment hangers.
  - b. Support Wires:
    1. Support wires shall consist of #12 drop wire (or as approved) with integral clip and fastener (such as power-actuated deck pin, beam flange, or other fastener appropriate for the use).
    2. Secure support wires at both ends in accordance with CEC.

- c. Support Rods:
  - 1. Support rods shall consist of 1/4 inch (6.3mm) or 3/8 inch (9.5mm) threaded or smooth rod and concrete anchor or beam flange clip or angled flange clip (as required for attachment to the building structure).
- 4. Clearances (minimum):
  - a. From fluorescent light fixtures, or other EMI sources = 6 inches (150 mm)
  - b. From any motor = 48 inches (1,220mm)
  - c. From flue, hot water, steam line or other non-insulated heat sources = 12 inches (300 mm)

#### C. Fire Rated Sleeves

- 1. Provide complete fire rated sleeve systems where shown on the drawings and where cables penetrate rated walls, in accordance with ASTM E814 (UL1479). Complete shall include sleeves, brackets, frames, plates, etc, and other required accessories necessary for a complete installation according to UL System drawings.
- 2. Provide complete fire rated sleeve systems equal to (or greater than) the F rating of the barrier in which the device is installed.
- 3. Provide a system label at each penetration instance.

#### D. Surface Raceway

- 1. Provide a complete surface raceway system in accordance with NEC Article 386 and or NEC Article 388 where required by manufacturer's installations. Complete shall include base and cover straight sections, couplers, corners, 'T' junctions, feed connectors, compartment dividers, end caps, and hardware required for a fully enclosed pathway system that fully houses and conceals cables and wires. Refer to Drawings for locations and routes.
- 2. Surface raceway shall be mechanically and electrically continuous. Bond surface raceway system to approved electrical ground in accordance with NEC Article 250 and ANSI-J-STD-607-A. Provide bonding straps where necessary to assure electrical continuity.
- 3. Surface raceway shall have a minimum two inch radius control at all bend points.
- 4. Coordinate raceway lengths with building walls, counter, and other actual field conditions. Raceways mounted above benches and counters shall align with each end of bench or counter, within 1/16-inch tolerance.
- 5. Finish:
  - a. Paint surface raceway system to match existing walls.
  - b. Touch-up any marks, blemishes or other finish damage suffered during installation.

- E. Spiral Wrap
  - 1. Provide spiral wrap to support and dress cables from feed pathways to the point where the cables enter the furniture system.

## 1.5 SUBMITTALS

- A. General: Conform to Submittal requirements as described in Section 270000.
- B. Quantity: Furnish quantities of each submittal as noted in Section 270000.
- C. Submittal Requirements Prior to the Start of Construction:
  - 1. Product Data Submittal, showing product dimensions, fabrications materials, fabrication details, knockout sizes and locations, capacities, finishes, and accessories
  - 2. Shop Drawings Submittal, consisting of proposed changes to pathways (routes, types, sizes, etc.) compared to the contract documents
  - 3. Seismic Calculations for Anchoring and Bracing: Submit seismic calculations for support systems in conformance Section 270000. Calculations shall be prepared and signed by a Structural Engineer registered in the state of California. If used, specify proof loads for drilled-in anchors.
- D. Submittal Requirements at Close Out:
  - 1. As-Built Drawings, showing the routes/locations, dimensions, types, sizes, quantities, etc., of pathways/pathway devices.
  - 2. O&M Manual, including as-builts, a parts list, repair information, and detailing ongoing maintenance requirements
- E. Substitutions
  - 1. Requests for substitutions shall conform to the general requirements and procedure outlined in Section 270000.

## 1.6 QUALITY ASSURANCE

- A. Comply with Quality Assurance requirements of section 270000.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Delivery, Storage and Handling requirements of section 270000.

## 1.8 WARRANTY

- A. Comply with Warranty requirements of section 270000.

## PART 2 PRODUCTS

### 2.1 HANGERS AND STRAPS

- A. Application: Suitable for indoor installation within ceiling space for the support of communications cables.

- B. Hanger shall be rated for use in air handling space.
- C. Hangers shall contain a closing loop, retainer, or latch to prevent cables from falling off the hanger.
- D. Manufacturer:
  - 1. CEAS "Stiffy" low voltage supports (such as Figure 200 series)
  - 2. Eaton B-Line
    - a. #BCH21-W2; for drop wire installation
    - b. #BCH32-W2; for drop wire installation
    - c. #BCH21; for wall installation
    - d. #BCH32; for wall installation
  - 3. Erico
    - a. #CAT12 (or variation per installation method); cable hanger
    - b. #CAT21 (or variation per installation method); cable hanger
    - c. #CAT32 (or variation per installation method); cable hanger
    - d. #CAT425 (or variation per installation method); cable strap
  - 4. Panduit
    - a. #JMJD2-X20
  - 5. Or equal

## 2.2 DROP WIRE

- A. Application: Suitable for indoor installation within ceiling space into structure above (e.g., deck or slab) for the support of cable supports such as cable hangers.
- B. Listings: UL 2043, for use in air handling spaces
- C. Drop wire shall be equipped with pre-mounted ceiling clip, fastening pin, and pre-tied wire. Pin shall be 7/8". Wire shall be 12 gauge.
- D. Manufacturers:
  - 1. Hilti #CC27 X-AL-H22P8T x ft. PT (100); drop wire assembly, "x" for length
  - 2. Armstrong #7891
  - 3. Dottie #CWC
  - 4. Garvin Industries
  - 5. Oregon Wire Products
  - 6. Or Equal

### 2.3 DROP ROD

- A. Application: Suitable for indoor installation within ceiling space into building structure above (e.g., deck or slab) for the support of cable supports such as cable hangers.
- B. Listings: UL 2043, for use in air handling spaces
- C. Zinc plated for corrosion resistance
- D. Manufacturers:
  - 1. CEAS #01014801; "Stiffy" straight rod, 1-1/4" power-actuated pin, 48 inches (or configured as required per instance)
  - 2. Or equal

### 2.4 FIRE RATED SLEEVE

- A. Application: Suitable as a sleeve for cables to pass through a full-height partition or floor, and as a through-penetration fire stop system maintaining the fire rating of the penetrated partition.
- B. Sleeve system shall be tested in accordance with ASTM E 814 (ANSI/UL1479).
- C. Sleeve system shall be UL Listed and shall bear a UL Classification marking.
- D. Sleeve system shall match (or exceed) the partition's/floor's F and T rating.
- E. Manufacturers:
  - 1. Hilti
    - a. #236323; "CP 653 Speed Sleeve", 2-inch round sleeve kit
    - b. #236324; "CP 653 Speed Sleeve", 4-inch round sleeve kit
  - 2. Specified Technologies Inc (STI)
    - a. #EZD22; "EZ Path Series 22", 2-inch square sleeve kit #EZDP33FWS; "EZ Path Series 33" 3-inch square sleeve kit
    - c. #EZDP233GK; "EZ Path Series 33" 2 gang 3-inch square sleeve kit
    - d. #EZDP333GK; "EZ Path Series 33" 3 gang 3-inch square sleeve kit
    - e. #EZDP433GK; "EZ Path Series 33" 4 gang 3-inch square sleeve kit
    - f. #EZDP733GK; "EZ Path Series 33" 7 gang 3-inch square sleeve kit
    - g. #EZDP133CWK; "EZ Path Series 33" 3-inch square sleeve kit with circular wall plates
    - h. #EZDP33WR; "EZ Path Series 33" 3-inch square sleeve kit with retrofit/repair wall plates
    - i. #EZDP133FK; "EZ Path Series 33" 3-inch square sleeve kit with kick plate

- j. #EZDP133CAK; “EZ Path Series 33” 3-inch square sleeve kit with attach plates for 4-inch conduit
- k. #EZD33FWS; “EZ Path Series 33” 3-inch square sleeve
- l. #EZP133W; “EZ Path Series 33” wall plates (1 pair) for EZD33FWS sleeve
- m. #EZP233W; “EZ Path Series 33” wall plates (1 pair) for 2 EZD33FWS sleeves
- n. #EZP333W; “EZ Path Series 33” wall plates (1 pair) for 3 EZD33FWS sleeves
- o. #EZP433W; “EZ Path Series 33” wall plates (1 pair) for 4 EZD33FWS sleeves
- p. #EZP733W; “EZ Path Series 33” wall plates (1 pair) for 7 EZD33FWS sleeves
- q. #EZP133CW; “EZ Path Series 33” circular wall plates (1 pair) for EZD33FWS sleeve
- r. #EZP133K; “EZ Path Series 33” kick plate for EZD33FWS sleeve
- s. #EZP133CA; “EZ Path Series 33” attach plates (1 pair) to 4-inch conduit for EZD33FWS sleeve
- t. #EZP133R; “EZ Path Series 33” repair/retrofit wall plates (1 pair) for EZD33FWS sleeve
- u. #EZP133PC; “EZ Path Series 33” positioning clamps for EZD33FWS sleeve
- v. #EZD33E; “EZ Path Series 33” extension kit for EZD33FWS sleeve
- w. #RCM33; radius drop out for “EZ Path Series 33” sleeve
- x. #EZDP44; “EZ Path Series 44” 4-inch square sleeve kit
- y. #EZDP144FK; “EZ Path Series 44” 4-inch square sleeve kit with kick plate
- z. #EZDG444; “EZ Path Series 44” 4-inch square kit with 4 sleeves and 1 grid
- aa. #EZD44; “EZ Path Series 44” 4-inch square sleeve
- bb. #EZP144W; “EZ Path Series 44” wall plates (1 pair) for EZD44 sleeve
- cc. #EZP544W; “EZ Path Series 44” wall plates (1 pair) for up to 5 EZD44 sleeves
- dd. #EZP144K; “EZ Path Series 44” kick plate for EZD44 sleeve
- ee. #EZG844; “EZ Path Series 44” grid for 8 sleeves
- ff. #EZG1644; “EZ Path Series 44” grid for 16 sleeves

gg. #TRK444; T-rating kit, for 4 Series 44 sleeves

## 2.5 SURFACE RACEWAY – SINGLE CHANNEL

- A. Application: Pathway system specifically designed and intended for surface-mounting to walls that house, route, and protect communications (and other signal) wiring and, as applicable, power wiring, and present communications (and other signal) and power services via standard receptacles.
- B. Material: Raceway's base, cover, couplers, and end plates shall be fabricated from cold rolled steel, 0.094 inch thickness minimum.
- C. Size: Raceway size and length as shown on Drawings or, if not expressly shown, as required for the intended use.
- D. Fittings: Boxes, extension rings, couplings, elbows, and connectors shall be designed for use with raceway system.
- E. Finish: Primed and finished with power coated or similar 'paintable' finish.
- F. Raceway shall be UL listed and labeled as such.
- G. Assembly: Installed and fully assembled raceway shall fully house and conceal cables and wires, shall hold cables and wires securely in place (such as wire retention clips), shall accept the communications connectors as specified in Section 271513, shall accept wiring devices (e.g., NEMA 5-20R or similar) as specified in Division 26.
- H. Double compartment / Two-channel raceway shall come factory pre-assembled, pre-cut and complete, including bases, covers, end plates, compartment dividers, wiring, receptacles, fittings and connections as required. U.L. labeled.

## 2.6 SPIRAL WRAP

- A. Application: Suitable for an indoor installation for the support of telecommunications cables from a feed pathway to furniture systems, or similar.
- B. Material shall be flame retardant polyethylene (UL94V-0), or equivalent.
- C. Color: Black.
- D. Size: As required to support the given cable bundle size (e.g., 3/4" minimum).
- E. Manufacturers:
  - 1. Panduit
  - 2. Or equal

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Comply with the Execution requirements of Section 270000.



### 3.2 EXAMINATION AND PREPARATION

- A. Prior to starting the work of this section, examine areas to receive pathways systems to verify conditions are ready for work and to verify conformance with manufacturer and specification tolerances. Notify the Owner's Representative in writing of conditions that would adversely affect the installation, or subsequent utilization, of the system. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Prior to installation, plan routes and locations of pathway systems and coordinate with other trades (ductwork, plumbing, electrical raceways, wall construction, ceilings, etc.). Pathway systems shall not unnecessarily cross other trade's work, shall not prevent removal of ceiling tiles or panels, and shall not block access to mechanical or electrical equipment. Provide offsets as required to avoid obstruction of pathway systems with other trades.

### 3.3 INSTALLATION

- A. Linear Ring Pathway System
  - 1. Install the system compliant to applicable portions of NFPA 70B and NECA's "Standards of Installation" pertaining to general electrical installation practices.
  - 2. Install system at locations indicated on the drawings. Routes are diagrammatic in nature. Field verify route prior to installation.
  - 3. Install system a minimum of 6" (150mm) from light fixtures, or other EMI sources. Install system between 6" (150mm) and 12" (300mm) above ceiling grid.
  - 4. Properly bond system to approved ground, as per <CEC><NEC 70 Article 250>.
- B. Hangers and Straps
  - 1. Install hangers so they are accessible through the ceiling grid and are not blocked by other building infrastructure.
  - 2. Install hangers above ceiling grid to result in cables sag 6 to 12 inches (150 to 300 mm), minimum, above ceiling grid. Cables shall not rest on the ceiling grid and/or ceiling tiles.
  - 3. Where hangers have loops/retainers, close loop/retainer (latch after cable installation).
- C. Fire Rated Sleeve
  - 1. Install the sleeves in strict accordance with the UL System drawing, with the approved shop drawings, and with the equipment manufacturer's instructions.
  - 2. Framed Walls – Pre-Framed and Cut-In
    - a. Coordinate location of penetration with other trades such as framing (wall studs), electrical (lighting), mechanical (ducts), and other trades.
    - b. For cut-in instances, cut wallboard to fit rated sleeve system – no more wallboard than is necessary to fit the system.
    - c. Apply the factory-supplied gasket prior to the installation of the wall plates.

- d. Secure wall plates to sleeves per the equipment manufacturer's recommendations.
  3. Affix a label at each fire sleeve location onto the wall or floor – within 2 to 3 feet. Place label in a location that will not be obscured after cables get installed through the sleeve. Label shall describe the system's applicable ratings, such as F, T, and L ratings.
- D. Surface Raceways
1. Install surface raceway in accordance with CEC Article 352 and in accordance with ANSI/TIA-569-B.
  2. Install surface raceway systems free from dents, bruises or deformations. Remove and replace any damaged products with new undamaged material.
  3. Securely support surface raceway straight sections at intervals not exceeding 10 feet (3m) or in accordance with manufacturer's installation sheets. Securely fasten together straight sections and fittings using manufacturers' instructions and approved couplings and/or fasteners.
  4. Install surface raceway level, plumb, and parallel/perpendicular to surfaces or exposed structural members. Follow surface contours where possible.
  5. Use flat-head screws to fasten base to surfaces/substrate.
  6. Close unused raceway openings.
  7. Vacuum clean surface raceway after installation.

#### 3.4 FINAL INSPECTION AND CERTIFICATION

- A. Punch the Work of this Section compliant to the requirements of Section 270000.
- B. Comply with system acceptance and certification requirements of Section 270000.

END OF SECTION