SECTION 26 05 36
CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufacturers
2. Materials and Finishes
3. Cable Tray Accessories
4. Warning Signs
5. Source Quality Control

B. Meet the following performance requirements:

1. Seismic performance: In accordance with Section 26 00 10.

C. System Description:

1. Raceways to support electrical systems.

1.2 RELATED SECTIONS

A. Section 26 00 10 – Basic electrical requirements, is an integral part of this section. Requirements and work indicated in 26 00 10 are not repeated in this Section.

1.3 COORDINATION

A. Coordinate work under provisions indicated in Section 26 00 10.

1.4 QUALIFICATIONS / QUALITY ASSURANCE

A. Conform to requirements indicated in Section 26 00 10.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements indicated in Section 26 00 10.

B. ASTM A-123: Hot Dip Galvanized After Fabrication.

C. ASTM A-525: Hot-Dip Mill Galvanized Before Fabrication.

D. NEMA VE 1: Metallic Cable Tray Systems.ANSI/TIA/EIA - 568-B Commercial Building Telecommunications Cabling Standard.

E. ANSI/TIA/EIA – 569-A Commercial Building Standard for Telecommunications Pathways and Spaces

1.6 SUBMITTALS

A. Submit as required here in and under Section 26 00 10.

B. Shop Drawings: Indicate tray type, material dimensions, support points, expansion splice plates, NEMA class, and finishes.

C. Product Data: Provide data for fittings and accessories.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of product.

E. Submit cable each system capacity in pounds per linear foot. Submit deflection at stated capacity.

1.7 EXTRA MATERIALS

A. Furnish under provisions indicated in Section 26 00 10.

1.8 PROJECT RECORD DOCUMENTS

A. Submit under provisions indicated in Section 26 00 10.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit under provisions indicated in Section 26 00 10.

1.10 WARRANTY

A. Provide under provisions indicated in Section 26 00 10.

1.11 LEED / SUSTAINABILITY

A. Conform to requirements indicated in Section 26 00 10.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturer specified:

1. CPI, Chatsworth Products, Inc.
2. Chalfant Manufacturing Company.
3. Cooper B-Line, Inc.
4. Cope, T. J., Inc.; a subsidiary of Allied Tube & Conduit.
5. GS Metals Corp.; GLOBETRAY Products.
6. MONO-SYSTEMS, Inc.
7. MPHusky.
8. PW Industries.
9. Cable Management Solutions Inc.
10. Cablofil Inc.
11. Management Solutions Snake Tray
12. Newton Instrument Co.
13. Substitutions: Under provisions of Section 26 00 10.

2.2 MATERIALS AND FINISHES

A. Cable Trays, Fittings, and Accessories:

1. Steel, complying with NEMA VE 1Hot-dip galvanized after fabrication, complying with ASTM A 123/A 123M, Class B2; with chromium-zinc, ASTM F 1136, or Type 316 stainless-steel hardware.
2. Aluminum, complying with NEMA VE 1, Aluminum Association's Alloy 6063-T6 for rails, rungs, and cable trays, and Alloy 5052-H32 or Alloy 6061-T6 for fabricated parts; with

chromium-zinc, ASTM F 1136, or Type 316 stainless-steel splice-plate fasteners, bolts, and screws

3. Stainless steel, Type 304 or 316, complying with NEMA VE 1.
4. Fiberglass, complying with NEMA FG 1 and UL 568. Splice-plate fasteners, bolts, and screws shall be fiberglass-encapsulated stainless steel. Design fasteners so that no metal is visible when fully assembled and tightened. Fastener encapsulation shall not be damaged when torqued to manufacturer's recommended value.
5. Black Powder Coat: Straight sections shall be powder coated black with an average paint thickness of 1.2mils (30microns) to 3.0mils (75microns).
6. Electroplated zin alvanized finish shall not be used in computer room, crac gallery or POP rooms.

B. Sizes and Configurations: Refer to Part 3 and the Drawings for specific requirements for types, materials, sizes, and configurations.

1. Center-hanger supports may be used only when specifically indicated.

2.3 CABLE TRAYS

A. Ladder Cable Trays: Nominally 18 inches (455 mm) wide, and a rung spacing of 12 inches (305 mm).

B. Smooth radiused 90-degree fittings shall be constructed from ASTM A1011 SS Grade 33 steel. They shall have a minimum 12 inch inside radius

2.4 BASKET CABLE TRAY

A. Basket Cable Trays: 12 inches (300 mm) wide and 4 inches (100 mm) deep. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).

B. Smooth radiused 90-degree fittings shall be constructed from ASTM A1011 SS Grade 33 steel. They shall have a minimum 12 inch inside radius

2.5 RUNWAY CABLE TRAY

A. Description: Except as otherwise indicated, provide metal cable runways, of types, classes and sizes indicated with splice connectors, bolts, nuts and washers for connecting units.

B. Support Span:

1. 4 Foot Span 350 lbs per LF with Solid rails.
2. 4 Foot Span 200lbs per LF Tubular rails.

C. Runway Types: Material specifications for each runway type are as follows:

1. Communication Cables Tubular Bar style runway: Runway shall be zinc plated and black ladder type with 2 inch side rail height with welded rungs. Stringer side rail shall conform to the minimum chemical and mechanical properties of ASTM A36 structural steel.
2. Cable runway rungs shall be constructed from ASTM A1011 SS Grade 33 structural steel. Each rung shall be 1/2 inch by 1 inch steel c-channel shape with radiused edges.
3. Runway shall be 18, 24 or 36 inches wide and at lengths required to route as indicated on drawings.

D. Finishes: Cable runway shall be provided with black finish. All fittings, supports, splices, rods, clamps etc. for the runway system shall be gold chromate finish and installed to provide a complete assembly- including fasteners, hardware, and other items required to complete the installation as indicated on the drawings.

1. Smooth radiused 90-degree fittings shall be constructed from ASTM A1011 SS Grade 33 steel. They shall have a 12 inch inside radius and 3 inch straight tangents for secure attachment to straight sections. Rungs shall be spaced a maximum of 6 inches on center when measured along centerline of runway.

2. Provide rubber finishing caps at ends.

2.6 CABLE TRAY ACCESSORIES

A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.

B. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

C. Turns, elbows, tees, crosses etc shall be large radius.

D. Waterfalls shall be provided at each location cable drop out of tray without conduit.

E. Barrier Strips: Same materials and finishes as cable tray.

2.7 WARNING SIGNS

A. Lettering: 1-1/2-inch- (40-mm-) high, black letters on yellow background with legend "WARNING! NOT TO BE USED AS WALKWAY, LADDER, OR SUPPORT FOR LADDERS OR PERSONNEL."

B. Materials and fastening are specified in Division 26 Section "Identification for Electrical Systems."

2.8 SOURCE QUALITY CONTROL

A. Perform design and production tests according to NEMA FG 1 and NEMA VE 1.

PART 3 - EXECUTION

3.1 CABLE TRAY APPLICATIONS

A. Power Feeders:
   1. Ladder cable tray

B. Power Branch Circuits:
   1. Above raised floors:
      a. Ladder cable tray
   2. Below raised floor:
      a. Ladder cable tray
      b. Basket cable tray

C. Communication Cables:
   1. Above raised floors
      a. Ladder cable tray
      b. Basket cable tray
   2. Below raised floors
      a. Ladder cable tray
      b. Basket cable tray
   3. In communication rooms (pop, meet me room, entrance room, MDF, IDF, etc).
      a. Runway cable tray

D. DC Power Cables:

1. Ladder cable tray

3.2 CABLE TRAY INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Comply with recommendations in NEMA VE 2. Install as a complete system, including all necessary fasteners, hold-down clips, splice-plate support systems, barrier strips, hinged horizontal and vertical splice plates, elbows, reducers, tees, and crosses.

C. Remove burrs and sharp edges from cable trays.

D. Fasten cable tray supports to building structure and install seismic restraints.

1. Design each fastener and support to carry load indicated by seismic requirements and to comply with seismic-restraint details according to Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
2. Place supports so that spans do not exceed maximum spans on schedules.
3. Construct supports from channel members, threaded rods, and other appurtenances furnished by cable tray manufacturer. Arrange supports in trapeze or wall-bracket form as required by application.
4. Support bus assembly to prevent twisting from eccentric loading.
5. Manufacture center-hung support, designed for 60 percent versus 40 percent eccentric loading condition, with a safety factor of 3.
6. Locate and install supports according to NEMA FG 1 and NEMA VE 1.

E. Support trays in accordance with Section 260529. Provide supports at each connection point, at the end of each run of each side of expansion connectors, within 2 feet, and at other points to maintain spacing between supports of 4 feet maximum for runway and basket tray and 10 maximum for ladder cable tray.

F. Provide sway supports that will support a 200 lb sideward thrust from either direction at least on each end of cable rack but not more than 40 feet apart.

G. Install expansion connectors where cable tray crosses building expansion joints and in cable tray runs that exceed dimensions recommended in NEMA FG 1 and NEMA VE 1. Space connectors and set gaps according to applicable standard.

H. Make changes in direction and elevation using standard fittings.

I. Make cable tray connections using standard fittings.

J. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping" and Section 26 05 00 "Common Work Results for Electrical."

K. Sleeves for Future Cables: Install capped sleeves for future cables through firestop-sealed cable tray penetrations of fire and smoke barriers.

L. Workspace: Install cable trays with enough space to permit access for installing cables.

M. Install barriers to separate cables of different systems, such as power, communications, and data processing; or of different insulation levels, such as 600, 5000, and 15 000 V.

N. After installation of cable trays is completed, install warning signs in visible locations on or near cable trays.

3.3 CABLE INSTALLATION

A. Install cables only when cable tray installation has been completed and inspected.

B. Fasten cables on horizontal runs with cable clamps or cable ties as recommended by NEMA VE 2. Tighten clamps only enough to secure the cable, without indenting the cable jacket. Install cable ties with a tool that includes an automatic pressure-limiting device.

C. On vertical runs, fasten cables to tray every 18 inches (457 mm). Install intermediate supports when cable weight exceeds the load-carrying capacity of the tray rungs.

3.4 CONNECTIONS

A. Ground cable trays according to manufacturer's written instructions.

B. Install an insulated equipment grounding conductor with cable tray, in addition to those required by NFPA 70.

C. Ground and bond cable tray under provisions of Section 260526 and as detailed on the Drawings.

1. Provide continuity between tray components. Provide bonding conductor or fitting between sections
2. Provide copper equipment grounding conductor through entire length of tray; bond to each component.
3. Connections to tray may be made using mechanical or exothermic connectors.

3.5 FIELD QUALITY CONTROL

A. After installing cable trays and after electrical circuitry has been energized, survey for compliance with requirements. Perform the following field quality-control survey:

1. Visually inspect cable insulation for damage. Correct sharp corners, protuberances in cable tray, vibration, and thermal expansion and contraction conditions, which may cause or have caused damage.
2. Verify that the number, size, and voltage of cables in cable tray do not exceed that permitted by NFPA 70. Verify that communication or data-processing circuits are separated from power circuits by barriers.
3. Verify that there is no intrusion of such items as pipe, hangers, or other equipment that could damage cables.
4. Remove deposits of dust, industrial process materials, trash of any description, and any blockage of tray ventilation.
5. Visually inspect each cable tray joint and each ground connection for mechanical continuity. Check bolted connections between sections for corrosion. Clean and retorque in suspect areas.
6. Check for missing or damaged bolts, bolt heads, or nuts. When found, replace with specified hardware.
7. Perform visual and mechanical checks for adequacy of cable tray grounding; verify that all takeoff raceways are bonded to cable tray.

B. Report results in writing.

3.6 PROTECTION

A. Protect installed cable trays.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by cable tray manufacturer.
3. Install temporary protection for cables in open trays to protect exposed cables from falling objects or debris during construction. Temporary protection for cables and cable tray can be constructed of wood or metal materials until the risk of damage is over.

END OF SECTION