

SECTION 26 05 36

CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal cable trays.

B. Products Installed, but Not Furnished, under This Section:

1. Section 07 84 13 "Penetration Firestopping" specifies firestopping products installed under this Section.
2. Section 26 05 26 "Grounding and Bonding for Electrical Systems" specifies grounding and bonding products installed under this Section.
3. Section 26 05 53 "Identification for Electrical Systems" specifies electrical equipment labels and warning signs installed by this Section.

1.2 ACTION SUBMITTALS

A. Product data.

B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CABLE TRAYS

A. Description: This product category covers metal cable trays and metal cable tray systems intended for field assembly and for use in accordance with Article 392 of NFPA 70.

B. Performance Criteria:

1. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

C. UL CYNW - Ladder Cable Tray :

1. General Characteristics:

- a. Configuration: Two longitudinal side rails with transverse rungs swaged or welded to side rails, complying with NEMA VE 1.
- b. Radius-Fitting Rung Spacing: 9 inch at center of tray's width.
- c. Minimum Cable-Bearing Surface for Rungs: 7/8 inch width with radius edges.
- d. No portion of the rungs must protrude below the bottom plane of side rails.
- e. Structural Performance of Each Rung: Capable of supporting a maximum cable load, with a safety factor of 1.5, plus a 200 lb. concentrated load, when tested in accordance with NEMA VE 1.
- f. Splicing Assemblies: Bolted type using serrated flange locknuts.
- g. Splice-Plate Capacity: Splices located within support span must not diminish rated loading capacity of cable tray.
2. Materials and Finishes (Steel):
 - a. Straight Section and Fitting Side Rails and Rungs: Steel complies with the minimum mechanical properties of ASTM A1011/A1011M, SS, Grade 33 .
 - b. Steel Tray Splice Plates: ASTM A1011/A1011M, HSLAS, Grade 50, Class 1.
 - c. Fasteners: Steel complies with the minimum mechanical properties of ASTM A510/A510M, Grade 1008.
 - d. Finish:
 - 1) Hot-dip galvanized after fabrication, complying with ASTM A123/A123M, Class B2, with galvanized, ASTM B633 hardware.
 - 2) paint, with chromium-zinc plated, ASTM F1136 hardware.
3. Options:
 - a. Width: 12 inch unless otherwise indicated on Drawings.

D. UL CYNW - Wire-Mesh Cable Tray :

1. General Characteristics:
 - a. Configuration: Galvanized-steel wire mesh, complying with NEMA VE 1.
 - b. Structural Performance: Capable of supporting a maximum cable load, with a safety factor of 1.5, plus a 200 lb. concentrated load, when tested in accordance with NEMA VE 1.
 - c. Splicing Assemblies: Bolted type using serrated flange locknuts.
 - d. Splice-Plate Capacity: Splices located within support span must not diminish rated loading capacity of cable tray.
2. Materials and Finishes (Steel):
 - a. Straight Sections and Fittings: Steel complies with the minimum mechanical properties of ASTM A1011/A1011M, SS, Grade 33 .
 - b. Steel Tray Splice Plates: ASTM A1011/A1011M, HSLAS, Grade 50, Class 1.
 - c. Fasteners: Steel complies with the minimum mechanical properties of ASTM A510/A510M, Grade 1008.
 - d. Finish:
 - 1) Hot-dip galvanized after fabrication, complying with ASTM A123/A123M, Class B2, with galvanized, ASTM B633 hardware.
 - 2) paint, with chromium-zinc plated, ASTM F1136 hardware.
3. Options:
 - a. Width: 12 inch unless otherwise indicated on Drawings.
 - b. Minimum Usable Load Depth: 6 inch.
 - c. Straight Section Lengths: 10 ft , except where shorter lengths are required to facilitate tray assembly.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Shop Drawings: Prepare and submit the following for each cable tray system:
1. Cable Tray Fabrication Drawings, Diagrams, and Supporting Documents:
 - a. Show fabrication and installation details of cable trays, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths, and fittings.
 - b. Include load calculations to show that dead and live loads do not exceed manufacturer's rating for tray and its support elements.
 - c. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:
 - 1) Vertical and horizontal offsets and transitions.
 - 2) Clearances for access above and to sides of cable trays.
 - 3) Vertical elevation of cable trays above the floor or bottom of ceiling structure.

3.2 INSTALLATION OF CABLE TRAYS

- A. Install cable tray and support systems in accordance with NEMA FG 1 .
- B. Install cable tray as a complete system, including fasteners, hold-down clips, support systems, barrier strips, adjustable horizontal and vertical splice plates, elbows, reducers, tees, crosses, cable dropouts, adapters, covers, and bonding.
- C. Install cable tray, so that the tray is accessible for cable installation and all splices are accessible for inspection and adjustment.
- D. Remove burrs and sharp edges from cable trays.
- E. Join aluminum cable tray with splice plates; use four square-neck carriage bolts and locknuts.
- F. Fasten cable tray supports to building structure.
- G. Place supports, so that spans do not exceed maximum spans on schedules, and provide clearances shown on Drawings. Install intermediate supports when cable weight exceeds the load-carrying capacity of tray rungs.
- H. 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.
- I. Support assembly to prevent twisting from eccentric loading.

- J. Install center-hung supports for single-rail trays designed for 60 versus 40 percent eccentric loading condition, with a safety factor of 3.
- K. Do not install more than one cable tray splice between supports.
- L. Support wire-basket cable trays with center support hangers .
- M. Support center support hangers for wire-basket trays with 1/4 inch diameter rods.
- N. Make changes in direction and elevation using manufacturer's recommended fittings.
- O. Make cable tray connections using manufacturer's recommended fittings.
- P. Install capped metal sleeves for future cables through firestop-sealed cable tray penetrations of fire and smoke barriers.
- Q. Install permanent covers and cover clamps, if used, after installing cable.
- R. Clamp covers on cable trays installed outdoors with heavy-duty clamps.
- S. Install warning signs in visible locations on or near cable trays after cable tray installation.

3.3 CABLE TRAY GROUNDING

- A. Ground cable trays in accordance with NFPA 70 unless additional grounding is specified.
- B. Cable trays with electrical power conductors must be bonded together with splice plates listed for grounding purposes or with listed bonding jumpers.
- C. Cable trays with single-conductor power conductors must be bonded together with a grounding conductor run in the tray along with the power conductors and bonded to the tray at 72 inch intervals. The grounding conductor must be sized in accordance with Article 250 and Article 392 of NFPA 70.
- D. When using epoxy- or powder-coat painted cable trays as a grounding conductor, completely remove coating at all splice contact points or ground connector attachment. After completing splice-to-grounding-bolt attachment, repair the coated surfaces with coating materials recommended by cable tray manufacturer.
- E. Bond cable trays to power source for cables contained within with bonding conductors sized in accordance with Article 250 of NFPA 70.

3.4 INSTALLATION OF CABLES

- A. Install cables only when each cable tray run has been completed and inspected.

- B. Fasten cables on horizontal runs with cable clamps or cable ties. 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. Fasten cables on vertical runs to cable trays every 18 inch.
- D. Fasten and support cables that pass from one cable tray to another or drop from cable trays to equipment enclosures. Fasten cables to the cable tray at the point of exit and support cables independent of the enclosure. The cable length between cable trays or between cable tray and enclosure must be no more than 72 inch.
- E. Tie mineral-insulated cables down every 36 inch where required to provide a two-hour fire rating and every 72 inch elsewhere.
- F. In existing construction, remove inactive or dead cables from cable trays.

3.5 FABRICATION OF CONNECTION POINTS

- A. Remove paint from all connection points before making connections. Repair paint after the connections are completed.
- B. Connect raceways to cable trays in accordance with requirements in NEMA VE 2 and NEMA FG 1.

3.6 INSTALLATION OF CABLE TRAY MARKINGS AND SIGNS

- A. Trays Containing Cables Operating Over 600 V: Provide hazard markings in accordance with Section 392.18 of NFPA 70 and with NEMA Z535.4.
 - 1. Legend: "DANGER - HIGH VOLTAGE - KEEP AWAY."
- B. Ladder Cable Trays: Provide warning signs to prevent use as personnel ladder.
 - 1. Lettering: 1-1/2 inch high.
 - 2. Legend: "WARNING! NOT TO BE USED AS WALKWAY, LADDER, OR SUPPORT FOR LADDERS OR PERSONNEL."

3.7 PROTECTION

- A. Protect installed cable trays and cables.
 - 1. Install temporary protection for cables in open trays to safeguard exposed cables against falling objects or debris during construction. Temporary protection for cables and cable tray can be constructed of wood or metal materials and must remain in place until the risk of damage is over.
 - 2. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.

3. Repair damage to paint finishes with matching touchup coating recommended by cable tray manufacturer.

END OF SECTION 26 05 36