

## SECTION 26 05 36 - CABLE TRAYS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes cable trays and accessories.

#### 1.2 SUBMITTALS

- A. Product Data: Include data indicating dimensions and finishes for each type of cable tray indicated.
- B. Shop Drawings: 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.
  - 1. Seismic-Restraint Details: Signed and sealed by a qualified professional engineer, licensed in the state where Project is located, who is responsible for their preparation.
    - a. Design Calculations: Calculate requirements for selecting seismic restraints.
    - b. Detail fabrication, including anchorages and attachments to structure and to supported cable trays.
- C. Field quality-control reports.
- D. Operation and maintenance data.

#### 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
  - 1. Cooper B-Line, Inc.

## 2.2 MATERIALS AND FINISHES

- A. Cable Trays, Fittings, and Accessories: Steel, complying with NEMA VE 1.
  - 1. Factory-standard primer, ready for field painting; with cadmium-plated hardware according to ASTM B 766.
  - 2. Mill galvanized before fabrication, complying with ASTM A 653/A 653M, G90 (Z275) coating; with hardware galvanized according to ASTM B 633.
- B. Cable Trays, Fittings, and Accessories: 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 splice-plate fasteners, bolts, and screws.
- C. Fabricate cable tray products with rounded edges. Surface finishes and section joints shall be smooth to the touch to eliminate cable chafing.
- D. Sizes and Configurations: Refer to the Cable Tray Schedule on Drawings for specific requirements for types, materials, sizes, and configurations.
  - 1. Low voltage and communications cable tray shall be solid bottom or ladder tray.
  - 2. Ladder tray shall include rounded rungs with a maximum of 6" spacing.
  - 3. Cable tray for medium voltage applications shall be ventilated trough type. Site rails shall be rolled, non-cutting edges. Barriers shall be utilized for separation of more than one medium voltage cable circuit.
  - 4. Center-hanger supports may be used only when specifically indicated.
  - 5. Corners shall utilize factory manufactured curved sweeps. 90 degree angle transitions are not acceptable.
  - 6. Cable tray in MDF and IDF rooms shall be ladder type.

## 2.3 CABLE TRAY ACCESSORIES

- A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.
- B. Barrier Strips: Same materials and finishes as cable tray.
- C. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

## 2.4 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."

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. 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.
- B. Remove burrs and sharp edges from cable trays.
- C. Fasten cable tray supports to building structure and install seismic restraints.
  - 1. Design each fastener and support to carry load indicated by seismic requirements.
  - 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 VE 1.
- D. Make connections to equipment with flanged fittings fastened to cable tray and to equipment. Support cable tray independent of fittings. Do not carry weight of cable tray on equipment enclosure.
- E. Install expansion connectors where cable tray crosses building expansion joint and in cable tray runs that exceed dimensions recommended in NEMA VE 1. Space connectors and set gaps according to applicable standard.
- F. Make changes in direction and elevation using standard fittings.
- G. Make cable tray connections using standard fittings.
- H. Cable trays shall not penetrate smoke and fire rated walls and floors. Use conduit sleeves for penetrations. Seal all openings in walls and floor around raceways with an approved product to maintain smoke and fire integrity and watertightness.
- I. Sleeves for Future Cables: Install capped sleeves for future cables through firestop-sealed cable tray penetrations of fire and smoke barriers.
- J. Workspace: Install cable trays with enough space to permit access for installing cables.
- K. 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.
- L. After installation of cable trays is completed, install warning signs in visible locations on or near cable trays.
- M. Install cables only when cable tray installation has been completed and inspected.

- N. 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.
- O. 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.
- P. In existing construction, remove inactive or dead cables from cable tray.
- Q. Install covers after installation of cable is completed.
- R. Mounting
  - 1. Cable trays shall be mounted or hung in a manner that ensures a 12-inch minimum vertical clearance above and a minimum 18-inch continuous horizontal clearance on at least one side to allow for future access.
  - 2. There shall be 6" clearance between the bottom of the cable tray hangers and removable ceiling tiles.
- S. Transition
  - 1. Cable trays shall be mounted between 9- and 12-feet AFF
  - 2. Provide gradual sloping raceway transition sections where changes in horizontal mounting height are unavoidable.
- T. Cable tray shall be routed so as not to interfere with installation of other systems or access to these systems for maintenance. Coordination with other systems shall be maintained so that where these systems traverse above or below the tray, there shall be direct access and unrestricted clearance 12 inches above and 18 inches to one side of the tray.
- U. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- V. Ground cable trays according to manufacturer's written instructions. Provide appropriately sized ground conductor for the length of the tray. Bond to every section. Cable tray shall not be used for the equipment ground path.
- W. Install an insulated equipment grounding conductor with cable tray, in addition to those required by NFPA 70. Bond to every tray section.

### 3.2 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensures cable tray is without damage or deterioration at time of Substantial Completion.
  - 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.

### 3.3 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 retorqued 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.

**END OF SECTION 26 05 36**