SECTION 16115

CABLE TRAY

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section describes specific requirements, products, and methods of execution relating to cable management systems including tray, tray connectors, supports, brackets, engineered seismic bracing, vertical and/or horizontal offsets, grounding, and hardware for a complete system.

1.2 REFERENCE STANDARDS

A. Underwriters' Laboratories, Inc.

B. National Electrical Code, Article 318

C. Canadian Standards Association

D. ANSI/EIA/TIA-569 - Commercial Building Standard for Telecommunications Pathways and Spaces

E. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

F. ASTM A 510 - General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel.

G. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.

1.3 QUALITY ASSURANCE

A. Wire mesh trays shall be of the latest approved design as manufactured by a nationally recognized manufacturer and shall be listed by the Underwriters' Laboratory and bear the UL label.

B. The Basis of Design for open cable tray systems is equipment from GS Metals Corporation, “FLEXTRAY” to set a standard for quality and style. The Basis of Design for enclosed industrial cable tray systems is P-W Industries, System 5F21 to set a standard for quality and style. Alternative systems may be acceptable providing that the equipment meets the requirements of this section.

1.4 SHOP DRAWINGS

A. Work shall be laid out in advance. Shop drawings shall be submitted to ANC for approval before work begins.

B. Locations of all work and equipment shall be verified to avoid interferences, preserve headroom, and keep openings and passageways clear. Review the plans for the work of all trades and coordinate adjustment of the work of the trades to achieve the best installation. Shop Drawings shall reflect coordination of work under this Section.

C. Submit a complete tray layout drawn at 1/8-inch = 1 foot scale minimum including suspension points, offsets, fire-wall penetrations and other essential information. Layout shall be coordinated with mechanical, plumbing, and fire protection contractors to insure that access to the tray is unobstructed for its entire length. Location of tray shall be dimensioned and closed obstructions shown and noted. Drawings shall include sections of corridors and of areas

where obstructions require special coordination, showing the tray location in relation to work of other trades. Submit tray layout for approval.

PART 2 - PRODUCTS

2.1 OPEN CABLE TRAY SYSTEM

A. Description: Continuous, rigid, welded steel wire mesh cable management system.

1. Mesh system shall permit continuous ventilation of cables and maximum dissipation of heat.

2. Provide a kinked and T-welded continuous top wire safety edge.

3. Wire mesh shall be welded at all intersections.

4. All mesh sections shall have at least one (1) bottom longitudinal wire along entire length.

B. Material: Carbon steel wire, ASTM A 510, Grade 1008. Wire welded, formed, and then surface treated.

C. Welding Process and Weld Quality Testing:

1. A factory destructive weld test shall be performed to verify strength of welds. This test shall be performed on a welded sample of wires. Records including weld failure lot number, and part number shall be kept on file for customer availability upon request.

D. Finish for Carbon Steel Wire: Finish applied after welding and bending of mesh.

1. Electro-Plated Zinc Galvanizing: ASTM B 633, Type III, SC-1.

2. Black anodized in all telecom rooms to match appearance of telecom racks.

E. Nominal Dimensions: 12 or 20 inch wide; 4 inches deep. Provide width as required by the application.

1. Mesh: 2 by 4 inches (50 by 100 mm).

2. Straight Section Length: 118 inches (3,000 mm).

3. Standard Widths: 12 inch (300 mm) wide and 20 inch (500 mm) wide tray.

4. Standard Channel Depths: Provide all tray 4 inches (105mm) deep.

5. Wire Diameter: 0.197 inch (5mm) minimum on all mesh sections.

F. Fittings: Field fabricated, (in strict accordance with manufacturer's instructions), from straight sections.

G. Provide hardware, including splice connectors and support components available from manufacturer.

2.2 OPEN CABLE TRAY ACCESSORIES

A. Shielding Divider Strips: Where required, provide pre-galvanized steel, full depth, divider strips following contour of mesh sections to allow systems of different types (when required by the application) to be run in the same tray.

B. “Z” brackets: Provide “Z” brackets where needed for support of trays under floors, to support vertical sections down walls, to terminate dead-end runs, etc.

C. Cable Drops: Provide bend radius drop out fittings for cable drops from tray system.

2.3 ENCLOSED INDUSTRIAL CABLE TRAY

A. Description: Continuous, one-piece corrugated solid bottom aluminum cable tray with solid flat removable covers.

1. Cable tray shall be manufactured and installed in accordance with NEMA Standard VE1-1991.

2. Load/span Class designation: 12B

3. Type: Aluminum corrugated solid bottom with 7/8" wide cable support ribs.

4. Materials:

a. Bottom: Aluminum Alloy 5052-H32.

b. Side Channels: Aluminum Alloy 6063-T6.

5. Inside Depth: 5-inches.

6. Width: 12-inches and 20-inches as required.

7. Fittings: Nominal radius of 24-inches for all vertical and horizontal elbows, tees, etc.

8. Accessories:

a. Covers: Provide aluminum flat "flange-in" covers in 60-inch lengths with cover connector clips at 30-inch intervals.

b. Provide all required tray hangers, support clamps, brackets, hardware, etc., for a complete and seismically rated mounting system.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Proceed with tray installation only after Shop Drawings are approved by ANC. If the Tenant proceeds without approval, the tray shall be relocated as directed by ANC at the Tenant's expense.

B. Install tray level, straight and true to building lines, unless otherwise approved or required due to structural considerations or obstructions. Maintain 12 inches minimum clearance above top of open tray and 18 inches minimum clearance above top of enclosed tray. Where installed above ceilings, maintain 3 inches minimum clearance between top surface of ceiling tiles and lowest point on tray or tray support assembly. Maintain 18 inches minimum clearance to at least one side of tray unless tray is placed at a height that requires greater clearance for workers to gain safe, convenient access to tray. Coordinate layout with work of other trades in advance of installation to provide required access with minimum number of offsets in tray runs. If during construction as-built conditions occur, such that tray becomes inaccessible for any reason, Tenant shall submit immediately to ANC:

1. The type and location of the obstruction, including the trades involved.

2. The means proposed by Tenant to maintain accessibility.

C. Install and support tray system in accordance with span load criteria, assuming 110 percent of maximum allowable cable fill regardless of the number of cables installed.

D. Support Systems: Provide center hung support system for open cable tray in accordance with manufacturer's engineered systems. Provide trapeze hung support systems with two rigid supports per trapeze hanger for enclosed industrial cable tray.

1. Center hung supports, center support tubes shall be full length of rod to structure. Tighten rod to place assembly in tension to maintain tray level with asymmetric loading.

2. Center supports suspended by rods shall have sufficient protective tubing over all exposed all-thread to protect the cable insulation from abrasion.

3. Provide seismic bracing in accordance with NUSIG standards, per manufacturer's recommendations, for Seismic Zone 4.

4. Install all open cable tray in an accessible location, visible from the floor, with minimum length hanger rods to avoid tray tilting under asymmetric loads. If tray tilts at any location, provide 1-1/2 inch pipe in compression over hanger rods, a bar stiffener at hanger rods, or other manufacturer recommended anti-tilt method of mounting tray. Provide stiffener bar at every other support, or in accordance with manufacturer's recommendations.

5. Open cable tray arranged in vertical configuration for rises and drops shall have stand-off support from the wall or structural support surface to facilitate installation of Velcro cable support ties.

E. Install tray to prevent sharp 90 degree bends in cables in any direction. Rises and drops shall be radiused, tees and crosses shall be flared or have radius fittings at junction points.

F. Unless specifically approved otherwise by ANC, above ceiling tray installations shall meet the following conditions:

1. Trays shall not be installed in inaccessible ceiling areas such as those with lock-in type ceiling tiles

2. Trays shall not be installed above lay-in type ceilings at a finished height greater than 11 feet above finished floor.

G. Conduit Entries:

1. Open Cable Tray: Conduits entering open cable trays shall terminate above the tray, within 3 inches laterally and 2 inches vertically of the top of the side rail. Conduits shall be bushed and supported within 6 inches of the termination. No grounding connection shall be provided from the conduit to the tray system.

2. Enclosed Cable Tray: Conduits entering enclosed industrial cable tray shall be connected to the tray at the vertical center line of either side with an approved conduit connector. Conduit connectors shall be bushed inside the cable tray. Conduits shall be installed and supported in accordance with the NEC and Section 16111. Conduits shall be installed so as to allow free removal of all sections of the cable tray top cover.

H. Enclosed cable tray shall be used in unfinished areas and vehicle travel areas such as bag makeup areas. Open cable tray shall typically be used in finished areas with accessible ceilings.

I. Unless specifically approved otherwise by ANC, install tray and all accessories to provide electrical continuity throughout system. Provide grounding and bonding straps to maintain electrical continuity at discontinuous connections.

J. Follow manufacturer's instructions and details for separation of dissimilar metals including steel suspension rod to aluminum splice connectors or tray. Provide nylon bushings at joints, vinyl sleeve at hanger rods.

K. Coordinate installation of tray with cable installers for purposes of symmetric cable loading, supplemental bracing in cases where cable loading will be asymmetric, periodic tie down of cables, and division of tray to maintain required separation of systems.

L. Secure cables in open cable trays using Velcro cable ties in accordance with manufacturer’s recommendations.

END OF SECTION