SECTION 27 0528 - PATHWAYS FOR COMMUNICATIONS AND TECHNOLOGY

PART 1 - GENERAL

1.1 RELATED DOCUMENT

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

1. Telecommunications Backboard
2. Cable Tray
3. Cable Runway
4. Conduits
5. Boxes

B. Related Sections

1. Division 26 – Electrical.
2. Division 27 – Technology and Communications Systems
3. Division 28 – Electronic Safety and Security

1.3 QUALITY ASSURANCE

A. NFPA 70 – The National Electrical code

B. ANSI/TIA 568-C.0 – Generic Telecommunications Cabling for Customer Premise

C. ANSI/TIA/EIA 568-C.1 – Commercial Buildings Telecommunications Cabling Standard

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

E. ANSI/TIA/EIA 606-A – Administration Standard for the Telecommunications Infrastructure of Commercial Building; TR-42.6 - Labeling

F. ANSI/TIA/EIA 607A – Commercial Building Grounding and Bonding Requirements for Telecommunications

G. ANSI/TIA – TSB 95 – Testing Standards

H. BICSI TDMM – Telecommunications Distribution Methods Manual

I. Northwestern University Design Information Technology Building Infrastructure Requirements for Communications Systems

J. Comply with most current edition of the Northwestern University Design Standards.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Include data sheets for the following additional items:

1. Cable Tray
2. Cable Runway

C. Samples

1. The Engineer reserves the right to request, and have submitted, additional samples, or samples not explicitly requested within these Documents.

1.5 DELIVERY STORAGE AND HANDLING

A. The Contractor shall responsible for the storage and handling of all Materials required by the Structured Cabling portion of this Contract.

B. Storage and Protection

1. Any Materials that show signs of mishandling or have been stored in a fashion so as to reduce the value of the Materials shall be replaced with new Materials at no additional cost to the Owner.

C. Waste Management and Disposal

1. All excess Materials shall be discarded in an appropriate manner.
2. Any/all hazardous materials shall be handled appropriately and shall be disposed of in a manner consistent with same, and compliant with all applicable codes and regulations.

1.6 PROJECT/SITE CONDITIONS

A. The Contractor shall become and remain familiar with all project/site conditions that may have impact on the timing, quality and/or quantity of Materials for the project. The Contractor shall coordinate their efforts with changes in the Project/Site conditions so as to optimize the installation for the Owner.

B. Any additional efforts by the Contractor due to a lack of awareness of project/site conditions shall not require additional compensation from the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Telecommunications Backboards

1. Telecommunications Backboards shall be provided on three wall of each TR (Telecommunications Room). The Backboards and shall be 4’ wide x 8’ high x ¾“thick fire retardant plywood, painted with white paint.

B. Cable Trays

1. Wire Mesh

a. Cable Trays shall be constructed of continuous, rigid, welded steel wire mesh, which shall permit continuous ventilation of cables and maximum dissipation of heat. Edges shall be constructed with a continuous safety edge T-welded wire lip, and shall be welded at all intersections.
b. Cable Trays shall have a UL Classification.
c. Cable Trays shall be constructed of carbon steel wire, ASTM A 510, Grade 1008, wire welded, bent, and surface treated after manufacturing.
d. The finish for the carbon steel wire shall be applied after welding and bending of mesh, and shall be composed of Electrodeposited Zinc Plating: ASTM B 633, Type III, SC-1.
e. Nominal Dimensions:
f. Mesh: 2 x 4 inches (50 x 100mm).
g. Straight Section Lengths: 118 inches (3,000 mm).
h. Width: as noted on Drawings.
i. Depth: 3 inches, unless otherwise noted.
j. Wire Diameter: 0.177 inch (4.5 mm), minimum.
k. Fittings shall not be required to be fabricated at the manufacturer. Fittings shall be fabricated in the field from straight sections in accordance with manufacturer’s instructions, and shall utilize any and all specialized tools required by the manufacturer for proper installation.
l. Standard support systems shall consist of wall mounting, trapeze mounting, and under floor mounting hardware – as described on the Drawings.
m. Connecting hardware, including splice connectors and support components, shall be furnished by the manufacturer. Hardware required to enable the tray to be considered as being continuously grounded for the entire length shall be supplied by the manufacturer, and installed by the Electrical Contractor.
n. Acceptable Manufacturer shall be:

1) nVent CADDY WBT Performance cable tray
2) Cablofil
3) Equal by Chalfant, B-Line or Flextray

C. Cable Runways

1. Cable runways shall be “ladder” type with 9” rung spacing and a black finish.
2. Straight Sections shall be one piece tubular construction. Side rails shall a box construction. Rungs shall be a box construction with a minimum of 3/4" wide and 1/16”

radius edges with a minimum cable bearing surface of 7/8". Rung shall be tig or mig welded to the web of the side rails. Standard length shall be 10 feet. Width shall be 12" minimum.

3. Material shall be steel.
4. Cable runways shall be built and tested to NEMA VE-1 and shall have a UL classification for cable runways to be used as an equipment grounding conductor.
5. Acceptable Manufacturers and Products shall be:

    a. CPI Chatsworth
    b. nVent Hoffman
    c. Equal tubular ladder runway by B-line or Homaco

6. Provide Radius Drops at all points where the cabling is routed down out of the runway or into runway from cable tray. The radius drops shall be as manufactured by the runway manufacturer.
7. Provide manufactured materials from the manufacturer of the cable runway for all connections and splices.

D. Boxes and Conduit

1. All boxes and conduit shall be new and UL listed.
2. All boxes and conduit shall be as specified under the Division 26 specifications.

E. In Floor Service Boxes

1. Floor Service Boxes shall be as specified under the Division 26 specifications.
2. For those locations indicated as being service points on the drawings, provide a box of sufficient size so as to proper bending radius for the quantities of cabling to be routed through this service box.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Materials shall be examined for damage on receiving the materials. Reject any materials that are damaged.

B. Examine all materials before installation. Reject and materials that are damaged.

C. Examine elements and surfaces to which materials will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Telecommunications pathways, spaces and metallic raceways, which run parallel with electric power or lighting cables or conduits, which is less than or equal to 480 Vrms, shall be installed with a minimum clearance of 50 mm (2 inches).

B. The Contractor shall provide all devices for routing the cabling as indicated on the Drawings, and as required by the manufacturer of the Structured Cabling System, so as to maintain the long term health and operability of the Structured Cabling System.

C. All horizontal pathways shall be designed, installed and grounded to meet applicable local and national codes.

D. Cable Tray and Runway

1. Provide straight sections, hangers, support rods, clamps, related fittings and mounting accessories as recommended by the system supplier. Provide pre-manufactured curved sections for systems created from hard tray materials as fabricated by the manufacturer of the cable tray system. Conflicts shall be brought to the attention of the Architect and Engineer for resolution.
2. For mesh cable tray systems, the Contractor shall, in areas of curvilinear architecture, provide smooth radiused sweeps when routing the tray.
3. The Drawings indicate intended routings. Size trays based on cable fill in a branch pathway system with larger trays used near Telecom Rooms. Trays reducing in size as they route out and cable counts decrease. Contractor shall provide horizontal and vertical transitions as required to suit field conditions in order to meet routing requirements. Any deviation from the indicated route, either due to field conditions or coordination issues, causing an increase in the overall cable length by more than 10 feet must be brought to the attention of the Technology Engineer immediately, as these may affect the design of the pathway and the subsequent cable routing. Any unapproved routing of cable tray and runways not brought to the attention of the Engineer, causing such an outcome shall be corrected, and the responsibility for this correction shall be borne by the Contractor responsible for the installation of the cable tray.
4. Provide a minimum of 6” clearance above all cable tray sections from the finished structure of any device or equipment installed or routed above the cable tray.
5. The Contractor shall coordinate these clearances and the routing of the cable tray with all other trades prior to installation, and monitor the installation of the other trades during the progress of the project. The Contractor shall hold all other trades accountable to this coordination. Any deviation by other trades to this coordination effort shall be brought to the immediate attention of the GC or CM for immediate resolution.
6. Installation shall comply with NEC Article 392. Ground cable trays as required in NEC Article 250. Cable trays and runways used as equipment grounding conductors shall be provided with bonding jumpers sized in accordance with NEC Section 250.102 between sections, raceways, and equipment. Bonding shall be in accordance with NEC Section 250.96.
7. Support of cable trays and runways shall meet NEMA Class 10A, at spans no greater than 6 feet to support 50 pounds/foot (safety factor 1.5).
8. Support all cable tray utilizing a trapeze with strut-using two 3/8” threaded rods with sections directly supported by and clamped to the strut, unless specifically directed otherwise on the Drawings.
9. Any cutting of mesh style trays shall be achieved by use of an offset cutting tool designed specifically for the process of cutting the spokes of a mesh style tray. The Contractor shall verify that all cuts are made in such a fashion, and treated, to assure the inability of the cut materials to damage the cabling routed through the tray wither during installation, or during normal use.

E. Boxes and Conduit

1. All boxes and conduits shall be grounded, and installed per NEC, as well as any other applicable local, state or federal regulations and codes.
2. All conduit and box materials shall be designed for the environment in which it is to be installed and designed for the cabling to be used
3. Boxes

    a. All boxes, unless otherwise specifically indicated, shall be 4-11/16" square by 2-1/8" deep, with a two gang plaster ring, of appropriate depth for the wall material utilized in the application.
    b. Where pullboxes are utilized, conduits shall enter and exit the box on opposite sides of the box. The box shall not be used as the turning point of the cable.

4. Conduit

    a. Conduit shall be provided from the cable tray system to each communication outlet location
    b. All conduit shall be a minimum of 3/4".
    c. Conduit routes shall meet the following criteria:

        1) No conduit bend shall exceed 90º.
        2) Conduit bends must be no less than 6-inch radius.
        3) No conduit route shall have more than two bends.
        4) Continuous conduit runs shall not exceed 100 ft. nor contain more than two (2) 90º bends without utilizing appropriately sized pull boxes,

5. In Floor Service Boxes shall utilize a minimum of a 1" conduit. In Floor Service box conduits shall be individual home runs, and shall at no cost be daisy chained, i.e. configured so that a box feeds another box, unless explicitly indicated on the Drawings.

3.3 FIELD QUALITY CONTROL

A. Keep areas of work accessible until inspection by authorities having jurisdiction.

B. Where deficiencies are found, repair products so they comply with the Construction Documents.

C. Install work in full accordance with the rules, regulations, and safety requirements of Federal, State, County and City authorities having jurisdiction over premises. Do not construe this as relieving Contractor from compliance with any requirements of the Specifications which are in excess of Code requirements and not in conflict therewith.

D. Correct unacceptable workmanship and, as necessary, provide additional inspection to verify compliance with this Specification at no additional cost to the Owner or the Owner's appointed representative.

3.4 ADJUSTING AND CLEANING

A. Remove equipment, materials, and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

END OF SECTION 27 0528