

SECTION 16741 -TELEPHONE/DATA RACEWAY SYSTEMS

PART 1 -GENERAL

A. RELATED DOCUMENTS:

1. Division 16 Basic Materials and Methods sections apply to work specified in this section.

B. DESCRIPTION OF WORK:

1. Furnish and install a complete structured raceway system including all boxes, backboards, outlet boxes, conduit, cable trays, rings and bails, fittings, sleeves, etc., for the telephone/data system as shown on the drawings, specified or required.

C. QUALITY ASSURANCE:

1. NEC Compliance: Comply with NEC as applicable to communication system materials and installations.
2. NEMA Compliance: Comply with applicable portions of NEMA standards pertaining to types of electrical equipment enclosures.
3. EIA/TIA 569B Compliance: Comply with EIA/TIA-569B standards for telecommunications pathways and spaces for commercial buildings.
4. The installation of the telephone/data raceway systems shall be performed under the direction and supervision of the Contractor's designated Registered Communications Distribution Designer (RCDD), under Specification Section 16751.]
5. The Contractor's designated project Registered Communication Distribution Designer (RCDD) shall be responsible for verifying the routing and sizing of cable tray, channels, wireways, conduits, etc. as required to meet the intent of the Specifications. Where applicable, the Contractor shall submit for the Associate's review and acceptance, drawings indicating raceway routing, size, cable fills, etc.

PART 2 -PRODUCTS AND EQUIPMENT

A. BACKBOARDS:

1. Furnish and install in the areas or rooms as indicated on the detailed engineering drawings and documents, for mounting electrical, electronic, data and telecommunication equipment, A/C PLUGGED-INT-APA void-free plywood sheets 48"W x 96"H x 3/4"THK in size, painted with two (2) coatings of fire retardant paint; Flame Control No. 20-20 as available from Glidden, Benjamin Moore, Pittsburgh Paint and Sherwin Williams. Unless noted otherwise, plywood sheets shall be installed flush on the finished drywall, block or concrete wall, securely anchored to the building structure, and extending 4" or less from the floor or curb up the wall 8'-0". All data/communication cable

conduits shall stub onto either the backboards or onto cable trays and ladder systems.

B. OUTLETS AND BOXES:

1. Each communications outlet shall be a 4-11/16" square double gang deep (2-1/8" deep) box with raised single gang or double gang plaster ring as required and 1" conduit (unless noted otherwise) stubbed out above the suspended ceiling into the bar joist area, or stubbed out below the floor into the bar joist area below as indicated on the drawings. Conduit to turn towards the main cable routing path or cable tray and have an insulated bushing installed. Conduits home runned, extended to the cable tray and/or otherwise extended beyond the turn out, shall have a grounding bushing installed and be bonded to the data/telecommunication grounding system.
 - a. Outlet boxes receiving a double gang plaster ring and faceplate shall have a 1-1/4" or two (2) 1"C stub outs installed to accommodate potential cable capacity.
2. Thin wall, EMT couplings and connectors shall be steel setscrew or compression type, not die cast.
3. For data/telecommunications outlet boxes in masonry construction, the Contractor shall utilize the 4-11/16" square x 2-1/8" deep box with an extension ring (1-1/2" or 2-1/8" deep) and plaster ring as required.
4. Communications outlet mounting height shall be ADA compliant, 18" above finished floor (A.F.F.) unless noted otherwise (Contractor to verify). Each communications outlet shall be provided with a matching blank cover plate unless noted otherwise. Outlet faceplates shall be as noted on the drawings.
5. Each pay phone or emergency phone outlet shall be a 4-11/16" square double gang deep (2-1/8" deep) box with reinforced support, stud to stud and 1" conduit stubbed out as above, single gang plaster ring, with a Type 630A stainless steel plate or as required to match the phone. Mounting height of the phone shall be 48" to the top of the phone from finished floor. Contractor to verify outlet height requirement.

C. CABLE TRAYS:

1. Cable trays shall be as indicated on the Engineering Drawings and sized as per Table 1 attached. Cable trays shall be center hung, facilitating loading from both sides:
 - a. Industrial type, single-piece, formed aluminum trough cable tray for heavy cable loads and large cables shall be Chalfant Series 6A, as indicated on the drawings.
 - b. Welded steel wire basket type cable tray shall be "Mega Snake Tray" by CMS or "GR-Magic by Chalfant or Associate approved equal as indicated on the Engineering Drawings.
 - c. Single spline, welded steel hoop, hand bendable, cable trough shall be "Snake Tray" by Cable Management Solutions, as indicated on the Engineering Drawings.

Center spline is not a requirement to separate voice and data cables in the trays and has been omitted as item B in this section all other items have been moved up in sequence,

- d. Cable tray installation shall meet all applicable UL standard requirements for use as an equipment ground conductor.

D. CABLE LADDER:

1. Cable ladder shall be B-Line/Saunders Type "SB" aluminum cable runway with removable/relocatable rungs, in standard bare aluminum finish unless otherwise noted, as indicated on the drawings. The ladder shall be installed per manufacturer's instructions, utilizing manufacturer's accessories and components.

E. CONDUITS:

1. Conduits shall be installed per Raceway Specification Section 16110 (verify) of this specification except as noted. The sizes of conduits shall be as shown on the drawings, minimum size is 1". All conduits shall be reamed and furnished with insulation and/or grounded bushings as required.
2. Flexible steel conduits shall not be utilized for telephone/data raceway systems without specific written approval of the Associate for the application.

F. SURFACE MOUNTED RACEWAY:

1. Metallic and/or non-metallic surface mounted raceways shall be as indicated on the Engineering Drawings, sized as per Table I attached, and shall include all end caps, brackets, connectors, fitting and accessories required to provide a complete installation.
2. Metallic raceways shall be UL listed as a grounded raceway system and shall be installed per the manufacturer's directions such as to maintain the UL listing. Provide bonding jumpers as required.
3. Where indicated on the Engineering Drawings, surface mounted raceway shall be divided, providing separate isolated compartments as indicated for power, data/telecommunications, etc.
4. Generally, the top section is to be utilized for power distribution, the bottom section utilized for data/telecommunications, and if specified, the middle section for security, fiber optics or CATV coax, etc. as indicated.
5. Duplex receptacle faceplates or device brackets shall be provided utilizing a 106 duplex mounting frame for data/telecommunications outlet as per the Connectivity Schedule on the Engineering Drawings.
6. Unless noted otherwise, surface mounted raceway shall be fed utilizing a minimum 3/4" conduit and recessed handy box for power and a 1-1/4"C and recessed 4-11/16" square x 2-1/8" deep double gang box with raised single gang plaster ring as required for data/telecommunications.
7. Surface mounted raceways shall be firmly anchored to the wall studs or concrete/block structure. Appropriate screws shall be utilized in studs.

Appropriate screws and metal anchors or Associate approved metallic anchoring system shall be utilized in concrete/block structure. Plastic anchors of any type are not acceptable.

8. Non-metallic raceways shall be provided with double-sided self-adhesive tape backing to aid in the positioning of the raceway prior to screw fastening and anchoring. All raceway shall be screw fastened for permanent attachment.
9. Provide stud blocking as required for raceway support, do not support from drywall only.

PART 3 -EXECUTION

A. CABLE TRAYS:

1. Where indicated on the drawings and in the contract documents, cable ladders, trays and/or cable channel shall be furnished and installed by the Contractor.
2. Cable ladders, cable trays and cable channels shall be as indicated on the drawings or Associate approved equal and sized as per Table I herein.
3. The Contractor shall furnish and install additional cable racks, cable tray, channels and ladders per specification as required to facilitate the data/communication cabling installation. The minimum required installation is indicated on the drawings.
4. Cable racks, trays, channels and ladders shall be installed per manufacturer's recommendations and instructions, utilizing manufacturer's accessories and components.
5. All cable ladders, trays, channels, and supporting unistrut and brackets shall be cleanly cut with an appropriate metal cut-off saw and be clean and free of all burrs and sharp edges. Associate shall approve all fabrications.
6. Minimum bend radius for cable tray or channel shall be 12" when utilized for data/telecommunication cables, unless noted otherwise.
7. Cable trays and channels shall be supported from building structure above on 6'-0" centers maximum or less as required per manufacturer's instructions unless noted otherwise.
8. Minimum cable tray depth shall be 4", unless approved in writing by the Engineer. Maximum cable tray fill depth shall not exceed 3". Maximum cable tray fill capacity shall not exceed 50% per N.E.C. The Contractor shall size the raceway for 50% future growth and expansion.
9. The Contractor shall verify cable tray, channel and ladder loading requirements, and install the raceway system as per the manufacturer's recommendations and directions. The Contractor shall support the raceway system for 100% future growth and expansion.

10. The Contractor shall provide all end caps, tube caps, mounting spacers, couplings, hangers, brackets, dropouts, connectors, supports, braces, and other manufacturer's accessories and components as required to provide a complete and functional installation.
11. The Contractor shall verify with the Architect or the local building authority, the fire rating requirements of any wall or floor to be breached by a conduit, cable, raceway or other penetration as per ASTM E-119 (NFPA-251 and UL-263) standards. The Contractor shall notify the Associate, Architect and Owner in writing of all existing non-compliant conditions for resolution.
 - a. The Contractor shall assume responsibility for existing trade penetrations not reported.
12. The presence of existing non-compliant conditions will not exempt the Contractor from meeting the installation fire rating requirements for new construction.
13. The Contractor shall provide through penetration firestops as per ASTM E814 and UL-1479. Firestop systems shall have been tested by UL and meet the rating criteria, as published in the UL Fire Resistance Directory. The Contractor is referenced to the latest BICSI Telecommunications Distribution Methods Manual (TDMM) and EIA/TIA-569A Annex "A" for general guidelines and overview of firestop technology and methods. Contractor shall consult individual manufacturers instructions for specific application details.
14. Openings around cable trays, cable channels, conduits or in sleeves penetrating fire-rated floor slabs, walls, partitions, ceilings or smoke partitions, shall be sealed at both sides of the partition. Pack openings with calcium silicate blocks, 3M Brand Fire Barrier Caulk "CP25" and Putty "303", 3M Brand Series 7902/7904 systems for floor and walls, Nelson Flame Seal System, or an Associate accepted material having the same fire-rating as the floor or wall penetrated. Fiberglass is not acceptable.
15. Where indicated on the Drawings and/or other locations where applicable, the Contractor shall utilize the Specified Technologies "EZ-Path" fire rated pathway assembly/ies, or approved equal to facilitate future moves, adds and changes (M.A.C'S).
16. All firestopping systems shall be of a single manufacturer, as manufactured by 3M, Nelson, Specified Technologies, Hilti or Associate approved equal. Contractor shall submit cut sheets with "Authority Having Jurisdiction" (AHJ) approval to the Associate for review and acceptance.

B. CONDUIT:

1. Conduits shall be sized as per Table I herein or as noted on the drawings. Where sections of conduit runs are longer than 100'-0", or have more than 180o of bends, or have a reverse (greater than 90o) bend, pull boxes shall be provided and installed. Bends in conduits larger than 2", shall be long sweep bends. Unless otherwise noted, in no instance shall the inside radius of bends

be less than:

- a. Six times the internal diameter for conduits 2" and smaller
 - b. Ten times the internal diameter for conduits 2-1/2" and larger
2. Conduits entering telephone and data closets shall terminate as close as possible to the wall through which the conduits enter, unless otherwise noted. In-floor conduits shall terminate 4" A.F.F. or curb unless noted otherwise. All conduits shall be left clean, dry and free of debris or other obstructions, with insulated grounding bushings installed.
 3. Pull boxes shall be constructed of code gauge steel, etched, primed and shall have rust resistant ANSI 61 gray finish and be NEMA 1 construction with screw covers unless noted otherwise. For conduits 1-1/4" and larger terminating in a pull box, the minimum length of pull box shall be 8 times the diameter of the largest conduit terminating in the pull box. Splice boxes shall be sized as per EIA/TIA-569A Table 5.2-3. Pull boxes and/or splice boxes shall be placed in straight sections of conduit runs and should not be used in lieu of a bend without approval of the Associate. Pull boxes and/or splice boxes shall be installed in readily accessible locations. Where boxes are installed above suspended ceilings, they shall be located immediately above the suspended ceiling or the ceiling shall have a suitably marked and hinged panel or equivalent to facilitate direct access to the box. Location and sizes of pull boxes and splice boxes shall meet the approval of the Associate. Condulete type fittings shall not be used in lieu of pull boxes or bends.
 4. Conduit, sleeves and stubs through fire rated floors and walls shall be rigid galvanized steel conduit with insulated and/or grounding bushings as per specifications, sized as per the schedule herein. Conduit sleeves shall be a minimum 8" long. Install fire stop as per specifications and codes upon completion of the work.
 5. Furnish and install pipe sleeves as shown on the drawings. The sleeves shall extend 4" above the floor and a minimum of 2" below the bottom of ceiling slab. The inner edges of the sleeve at both ends shall be reamed, providing a smooth surface to prevent damage to cable insulation. Sleeves shall be equipped with metal caps to ensure fireproofing between floors and/or insulated bushings (when occupied). Sleeves shall be installed plumb and shall be vertically aligned to provide a clear vertical pull of cable without offsets. The number, size and location of sleeves shall be as shown on the drawings.

C. MISCELLANEOUS:

1. Raceway systems shall be bonded to the telecommunications grounding system, as per N.E.C. Article 250, EIA/TIA 607 standard and Specification 16453.
2. Provide and install a minimum of two duplex isolated ground receptacles rated 20 amp 110 volt on a dedicated circuit, on the telephone backboard, to be located as directed, 72" M.H. unless noted otherwise. Full area of the

backboard shall be kept free of all pipes or conduits with a minimum of 36" depth of maintenance area in front.

3. All wiring, cabling and telephone/data equipment shall be furnished and installed by the Contractor and/or the local telephone/data/CATV company as per Specification 16751 and detailed engineering drawings and documents.
4. Provide a 1/8" nylon or polypropylene line in all conduits.
5. The Contractor shall contact the telephone/data companies before proceeding and shall coordinate his work with theirs.
6. The Contractor shall submit for Associate and Owner review and acceptance, drawings indicating cable tray, conduit or other raceway routing, size, cable fill, etc. as required to verify that the installation will meet all aspects of the Specification.

END OF SECTION 16741

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