SECTION 16711 - 27 05 28.33 CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes Labor, materials and equipment necessary to complete the installation required for the items specified under this Section, including but not limited to:

1. Electrical metallic tubing and fittings.
2. Wall, ceiling, and floor outlet boxes.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
C. Section 27 05 28.28 – FireStopping Telecommunications and Data Cabling
D. Section 27 05 28.29 Hangers and Supports for Communications Systems
E. Section 27 05 28.34 – Pull and Junctions Boxes for Communications Systems

1.03 REFERENCE STANDARDS

A. National Electrical Code (NEC)

1.04 SUBMITTALS

A. Submit shop drawings to the Owner detailing proposed method of anchoring or supporting all items to the structural building systems.
B. Submit to the Owner coordination drawings showing routing of all feeders and grouped branch conduits at least two weeks prior to any rough in.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.02 CONDUIT PRODUCT REQUIREMENTS

A. Only Electrical metallic Tubing (EMT) shall be used for all conduits.
B. EMT fittings shall be formed steel compression ring type. Die cast fittings are not allowed.
C. Set-screw fittings shall only be used on conduits larger than 2”.
D. All conduit ends shall have a plastic or nylon bushing installed.
E. At the telecom side of each conduit, a grounding bushing and ground wire to the main telecom room grounding buss bar shall be installed.

F. If any existing conduit runs are modified, the entire run shall be subject to new conduit requirements and conditions.

G. “Flex” or BX type conduits are not acceptable unless it is the only practical solution and has been approved by a designated communications representative. If flexible conduit must be used, increase the conduit size by one trade size.

2.03 BACKBOXES/OUTLET BOXES

A. Outlet boxes shall be qualified by an independently approved testing facility for use with the compatible raceway systems.

B. Only quad/double gang size outlet boxes shall be used for all outlet box installations.

C. Only metallic outlet boxes may be used.

D. Use only matching cover plates to cover unused outlet boxes.

E. New construction communication outlet boxes shall have following:
   1. The outlet box will be a 4” x 4” box with 1” knockouts plus a two gang opening plaster ring for a total assembled depth of 2 ¼” minimum.
   2. Communication outlet boxes will have an attached extension ring recessed 1/8” from the finished drywall surface.

F. Cut-in communication outlet boxes shall have the following:
   1. The box will be installed as a two-gang assembly.
   2. The minimum depth of the assembled outlet box will be at least 3 ½”.
   3. The outlet box shall have 1” knockouts.

G. Provide knockout closures for unused openings.

H. Floor mounted junction boxes shall have the following characteristics:
   1. The communication Floor Outlet box shall not share space with any other service including electrical.
   2. The pathway to the floor outlet box shall not share space with any other service unless specifically approved by the Owner’s designated Network Engineer.
   3. A minimum of four terminations including fiber and Category 6 style media shall be supported by the box.
   4. The box shall fit within a maximum of a 4" round hole.
   5. The maximum depth of floor box shall not exceed 3.5”.
   6. The media designated areas shall not exceed the maximum bend radius of 10 times the 0.25” diameter cable.
7. The floor Outlet box shall be flush with a brass cover and hardware and protect the media outlets with an attached cover. The floor box used shall be approved by the Owner’s designated Network Engineer.

I. Existing outlet boxes must have a quad/double gang size outlet box and mud ring and meet the minimum outlet box depth requirement.

PART 3 - EXECUTION

3.01 CONDUIT SIZING, ARRANGEMENT AND SUPPORT REQUIREMENTS

A. The Owner’s drawings or designated network representative shall approve all communications outlet runs.

B. A single outlet run shall use 1” EMT all the way to its final designated destination.

C. A two outlet shared conduit run will use 1 ¼” EMT from the telecommunications room to a designated shared j-box of at least 12”x12”x4” NEMA 1, mounted above the wall. The remaining conduit run from the box to the telecommunications outlet shall be 1” EMT.

D. Conduits shall have a 40% unused capacity, unless specifically defined.

E. Arrange conduit supports to prevent alignment distortion by wire pulling operations. Fasten conduit using galvanized straps, lay in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.

F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 30% additional conduits whenever possible.

G. Maintain minimum 6” clearance between conduit and piping. Maintain 12” clearance between conduit and heat sources such as flues, steam pipes, and heating appliances whenever possible.

H. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

I. Support conduit per National Electrical Code (NEC) and local requirements for the conduit size but in no case exceed 10’ center-to-center spacing.

J. Conduit shall be supported at least every 10 feet, and within 3 feet of an outlet or junction box. All junction boxes shall be independently supported.

K. Follow the National Electrical Code (NEC) and local specifications for the spacing from electrical wiring.

3.02 CONDUIT INSTALLATION

A. The specified conduit paths provided or approved by the Owner will be followed and any deviation will require the Owner’s network representative approval prior to any conduit installation.

B. Arrange conduit to maintain headroom and present a neat appearance.

C. Route all conduits parallel and perpendicular to walls and adjacent piping, except where impractical and approved by the Owner’s designated network representative.

D. Conduits shall be racked or follow other conduits to its destination.

E. Conduit and joints must be aligned and properly joined. Joints shall not be used in lieu of a bend.
F. A minimum of a 8"x8"x4" pull box shall be inserted into any single conduit run that has in excess of four bends, or any combination of bends that exceed 270 degrees total. An offset is equivalent to a 90 degree bend.

G. A conduit size equal to or larger than 1 ½" requires route and pull box approval by the Owner's designated network representative.

H. Cut conduit square and true using a saw or pipe cutter and de-burr ends.

I. Bring conduit to the shoulder of fittings and couplings and fasten securely.

J. The radius of a conduit bend must be at least six times larger than the internal conduit diameter for conduit size 2" or less. For conduits over 2", the bend radius shall be increased to ten times the internal conduit diameter.

K. Use hydraulic one shot conduit bender or factory elbows for bends in conduit larger than 2".

L. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.

M. All conduit installations shall have a suitable plastic or nylon pull string installed.

N. Install expansion joints where conduit crosses building expansion joints.

O. All conduit penetrations in fire rated walls or floors shall be sealed and fire proofed to at least the rating of the penetration area.

P. All conduit runs shall be properly grounded.

Q. All conduit runs shall be terminated with a plastic or phenolic bushing.

R. Install conduit connectors wrench tight.

S. No short radius conduit bodies (LB's) are to be used.

T. For all bends, only large radius sweeps shall be used.

U. Wall box Installation in an existing drywall wall:
   1. When a cut-in box is to be installed in an existing wall, cut one hole for the box at ADA compliant height from the floor (remove knock-outs before box installation) and cut a second hole in the top plate of the wall large enough to accept the conduit and its coupling connector.
   2. EMT conduit shall then be cut into sections to be inserted into the wall. These sections shall be coupled together until the conduit will attach to the box.
   3. If EMT conduit must be cut smaller than 12" to be able to insert it into the wall, then the Subcontractor shall consult with the Owner's designated staff to determine if the box should be moved or flex conduit installed.

V. Flexible Conduit
   1. When the use of steel clad flex has been approved by the Owner's designated staff for a particular wall box installation, the flexible conduit may only be used for straight-in wall sections.
   2. The use of flexible conduit will only be allowed where the Owner's engineers have determined that EMT conduit cannot be installed.
3. The transition from flexible conduit to EMT conduit shall be through the use of a junction box directly over the wall box.

4. The flexible conduit shall not have any slack between its termination points.

5. Only steel straight connector style fittings may be used.

6. If flexible conduit must be used, the conduit size shall be increased by one trade size.

W. Where existing conduit is to be reused, the Subcontractor shall be responsible for meeting the NEC and local codes for proper support of the entire conduit run.

X. No conduit bends shall exist inside an interior or exterior wall.

Y. If any item has not been specified with this section, all standards bodies outlined in the communications division shall apply.

3.03 COORDINATION OF BOX LOCATIONS

A. Provide communication outlet boxes as shown on Owner provided drawings and as required for wire pulling, equipment connections, and code compliance.

B. Communication Outlet box locations shown on Owner provided drawings are approximate unless dimensioned. Any deviation from the dimensioned locations shall require Owner approval.

C. Locate and install pull boxes to allow access.

D. Pull or junction boxes shall not be installed over walls or any other mechanical devices.

E. Do not use a pull or junction box in lieu of a bend. Align conduits that enter the pull box from opposite ends.

F. Place pull boxes in sections of conduit that are 100 feet or more in length.

G. Locate and install to maintain headroom and to present a neat appearance.

H. Support boxes independently of conduit.

I. Boxes shall be installed solid, plumb, square, and use a four point hang to other mechanical items.

J. If any item has not been specified with this section, all standards bodies outlined in the communications division shall apply.

3.04 OUTLET BOX INSTALLATION

A. Do not install boxes back to back in walls. Provide a minimum of a 12” separation between boxes except in acoustic-rated walls where a minimum of a 24” separation shall be installed. If boxes must be installed back to back to conform to layout shown, separate the boxes with drywall material.

B. Communication outlet box height shall match electrical outlet standard heights but in no case shall the height be less than 15” AFF and a minimum of 18” from corners or other building structures. A minimum of 12” clearance is required in all directions from the center point of the box to any other utility or obstruction. All ADA requirements for the installation of the outlet box shall be followed.

C. All communications outlet boxes shall be installed within a wall.

D. Locate boxes in masonry walls to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat openings for boxes.
E. Provide knockout closures for unused openings.

F. Install boxes in walls without damaging wall insulation.

G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

H. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud walls and adjustable steel channel fasteners for flush ceiling outlet boxes.

I. To install cut-in boxes, plaster shall be surface shaved so box does not protrude from the surface of the wall.

J. Boxes with mud rings installed shall not have the mud ring or finish plaster protrude from the finished wall plane. The mud ring shall not be more than 1/8" below the wall surface before the finish plaster is applied.

K. Assembled cut-in boxes shall have all four screw holes aligned to standard dimensions.

3.05 FLOOR OUTLET BOX INSTALLATION

A. Provide a minimum of a 12" separation between floor boxes.

B. The installation shall use a 4" core and be fire rated and sealed.

C. The floor box conduit path shall be grouped into the same area as other outlet pathways found in the same general area.

END OF SECTION 16711 - 27 05 28.33