SECTION 260530 - CONDUIT

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Contractor Provide:

1. Metal conduit
2. Flexible metal conduit.
3. Electrical metallic tubing.
4. Electrical non-metallic tubing.
5. Fittings and conduit bodies.

1.2 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

C. ANSI C80.5 - Rigid Aluminum Conduit.

D. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

E. ANSI/NFPA 70 - National Electrical Code.

F. NECA "Standard of Installation."

G. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

H. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

I. NEMA TC 13 – Electrical Non Metallic Tubing.

1.3 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70.

1.4 RELATED WORK

A. Specification 260548 Vibration and Seismic Controls.

1.5 SUBMITTALS

A. Submittals for approval by the engineer are not required for this section. Un-requested submittals will not be processed or reviewed. Non-requirement of submittals is not to be construed as an allowance for substitutions and does not relieve the contractor from full compliance with the plans and specifications.

1.6 PROJECT RECORD DOCUMENTS

A. Submit Project Record Documents.

B. Accurately record actual routing of conduits.

1.7 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. or other testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.9 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Provide conduit as required to complete wiring system.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Minimum Size: 3/4 inch unless otherwise specified.

B. Outdoor Locations, Above Grade: Use rigid steel conduit.

C. In Slab Above Grade: No conduit shall be installed in slab above grade.

D. Wet and Damp Locations: Use rigid steel conduit.

E. Dry Locations: Electric metallic tubing. In exposed areas provide rigid steel to 6 inches above finished floor.

2.2 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit.

2.3 FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction.

B. Fittings: ANSI/NEMA FB 1.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction with PVC jacket.

B. Fittings: ANSI/NEMA FB 1.

2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel compression type.

2.6 NONMETALLIC CONDUIT

A. Description: NEMA TC 2; Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3.

2.7 SUPPORTING DEVICES

A. Suspended conduits less than 1 inch.

1. For exposed construction, provide strap type hangers supported from beam clamps or threaded rods. Hangers manufactured by Minerallac, Midwest Electric, Crouse-Hinds, T & B or B-Line are acceptable. Hangers will be required to suspend below the drywall ceiling fire barrier. Coordinate installation with the drywall installation. Provide fire seal at all drywall penetrations.
2. For conduits suspended above ceilings, anchor to building structural steel or hat channels above drywall, seal all fire rated drywall penetrations. When span exceeds NEC limits, provide channel steel between framing members. Tie wiring of conduit to air ducts, structural steel, piping or other elements not permitted. Plumber's perforated strap not permitted. Do not attach conduit to ceiling support wires.

B. Surface Mounted Conduit

1. Provide one-hole galvanized steel straps for conduits one inch or less manufactured by Appleton, Steel City, B-Line or Raco. Provide clamp backs on exterior walls below grade or in wet areas.
2. For conduit larger than one inch and all exterior surfaces, use galvanized, malleable iron pipe straps.
3. For multiple conduits, provide channel anchored to wall with conduit attached to

channel with split pipe clamps. Provide space for 25% additional conduits.

C. All conduit shall be supported in accordance with Specification Section 13080 Seismic Protection.

PART 3 - EXECUTION

3.1 INTERFERENCES

A. Coordinate work with other contractors so that interference between piping, equipment, structural and electrical work will be avoided.

B. If interference develops, Construction Manager will decide which equipment will be relocated; regardless of which apparatus was installed first.

3.2 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."

B. Install nonmetallic conduit in accordance with manufacturer's instructions. Nonmetallic conduits, fittings and accessories shall be of same manufacturer.

C. Arrange supports to prevent misalignment during wiring installation.

D. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

E. All conduits shall run concealed above ceilings or in walls. This includes apparatus bay (UON). Mechanical rooms, electrical rooms and pump rooms are the exceptions.

F. Fasten conduit supports to building structure and surfaces under provisions of Section 260529.

G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports

H. Do not attach conduit to ceiling support wires.

I. Arrange conduit to maintain headroom and present neat appearance.

J. Route exposed conduit parallel and perpendicular to walls.

K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

L. Maintain adequate clearance between conduit and piping.

M. Maintain 12 inches (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

N. Cut conduit square using saw or pipe-cutter; de-burr cut ends.

O. Bring conduit to shoulder of fittings; fasten securely.

P. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

Q. Use conduit hubs or sealing lock nuts to fasten conduit to sheet metal boxes in damp and wet locations.

R. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inches (50 mm) size.

S. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

T. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints.

U. Provide suitable pull-string in each empty conduit except sleeves and nipples. Provide bushings on all conduit terminations.

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

W. Ground and bond conduit under provisions of Section 260526.

X. Identify conduit under provisions of Section 260553.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket.

C. Install conduits to preserve moisture barriers of partitions and other elements.

3.4 CONDUIT INSTALLATION REQUIREMENTS

A. Provide rigid steel conduit underground to a location 5 feet outside of the building foundation walls. Galvanized rigid steel conduit shall pass through foundation wall. Bond conduit to grounding system using grounding bushings.

B. U.O.N. underground conduit shall be schedule 40 PVC other that within 5 feet of foundation walls.

C. See section 260523 for additional information regarding the use of conduit and cable. EMT is acceptable at all other areas not specified above.

END OF SECTION 260530