

## SECTION 26 01 11 - CONDUITS

## PART 1 - GENERAL

- A. The general provisions apply to this section.

## 1.1 WORK INCLUDED

- A. Conduits; including:
  - 1. Rigid steel conduit.
  - 2. Intermediate metal conduit (IMC).
  - 3. Electrical metallic tubing (EMT).
  - 4. NOT USED
  - 5. Polyvinyl chloride conduit (PVC).
  - 6. Flexible metal conduit.
  - 7. Liquid-tight flexible metal conduit.

## 1.2 DEFINITION

- A. Conduit: This term shall be construed to mean conduit and conduit fittings; and tubing and tubing fittings.
- B. Amphitheater coordination: Section 013150 for theatrical & AV systems.

## 1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Support material: Section 260190.

## PART 2 - PRODUCTS

## 2.1 MATERIAL AND FABRICATION - ALL MATERIALS SHALL BE MANUFACTURED IN THE USA.

- A. Rigid Steel Conduit: Hot-dipped galvanized or sherardized including the threads, manufactured in accordance with ANSI C80.1 and UL6.
  - 1. Threaded, hot-dipped galvanized or sherardized fittings manufactured in accordance with ANSI C80.4.
- B. Intermediate Metal Conduit: Hot-dipped galvanized including the threads, manufactured in accordance with UL 1242.
- C. Electrical Metallic Tubing: Manufactured in accordance with ANSI C80.3 and UL 797.
  - 1. Provide compression fittings in walls, ceiling spaces or exposed construction areas.
  - 2. Provide compression (water tight) fittings in damp areas or areas exposed to weather.
- D. NOT USED

- E. Polyvinyl Chloride Conduit: Schedule 40 and schedule 80, manufactured in accordance with ANSI C33.91, UL 651, and Nema TC-2.
  - 1. Cemented type fittings of the same manufacturer as the conduit.
- F. Polyvinyl Chloride Conduit: Type EB, heavy wall, manufactured in accordance with ANSI C33.91, UL651, and Nema TC-8.
  - 1. Cemented fittings of the same manufacturer as the conduit.
- G. Flexible Metal Conduit: Hot-dipped galvanized steel, manufacturer in accordance with UL 1.
  - 1. Squeeze type, malleable iron, cadmium plated, straight and angle connectors for all sizes and twist-in connectors for 1/2-inch and 3/4-inch flexible metal conduit.
- H. Liquid-Tight Flexible Conduit: Hot-dipped galvanized with liquid-tight vinyl jacket.
  - 1. Liquid-tight fittings.

### PART 3 - EXECUTION

#### 3.1 USE

- A. EMT for all exposed and concealed work except as indicated in Paragraphs B, C, D, E, F, and G.
- B. Rigid steel, IMC, or rigid aluminum conduit in areas where exposed conduit could be subject to physical damage or where conduit is exposed and conductor phase to ground voltage exceeds 300 volts.
- C. Rigid aluminum conduit may be used for all feeder runs exposed or concealed in stud walls and spaces above suspended ceilings.
- D. PVC Conduit:
  - 1. Schedule 40 for runs below grade in direct contact with earth.
  - 2. Schedule 40 in concrete floors, walls or roofs.
- E. Flexible Conduit (steel only permitted):
  - 1. For connection to equipment subject to vibration, maximum length 18 inches. In wet locations use liquid-tight flexible conduit.
  - 2. For connection to lighting fixtures above suspended ceilings. Lengths limited to 72 inches.
  - 3. Install ground conductors in all flexible conduits.
- F. Where 3/4-inch conduit runs are concealed in walls or ceilings and these runs are through wood studs and wood joists, flexible steel conduit may be used up to a maximum length of 6'0".
- G. All risers shall be PVC coated RGS with bushings.
- H. In concrete or below grade use conduit not smaller than 1 inch. Maximum size in concrete slab: 1 inch. Run larger sizes under slab.

- I. Use long sweep elbows with minimum radius 10 times nominal conduit diameter for all telephone and communication runs.

### 3.2 INSTALLATION

- A. Provide conduit support and bracing in accordance with the latest published SMACNA guidelines.
- B. Perform excavating, trenching, backfilling, and compacting as specified in Division 2.
- C. Minimum cover for runs below finished grade outside buildings: 24 inches except where noted or required by the serving utility. Minimum cover for conduit in concrete floors, walls or roof: 1/3 thickness of slab. Minimum cover under building slabs is 12-inches.
- D. Minimum separation from uninsulated hot water pipes, steam pipes, heater flues or vents: 6 inches. Avoid running conduit directly under water lines.
- E. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose.
- F. Provide conduit bodies for exposed conduit runs at junctions, bends or offsets where required. Do not use elbows or bends around outside corners of beams, walls or equipment. Make conduit body covers accessible.
- G. Make conduit field cuts square with saw and ream out to full size. Shoulder conduits in couplings.
- H. Run a minimum of one 3/4-inch empty conduit for every three single pole spare circuit breakers, spaces or fraction thereof and not less than two 3/4-inch conduits from every flush mounted panel to an accessible space above the ceiling and below the floor.
- I. Make conduit projections from covered areas to areas exposed to the weather watertight by proper flashing. Extend flashing a minimum of 6 inches in all directions from conduit.
- J. Where conduit is to remain empty, install polypropylene or nylon pull-line 3/16" minimum diameter from end to end with tag at each end designating opposite terminations.
- K. Run conduit parallel and at right angle to building lines, when visible in finished construction.
- L. Cap conduits indicated to be stubbed-out underground using glued-on PVC caps intended for this purpose.
- M. Install a coupling flush with the floor on all conduits stubbed up through floors on grade.
- N. Make no bends with a radius less than 12 times the diameter of the cable it contains nor more than 90 degrees. Make field bends with tools designed for conduit bending. Heating of metallic conduit to facilitate bending is not permitted.
- O. Where conduit installed in concrete or masonry extends across building construction joints, provide expansion fittings as manufactured by O.Z.; Crouse-Hinds; Appleton; or equal, with approved ground straps and clamps.
- P. Concrete Wall or Slab Penetrations: All core drilling, sleeves, blockouts or other penetrations must be approved by the Structural Engineer prior to installation.

1. Space sleeves and core drills to insure a minimum dimension of 3 times the nominal trade diameter of the largest adjacent conduit between sleeves or core drills.
  2. Use blockouts for concentrations of conduits in a confined area.
- Q. Do not penetrate walls with flexible conduit where subject to physical damage. Use recessed box with extension ring for transition from interior to exterior of wall.
- R. All homeruns shown shall be run to the panel indicated independently of all other homeruns. Provide pull points so as not to exceed total bends of 360 degrees between them unless otherwise indicated.
- S. At switchboards, manholes and floor standing distribution panelboards, provide insulated throat bushings or bell ends on all non-metallic conduit entries and bushings on all metallic conduit entries.
- T. Provide bushings on all conduit terminations sized 1" and larger.
- U. Provide weatherproof boxes and connectors for all exposed parking structure raceways and boxes.
- V. Provide bell ends on all conduits into pullboxes and manholes, seal all conduits after conductors are pulled.
- W. Cap all unused conduits with end cap. Do not tape.
- X. Provide separation of conduits & feeders per Audio/Video plans & specifications.
- Y. In inaccessible areas, provide conduits for all each system, conduit shall be sized per NEC and BICSI standards. AV, Low Voltage, Controls, low voltage lighting, lighting control, motor control, ATS control, etc systems shall all be in conduit in inaccessible areas.

END OF SECTION 26 01 11