

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Instructions: submit manufacturer's installation instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

1.6 GENERAL

- .1 Routing of conduits and does not appear entirely on drawings. Those indicated are represented in schematic form.

- .2 Fire alarm and communication/telephone conduits must be factory painted over the entire length of the color specified in the table in Section 26 05 00 - Common Work Results - Electrical.

1.7 ACCEPTABLE PRODUCTS AND MATERIALS

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products.

Part 2 Products

2.1 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel, threaded.
- .2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .4 Rigid PVC conduit: to CSA C22.2 No. 211.2.
- .5 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal, steel.
- .6 Conduit and tubing diameter size: minimum 21 mm, unless indicated otherwise.

2.2 CONDUIT FASTENINGS

- .1 One-hole galvanized steel straps to secure surface conduits 53 mm and smaller.
 - .1 Two-hole galvanized steel straps for conduits larger than 53 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m on centre.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.
- .5 Attachments: metal type. Plastic fasteners are not accepted.

2.3 CONDUIT FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.
 - .1 Coating: same as conduit.
- .2 Ensure factory "L" where 90 degrees bends for 27 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
 - .1 Set-screws are not acceptable.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

- .1 Polypropylene, single length, in each duct and 3 m beyond each end.

2.6 ACCEPTABLE PRODUCTS

- .1 Conduits:
 - .1 Columbia/MBF.
 - .2 Wheatland.
 - .3 B-Line (Cooper Industries/Eaton).
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Fastenings, Connectors, and Accessories:
 - .1 Thomas & Betts.
 - .2 Cooper Industries.
 - .3 Hubbell (Raco).
 - .4 Replacement materials or products: approved by addendum according to Instructions to bidders.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in unfinished areas.
- .3 Install conduits concealed in exposed concrete.
- .4 Use rigid galvanized steel threaded conduit where exposed to weather conditions, in explosion-proof installations and/or where subject to mechanical damage.
- .5 Use epoxy coated conduit in corrosive areas.
- .6 Use electrical metallic tubing (EMT), except in cast concrete and not subject to mechanical injury.

- .7 Metal armored cables can be used instead of electric metal tubings between junction box accessible in suspended ceilings and lighting or wiring devices in the gypsum walls, when the circuits have 2, 3 or 4 wires up to #10 for a maximum length of 5 m.
- .8 Do not use electrical metallic tubing (EMT) in hazardous areas and where there are corrosive fumes.
- .9 Use rigid PVC conduit where concealed in concrete or underground outside building foundations' limits.
- .10 Use flexible metal conduit for connection to motors in dry areas, connection to recessed incandescent fixtures without prewired outlet box, connection to surface or recessed fluorescent fixtures, and work in movable metal partitions.
 - .1 Unless otherwise indicated, maximum length of such circuit shall be 1 000 mm.
- .11 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.
- .12 Use explosion proof flexible connection for connection to explosion proof motors.
- .13 Install conduit sealing fittings in hazardous areas.
 - .1 Fill with compound.
- .14 Minimum conduit size for lighting and power circuits: 21 mm.
- .15 Bend Conduit Cold:
 - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .16 Mechanically bend steel conduit over 21 mm diameter.
- .17 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .18 Install fish cord in empty conduits.
- .19 Run 2-27 mm spare conduits up to ceiling space and 2-27 mm spare conduits down to ceiling space from each flush panel.
 - .1 Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.
- .20 Remove and replace blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .21 Dry conduits out before installing wire.
- .22 Install metal brackets that are installed on the "T" ceiling for the installation of exit signs and fire detectors.
- .23 Install an expansion connector on all conduits through construction expansion joints.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Group conduits wherever possible on suspended or surface channels.
- .4 Do not pass conduits through structural members except as indicated.
- .5 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls, unless indicated otherwise.
- .3 Do not install conduits in terrazzo or concrete toppings, unless indicated otherwise.
- .4 Secure all concealed conduits and tubings, including those above suspended ceilings.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

- .1 Locate to suit reinforcing steel.
 - .1 Install in centre one third of slab.
- .2 Protect conduits from damage where they stub out of concrete.
- .3 Install sleeves where conduits pass through slab or wall.
- .4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed.
 - .1 Use cold mastic between sleeve and conduit.
- .5 Conduits in slabs: minimum slab thickness 4 times conduit diameter.
- .6 Encase conduits completely in concrete with minimum 25 mm concrete cover.
- .7 Organize conduits in slab to minimize cross-overs.

3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

- .1 Run conduits 27 mm and larger below slab and encase in 75 mm concrete envelope.
 - .1 Provide 50 mm of sand over concrete envelope below floor slab.

3.7 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (pvc excepted) with heavy coat of bituminous paint.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION