
PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Division 03 – Concrete.
- .3 Section 26 05 00 – Common Work Results - Electrical.

1.2 REFERENCES

- .1 Codes and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA),
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium. Includes:
 - .1 CAN/CSA-A5, Portland Cement
 - .2 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .3 CSA G30.3, Cold-Drawn Steel Wire for Concrete Reinforcement.
 - .4 CSA G30.5, Welded Steel Wire Fabric for Concrete Reinforcement.
 - .5 CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement.
- .3 American Society for Testing and Materials (ASTM),
 - .1 ASTM D1056, Specification for Flexible Cellular Materials – Sponge or Expanded Rubber.

1.3 SUBMITTALS

- .1 Submit manufacturer's test data and certification at least 2 weeks prior to commencing work.
- .2 Submit manufacturer's information data sheets and instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

1.5 RECORD DRAWINGS

- .1 Provide record drawings, including details of pipe and duct bank materials, maintenance and operating instructions in accordance with Section 01 78 00 – Closeout Submittals.

PART 2 PRODUCTS

2.1 PVC DUCTS AND FITTINGS

- .1 Rigid PVC duct and conduit for exterior underground wiring, size as indicated to CSA C22.2, with moulded fittings and minimum wall thickness at any point of 2.8 mm. Nominal length: 3 m plus or minus 12 mm.
- .2 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.
- .3 Rigid PVC 90° and 45° bends.
- .4 Rigid PVC 5° angle couplings.
- .5 Expansion joints as required.
- .6 Preformed, interlocking intermediate duct spacers for duct size as indicated.
- .7 Use epoxy coated galvanized steel conduit for sections extending above finished grade.

2.2 SOLVENT WELD COMPOUND

- .1 Solvent cement for PVC duct joints.

2.3 RIGID EPOXY COATED CONDUIT

- .1 Rigid epoxy coated galvanized steel conduit with zinc coating and corrosion resistant epoxy finish inside and outside. Use for sections extending above finished grade as indicated on drawings.
- .2 Factory “ells” where 90° bends are required for 27 mm and larger conduits.
- .3 Fittings: FRE to rigid conduit female adaptors. Manufactured for use with conduit specified. Coating same as conduit.

2.4 CONCRETE & REINFORCEMENT

- .1 Refer to Division 3- Concrete.

2.5 DUCT SPACERS

- .1 As required for installation at 900 mm center – center.

PART 3 EXECUTION

3.1 INSTALLATION GENERAL

- .1 Install underground duct banks including formwork.

- .2 Build duct bank on undisturbed soil or on well compacted granular fill not less than 150 mm thick, compacted to 95% of maximum proctor dry density.
- .3 Open trench completely between points to be connected before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.
- .4 Prior to laying ducts, construct "mud slab" not less than 75 mm thick.
- .5 Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.
- .6 Install base spacers at maximum intervals of 900 mm levelled to grades indicated for bottom layer of ducts.
- .7 Make transpositions, offsets and changes in direction using 5 degree bend sections, do not exceed a total of 20 degree with duct offset.
- .8 Use bell ends at duct terminations in manholes or buildings.
- .9 Use conduit to duct adapters when connecting to conduits.
- .10 Terminate duct runs with duct coupling set flush with end of concrete envelope when dead ending duct bank for future extension.
- .11 Cut, ream and taper end of ducts in field in accordance with manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.
- .12 Use anchors, ties and trench jacks as required to secure ducts and prevent moving during placing of concrete. Tie ducts to spacers with twine or other non-metallic material. Remove weights or wood braces before concrete has set and fill voids.
- .13 Clean ducts before laying. Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.
- .14 Immediately after placing of concrete, pull through each duct wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Avoid disturbing or damaging ducts where concrete has not set completely. Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .15 Install four 3 m lengths of 15M reinforcing rods, one in each corner of duct bank when connecting duct to buildings. Wire rods to 10M dowels at building and support from duct spacers. Place concrete down sides of duct bank filling space under and around ducts. Rod concrete with flat bar between vertical rows filling voids.
- .16 In each duct install pull rope continuous throughout each duct run with 3 m spare rope at each end.

3.2 INSPECTIONS

- .1 Inspection of duct will be carried out by Departmental Representative prior to placing. Placement of concrete and duct cleanout to be done when Owner's Representative present.

END OF SECTION