

CONCRETE ENCASED  
CONDUITS

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 03 30 00 – Cast-in-Place Concrete.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 31 23 33 – Excavating, Trenching and Backfilling.

**1.2 REFERENCES**

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.3 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies WHMIS MSDS - Material Safety Data Sheets.
- .3 Quality assurance submittals: submit following in accordance with Section 01 45 00 – Quality Control.
  - .1 Test reports: submit certified test reports for specified materials from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
  - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

**1.4 QUALITY ASSURANCE**

- .1 Pre-Installation Meetings: convene pre-installation meeting prior to beginning work of this Section with contractor's representative and Departmental Representative to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building sub trades.
  - .4 Review manufacturer's installation instructions and warranty requirements.



**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities

**1.6 MEASUREMENT PROCEDURES**

- .1 No measurement will be made under this Section. Include costs in items of work for Division 26.

**Part 2 Products**

**2.1 PVC CONDUIT**

- .1 PVC conduit, encased in concrete.

**2.2 PVC CONDUIT FITTINGS**

- .1 Rigid PVC solvent welded type couplings, bends, plugs, caps, adaptors as required to make complete installation.

**2.3 MARKER TAPE**

- .1 Polyethylene marker tape: 75 mm wide suitable for burial below grade directly over buried cable.
  - .1 Marker tape to be red in colour with the following words printed in large black, block letters: "CAUTION CAUTION CAUTION ELECTRIC LINE BURIED BELOW".

**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.



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**3.2 INSTALLATION GENERAL**

- .1 Install underground conduit including formwork.
- .2 Install 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 before conduit is laid and ensure that no obstructions will necessitate change in grade of ducts.
- .4 Install conduit at depth as indicated and with minimum slope of 1 to 400.
- .5 Install base spacers at maximum intervals of 1.5 m.
- .6 Lay conduit with configuration and reinforcing as indicated.
  - .1 Encase duct bank with 75 mm thick concrete cover.
  - .2 Use utility bend at service pole.
- .7 Cut, ream and taper end of conduits in field in accordance with manufacturer's recommendations, so that conduit ends are fully equal to factory-made ends.
- .8 Conduit: Do not install excess concrete in trenches. Where concrete encasement is poured in sections, provide 4 x 10 M rebar connections between sections, 1 in each corner of concrete encasement, extending at least 1.0 m into each section.
- .9 Allow concrete to attain 50% of its specified strength before backfilling.
- .10 Use anchors, ties and trench jacks as required to secure conduits and prevent moving during placing of concrete.
  - .1 Tie conduits to spacers with twine or other non-metallic material.
  - .2 Remove weights or wood braces before concrete has set and fill voids.  
Clean conduits before laying.
  - .3 Cap ends of conduits during construction and after installation to prevent entrance of foreign materials.
- .11 Cleaning:
  - .1 Pull 300 mm long x diameter 6 mm less than internal diameter of conduit wooden mandrel through each conduit, immediately after placing of concrete.
  - .2 Then pull stiff bristle brush through conduit; avoid disturbing or damaging conduits where concrete has not set completely.
  - .3 Pull stiff bristle brush through each conduit immediately before pulling-in cables.
- .12 Install pull rope continuous throughout each conduit run with 3 m spare rope at each end.



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**3.3 MARKER TAPE**

- .1 Install marker tape continuously over entire conduit run.

**3.4 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspections:
  - .1 Inspection of conduit will be carried out by Departmental Representative prior to placing.
  - .2 Placement of concrete and conduit cleanout to be done when Departmental Representative present.

**3.5 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**



UNDERGROUND ELECTRICAL  
SERVICE

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 26 05 00 – Common Work Results for Electrical.
- .2 Section 26 24 01 – Service Equipment.

**1.2 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Quality assurance submittals: submit following in accordance with Section 01 45 00 – Quality Control.
  - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .2 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

**1.3 QUALITY ASSURANCE**

- .1 Regulatory Requirements:
  - .1 Perform Work to comply with applicable Provincial/Territorial regulations.
  - .2 Co-ordinate and meet requirements of power supply authority.
    - .1 Ensure availability of power when required.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling.
  - .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.



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**1.5 UTILITY COSTS**

- .1 Arrange for utility installation and energization.
- .2 Any fees or costs required by the utility to provide new services is to be paid for by the contractor, as part of the contract price. This includes energization fees for new metered service.

**1.6 MEASUREMENT PROCEDURES**

- .1 No measurement will be made under this Section. Include costs in items of work for Division 26.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Underground conduit: to Section 33 65 73 – Concrete Encased Conduits, size as indicated.
- .2 PVC coated rigid galvanized steel conduit: to Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
- .3 Conductors: copper, type RW90, to Section 26 05 21 – Wires and Cables (0 – 1000 V), size and number of conductors as indicated.
- .4 Concrete: to CAN/CSA A23.1/A23.2.
- .5 Backfill: clean and free of debris.

**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 cables in conduit in accordance with Section 26 05 43.01 – Installation of Cables in Conduits.
- .2 Stub conduit up service pole, Utility to install guard over conductors.
- .3 Allow adequate conductor length for connection to supply.
- .4 Allow adequate conductor length for connection to service equipment.



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- .5 Make grounding connections in accordance with Section 26 05 28 – Grounding – Secondary.
- .6 Seal conduit at service entrance after installation of cable.

**3.3 FIELD QUALITY CONTROL**

- .1 Site Tests:
  - .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
  - .2 Perform additional tests if required by authority having jurisdiction.
- .2 Submit written test results to Departmental Representative for review.

**3.4 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**