

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 26 05 21 Wires and Cables
- .2 Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings

**1.2 REFERENCES**

- .1 CSA C22.2 No. 211.2-06 (R2011) Rigid PVC (unplasticized) Conduit

**1.3 ACTION AND INFORMATIONAL 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.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates, padding and packaging materials.

**1.5 QUALITY CONTROL**

- .1 Pre-Installation Testing and Inspection
  - .1 All ducts are to be inspected to ensure that they are as specified in the Contract Documents.
  - .2 All ducts are to be inspected to ensure they are stamped with the appropriate CSA designation, strength, and type. During installation, all ducts are to be inspected to ensure they are properly bedded, have sufficient depth of cover, and are coupled or connected to electrical chambers, poles, or other devices as specified in the Contract Documents.
- .2 Proof of Performance Testing and Inspection
  - .1 All ducts are to be inspected and tested to ensure that they are as specified in the Contract Documents. All ducts are to be tested to ensure they are free of debris, water, breakage, or distortion.

## **1.6 QUALITY ASSURANCE**

- .1 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control. Certificates: signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
  - .1 Manufacturer's Instructions: for installation and special handling criteria, installation sequence, cleaning procedures.

## **Part 2 Products**

### **2.1 PVC DUCTS AND FITTINGS**

- .1 Rigid PVC duct: CSA C22.2 No. 211.2, with fittings, for direct burial with expanded flange ends, Trade size 50mm
  - .1 Nominal length: 6 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 a complete installation.
- .3 Rigid PVC 90 degrees, 45 degrees bends and 5 degrees angle couplings as required.

### **2.2 CABLE PULLING EQUIPMENT**

- .1 Braided nylon or polypropylene pull rope with a minimum tensile strength of 400N.

### **2.3 WARNING TAPE**

- .1 .1 Stranded 4-mil polyethylene 76 mm wide tape, yellow with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE 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.

### **3.2 INSTALLATION**

- .1 Install ducts in accordance with manufacturer's instructions and at elevations as indicated.
- .2 Clean inside of ducts before laying.
- .3 Slope ducts to ensure proper drainage.
- .4 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.

- .5 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 material.
  - .1 Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .6 Install a pull rope continuous throughout each duct run with 1.5 m spare rope at each end.
- .7 Place continuous strip of warning tape 300 mm above duct before backfilling trenches.
- .8 Install markers as required.
- .9 Wobble joint fittings with expanded polystyrene bedding is to be installed when direct buried rigid ducts terminate at concrete structures such as electrical maintenance holes, footings, bridge structures, retaining walls, and duct banks.
- .10 Notify the Departmental Representative for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.

### **3.3 CLEANING**

- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

### **3.4 TEMPORARY ELECTRICAL WORK**

- .1 The work for temporary electrical installations is to be the same as for permanent installations of the same type of work, except that the work is to include the removal of the installations when they are no longer required.

**END OF SECTION**

## **Part 1            General**

### **1.1            RELATED SECTIONS**

- .1      Section 26 05 21          Wires and Cables (0-1000V)
- .2      Section 26 05 28          Grounding Secondary
- .3      Section 26 05 34          Conduits, conduit fastenings and conduit fittings

### **1.2            REFERENCES**

- .1      American National Standards Institute (ANSI)/National Electrical Manufacturers (NEMA)
  - .1      ANSI/NEMA C29.17-2002, Composite-Line Post Type Insulators.
  - .2      ANSI/NEMA C29.18-2003, Composite-Distribution Line Post Type Insulators.
  - .3      ANSI/NEMA C29.3-1986 (R2002), Wet-Processed Porcelain Insulators-(Spool Type).
  - .4      ANSI/NEMA C29.4-1989 (R2002), Wet-Processed Porcelain Insulators (Strain Type).
  - .5      ANSI/NEMA C29.5-1984 (R2002), Wet-Process Porcelain Insulators (Low- and Medium-Voltage Pin Type).
- .2      Canadian Electrical Association Purchasing Specification (CEA)
  - .1      CEA LWIWG-02-96, Line Post Composite Insulator for Overhead Distribution Lines.
- .3      Canadian Standards Association (CSA International)
  - .1      CAN/CSA-G12-92 (R2007), Zinc-Coated Steel Wire Strand.
  - .2      CAN/CSA-C83-96 (R2005), Communication and Power Line Hardware.
  - .3      CAN/CSA-O80 Series-08, Wood Preservation.
  - .4      CAN/CSA-O15-05, Wood Utility Poles and Reinforcing Stubs.
- .4      Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
  - .1      EEMAC 1B-1, 1957, Standard for Wet Process Porcelain Insulators (Strain Type).
  - .2      EEMAC 2B-1, 1957, Standard for Wet Process Porcelain Insulators (Spool Type).
- .5      Local Utility Standards

### **1.3            QUALITY CONTROL**

- .1      Perform tests and field inspection for pole lines and hardware prior to energization.

## **Part 2            Products**

### **2.1            MATERIALS**

- .1      Wood preservation: to CAN/CSA O80 Series.

- .2 Power line hardware: to CAN/CSA-C83.
- .3 Wood utility poles: to CAN/CSA-O15, wood species Western Cedar, Red Pine, Scotch Pine, Lodge Pole Pine, Jack Pine, Southern Yellow Pine, Class 4, preservative treated.
  - .1 12.2 m long poles for secondary circuits only.

## **2.2 INSULATORS**

- .1 Guy strain insulators
- .2 Suspension/dead end insulators

## **2.3 GUYS AND ANCHORS**

- .1 Guy wire: to CAN/CSA-G12, 9 mm nominal diameter, stranded, galvanized steel for dead ends and guys.
- .2 Guy clamps: three-bolt heavy duty or preform grip type.
- .3 Eye bolt: 19 mm thimble, length to suit, four hole guy straps and 16 mm machine bolt with square washer to attach guy wire to pole.
- .4 Anchor rod: 19 mm diameter x 2.7m long, galvanized steel with thimble eye.
- .5 Anchor: manufacturer's standard, approved by Departmental Representative.
  - .1 Heavy duty expanding type, four way, expanded area 250 mm dia.
  - .2 Power installed screw anchor (PISA), double helix.
  - .3 Log anchor in earth or swamp.
  - .4 Rock anchor.
- .6 Guy guard: half-round, galvanized steel 2.7 m long.
- .7 Guy guard: plastic, colored yellow, 2.7 m long.
- .8 Guy anchors and associated hardware is to be installed as specified in the contract Documents and the Canadian Electrical Code. Anchorage plates are to be installed at the specified guy lead distance and adjusted to remain clear of any existing guy anchors by a minimum distance of 600 mm and then backfilled with native material and compacted.
- .9 Guy anchors are to be installed with single or double guy cable sets as specified in the Contract Documents.
- .10 All guy cables to be installed to a snug condition prior to aerial cable stringing and readjusted upon completion to maintain poles in a plumb position.
- .11 Guy cables to be tightened to maintain pole alignment and aerial cable clearances.

## **2.4 WIRE CONNECTORS**

- .1 In accordance with Section 26 05 21 – Wire and Cable (0-1000V).

## **2.5 GROUND RODS, GROUND CONDUCTORS AND GRADIENT MAT**

- .1 In accordance with Section 26 05 28 - Grounding - Secondary.

**Part 3            Execution**

**3.1                MANUFACTURER'S INSTRUCTIONS**

- .1        Install electrical pole lines and hardware in accordance with manufacturer's written recommendations and contract specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2                PREPARATION OF POLES**

- .1        Where poles require shortening, cut piece from top only.
- .2        Treat roof top, gains, bored holes with preservative before assembly.
- .3        Drill through bolts and brace bolts.
- .4        Install secondary clevis-clamps for spun bus installations.

**3.3                INSTALLATION**

- .1        Locate and dig pole holes.
  - .1        Make holes large enough to allow space for tamping backfill.
- .2        Set poles.
- .3        At change in direction of line, set insulator brackets to bisect angle formed by change.
- .4        Set poles to maintain even grade.
  - .1        Allow for contour of terrain and do not exceed grading of 1.5 m per pole.
- .5        Replace backfill in 150 mm layers.
  - .1        Tamp each layer, and apply final layer to drain water away from pole.
- .6        Locate and install guy wires and anchors at dead-ends, at non-tangent poles, corner poles, and start of branch feeders.
- .7        Insert anchor at least 1.8 m into ground. Backfill and tamp in 150 mm layers.
- .8        Install insulators.

**3.4                TEMPORARY ELECTRICAL WORK**

- .1        The work for temporary electrical installations is to be the same as for permanent installations of the same type of work, except the work is to include the removal of the installations when they are not longer required.

**3.5                CLEANING**

- .1        Remove surplus materials, excess materials, rubbish, tools and equipment at end of every day.

**END OF SECTION**