



## **CONSTRUCTION SPECIFICATION FOR INSTALLATION OF POLES**

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### **615.01 SCOPE**

This specification covers the requirements for the installation of poles used for the mounting of lighting equipment, traffic signals and control equipment, low-voltage aerial cables, and extra low-voltage aerial cables.

#### **615.01.01 Specification Significance and Use**

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be according to the Contract Documents.

## **615.01.02 Appendices Significance and Use**

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

## **615.02 REFERENCES**

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

### **Ontario Provincial Standard Specifications, Construction**

OPSS 492	Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures
OPSS 501	Compacting
OPSS 603	Installation of Ducts
OPSS 609	Grounding
OPSS 610	Removal of Electrical Equipment and Materials
OPSS 904	Concrete Structures

### **Ontario Provincial Standard Specifications, Material**

OPSS 1010	Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
OPSS 1350	Concrete - Materials and Production
OPSS 1440	Steel Reinforcement for Concrete
OPSS 2420	Wooden Poles
OPSS 2421	Spun Concrete Poles
OPSS 2422	Heavy Class Steel and Sectional Steel Poles, Base Mounted
OPSS 2423	Steel Poles, Base Mounted
OPSS 2452	Aluminum Poles, Base Mounted
OPSS 2453	Sectional Steel Poles

## **CSA Standards**

C83-22                      Communication and Power Line Hardware  
G12-14 (R2019)        Zinc-Coated Steel Wire Strand

## **Others**

Ontario Electrical Safety Code

### **615.05                      MATERIALS**

#### **615.05.01                Concrete**

Concrete shall be according to OPSS 1350 with a nominal minimum 28-Day compressive strength of 30 MPa.

#### **615.05.02                Granular Material**

Granular materials shall be Granular A or B according to OPSS 1010.

#### **615.05.03                Steel Reinforcement**

Steel reinforcement shall be according to OPSS 1440.

#### **615.05.04                Poles**

Concrete poles shall be according to OPSS 2421.

Steel poles for base mounting shall be according to OPSS 2423.

Aluminum poles for base mounting shall be according to OPSS 2452.

Sectional steel poles for direct burial or base mounting shall be according to OPSS 2453.

Wooden poles shall be according to OPSS 2420.

Heavy class steel poles and heavy class sectional steel poles shall be according to OPSS 2422. This class is required for poles with mast arms longer than 5.5 m.

#### **615.05.05                Frangible Bases**

Frangible bases shall be as specified in the Contract Documents.

#### **615.05.06                Pole Hardware and Accessories**

Pole line hardware shall be according to CSA C83.

Steel guy cable shall be according to CSA G12.

Guy anchors shall be of the helical power driven or direct buried expandable type with a minimum diameter of 250 mm and a minimum anchor rod ultimate strength of 50 kN.

**615.07 CONSTRUCTION**

**615.07.01 General**

General requirements for electrical work shall be as specified in the Contract Documents.

Concrete, wooden, and metal poles shall be installed at locations specified in the Contract Documents.

All compaction shall be according to OPSS 501.

Grounding of poles shall be according to OPSS 609 and the Contract Documents.

**615.07.01.01 Pole Orientation**

Concrete and metal poles shall be installed with the handhole location on the pole as specified in the Contract Documents and such that the top wiring aperture is at right angles to the centreline of the road being served.

**615.07.01.02 Pole Handling**

Poles shall be handled using suitable non-abrasive slings at the pole pick up points as specified by the pole manufacturer.

**615.07.01.03 Removals**

Removals shall be according to OPSS 610.

**615.07.02 Sectional Steel Poles**

**615.07.02.01 Assembly**

Sectional steel poles shall be assembled in order of section number, taper, and diameter. Sections with wiring apertures shall be set with consideration given to the handhole location.

All sections shall be assembled by compression according to the manufacturer's instructions such that each section meets the normal overlap limits marked on the pole or refusal. Seam welds shall be slightly offset during assembly. The finished length of the pole shall be less than or equal to the nominal pole length.

Pole lengths of 5.64 m or more shall be assembled using three self-tapping screws or impact inserted pins. Screws and pins shall be installed in the overlap of all sections below the signal bracket so that they are spaced equally around the pole.

**615.07.03 Direct Buried Poles**

**615.07.03.01 Installation in Earth**

Excavation shall be by auger or by other suitable means to obtain a hole large enough to accommodate concrete encasement and backfill. Where the excavation extends beyond the neat limits specified in the Contract Documents, and, where concrete encasement is specified in the Contract Documents, concrete may be placed to the undisturbed earth or the encasement may be formed with the remainder of the backfill made up of native material.

For hydro vac excavation, backfill material shall consist of granular or limestone screening material.

### **615.07.03.02 Installation in Rock**

Where rock is encountered, the method of installation shall be chosen from those specified in the Contract Documents and be based on the depth of rock below finished grade. Each method of installation in rock shall be approved by the Contract Administrator prior to construction.

Rock anchors, bolts for rock mounts, and steel dowel bars shall be installed in drilled holes and grouted in place with non-shrink grout. Poles shall be cut off at the top end to provide the correct top of pole elevation. Wooden poles that have been cut off shall have the ends treated with preservative according to the pole manufacturer's specifications.

Concrete levelling pads, concrete backfill up to the top of the rock grade, and formed concrete encasement shall be placed according to OPSS 904.

Native or imported earth material shall be used as backfill above or around the concrete encasement and compacted.

Rock excavation shall be according to OPSS 603.

### **615.07.03.03 Pole Alignment**

Direct buried poles shall be held plumb by using a suitable temporary support assembly during concrete setting time and during backfilling operations.

### **615.07.04 Base Mounted Poles**

#### **615.07.04.01 Preparation**

Anchorage templates shall be removed prior to installation of poles and frangible bases.

All studs, bolts, and nuts shall be cleaned and coated with white lithium-based grease.

#### **615.07.04.02 Installation of Frangible Bases**

When frangible bases are specified in the Contract Documents, they shall be installed according to manufacturer's specifications.

#### **615.07.04.03 Installation of Poles**

When specified in the Contract Documents, poles shall be installed on frangible bases.

Poles shall be set plumb.

#### **615.07.05 Apertures**

Drilled apertures shall be accurately aligned to suit pole attachments or equipment. Wiring apertures in metal poles shall be provided with rubber grommets. Apertures in metal poles shall be deburred, and in galvanized steel poles, be coated with grey zinc-rich paint and allowed to dry before placing rubber grommets in them.

Unused pole apertures shall be plugged with rubber, neoprene, or plastic plugs.

#### **615.07.06 Guy Anchors**

Guy anchors and associated hardware shall be installed as specified in the Contract Documents and the Ontario Electrical Safety Code. Anchorage plates shall 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.

Guy anchors shall be installed with single or double guy cable sets as specified in the Contract Documents.

All guy cables shall be installed to a snug condition prior to aerial cable stringing and readjusted upon completion to maintain poles in a plumb position.

Guy cables shall be tightened to maintain pole alignment and aerial cable clearances.

#### **615.07.07 Quality Control**

##### **615.07.07.01 Pre-Installation Testing and Inspection**

Poles shall be inspected for any obvious flaws, prior to installation.

The Contractor shall certify that sectional steel poles are according to the supplier's design and drawing numbers as specified in OPSS 2453. The Contractor's certification shall reference the supplier's drawing numbers.

The Contractor shall certify that heavy class steel and sectional steel poles are according to the supplier's design and drawings as specified in OPSS 2422. The Contractor's certification shall reference the supplier's drawing numbers.

##### **615.07.07.02 Proof of Performance Testing and Inspection**

The work of pole installation shall be inspected to ensure that it is according to the Contract Documents. The inspection shall ensure that:

- a) Poles and appurtenances have been properly installed.
- b) Poles are plumb.
- c) Anchorage assemblies and frangible bases are installed correctly.

#### **615.07.08 Temporary Electrical Work**

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

#### **615.07.09 Site Restoration**

Site restoration shall be according to OPSS 492.

#### **615.07.10 Management of Excess Materials**

Management of excess material shall be as specified in the Contract Documents.

**615.09 MEASUREMENT FOR PAYMENT**

**615.09.01 Actual Measurement**

**615.09.01.01 Poles**

For measurement purposes, a count shall be made of the number of poles installed regardless of the type and size of the poles, and shall include any frangible bases and guy anchors installed with the poles.

**615.09.01.02 Sectional Steel Poles, Direct Buried in Earth**

For measurement purposes, a count shall be made of the number of sectional steel poles direct buried in earth.

**615.09.01.03 Concrete Poles, Direct Buried in Earth**

For measurement purposes, a count shall be made of the number of concrete poles direct buried in earth.

**615.09.01.04 Wooden Poles, Direct Buried in Earth**

For measurement purposes, a count shall be made of the number of wooden poles direct buried in earth.

**615.09.01.05 Sectional Steel Poles, Direct Buried in Rock**

For measurement purposes, a count shall be made of the number of sectional steel poles direct buried in rock.

**615.09.01.06 Concrete Steel Poles, Direct Buried in Rock**

For measurement purposes, a count shall be made of the number of concrete poles direct buried in rock.

**615.09.01.07 Wooden Poles, Direct Buried in Rock**

For measurement purposes, a count shall be made of the number of wooden poles direct buried in rock.

**615.09.01.08 Sectional Steel Poles, Base Mounted**

For measurement purposes, a count shall be made of the number of base mounted sectional steel poles installed.

**615.09.01.09 Heavy Class Sectional Steel Poles, Base Mounted**

For measurement purposes, a count shall be made of the number of base mounted heavy class sectional steel poles installed.

**615.09.01.10 Steel Poles, Base Mounted**

For measurement purposes, a count shall be made of the number of base mounted steel poles installed.

**615.09.01.11 Heavy Class Steel Poles, Base Mounted**

For measurement purposes, a count shall be made of the number of base mounted heavy class steel poles installed.

**615.09.01.12 Aluminum Poles, Base Mounted**

For measurement purposes, a count shall be made of the number of base mounted aluminum poles installed.

**615.09.01.13 Frangible Bases**

For measurement purposes, a count shall be made of the number of frangible bases installed.

**615.09.01.14 Guy Anchors**

For measurement purposes, a count shall be made of the number of guy anchors installed, regardless of the size and type.

**615.09.02 Plan Quantity Measurement**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

**615.10 BASIS OF PAYMENT**

**615.10.01 Poles - Item**

Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment, and Materials to do the work.

When the Contract contains separate items for the work required by this specification, payment shall be at the Contract price for such work.

- 615.10.02 Sectional Steel Poles, Direct Buried in Earth - Item**
- Concrete Poles, Direct Buried in Earth - Item**
- Wooden Poles, Direct Buried in Earth - Item**
- Sectional Steel Poles, Direct Buried in Rock - Item**
- Concrete Poles, Direct Buried in Rock - Item**
- Wooden Poles, Direct Buried in Rock - Item**
- Sectional Steel Poles, Base Mounted - Item**
- Heavy Class Sectional Steel Poles, Base Mounted - Item**
- Steel Poles, Base Mounted - Item**
- Heavy Class Steel Poles, Base Mounted - Item**
- Aluminum Poles, Base Mounted - Item**
- Frangible Bases - Item**
- Guy Anchors - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.



**615.10.03**                    **Sectional Steel Poles, Direct Buried in Earth (Temporary) - Item**  
**Concrete Poles, Direct Buried in Earth (Temporary) - Item**  
**Wooden Poles, Direct Buried in Earth (Temporary) - Item**  
**Sectional Steel Poles, Direct Buried in Rock (Temporary) - Item**  
**Concrete Poles, Direct Buried in Rock (Temporary) - Item**  
**Wooden Poles, Direct Buried in Rock (Temporary) - Item**  
**Sectional Steel Poles, Base Mounted (Temporary) - Item**  
**Steel Poles, Base Mounted (Temporary) - Item**  
**Aluminum Poles, Base Mounted (Temporary) - Item**  
**Frangible Bases (Temporary) - Item**  
**Guy Anchors (Temporary) - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Materials to do the work.

Progress payment for the above tender items shall be based on the following percentages of the Contract price:

80% for supply and installation

20% for removal

**615.10.04                    Rock Excavation**

Payment for rock excavation shall be according to OPSS 603.

Rock excavation shall not include holes drilled in rock for the placement of steel dowel bars.

**Appendix 615-A, November 2022  
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

**Note:** This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

**Designer Action/Considerations**

The designer should specify the following in the Contract Documents:

- Type and location of poles. (615.07.01)
- Excavation beyond the neat limit. (615.07.03.01)
- Concrete encasement for direct buried poles. (615.07.03.01)
- Single or double guy cable sets. (615.07.08)

The design should determine if the following is required and, if so, it should be specified in the Contract Documents:

- Poles installed on frangible base locations. (615.07.04.02)

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

**Related Ontario Provincial Standard Drawings**

OPSD 2200 Series	Electrical Foundations
OPSD 2410.010	Spun Concrete Pole
OPSD 2410.020	18.3 m Spun Concrete Pole for TV Camera Mounting
OPSD 2414.010	3.3m Aluminum and Sectional Steel Poles, Based Mounted
OPSD 2415.011	Steel Pole, Base Mounted
OPSD 2416.011	Steel Pole, Concrete Barrier Mounted
OPSD 2428.010	Frangible Bases
OPSD 2432.010	Aluminum Pole, Base Mounted