Note: The PROV published in November 2017 replaces OPSS 2421 COMMON, November 2012 with no technical content changes.

MATERIAL SPECIFICATION FOR SPUN CONCRETE POLES

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2421.01 SCOPE

This specification covers the requirements for round spun concrete poles, maximum 21.3 metres in length.

2421.02 REFERENCES

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

Ontario Provincial Standard Specifications, Material

OPSS 1301 Cementing Materials
OPSS 1302 Water
OPSS 1303 Admixtures for Concrete

CSA Standards

A14-07 Concrete Poles
A3001-08 Cementitious Materials for Use in Concrete
G30.18-09 Carbon Steel Bars for Concrete Reinforcement

2421.04 DESIGN AND SUBMISSION REQUIREMENTS

2421.04.01 Design Requirements

2421.04.01.01 General

All poles shall be of proper class according to CAN/CSA A14 and the Contract Documents.

If poles are not specified by class, the Owner shall provide the manufacturer with the load that the poles must resist and other sufficient information to allow the producer to determine the loads.

Extra stiff poles shall be manufactured according to CAN/CSA A14.

2421.04.02 Submission Requirements

2421.04.02.01 Working Drawings

Working Drawings shall be prepared for the fabrication of concrete poles.

Three (3) sets of Working Drawings shall be submitted to the Contract Administrator at least 14 Days prior to the commencement of fabrication of the concrete poles for information purposes only. Prior to making a submission, the seals and signatures of a design Engineer and a design-checking Engineer shall be affixed on the Working Drawings verifying that the Working Drawings are consistent with the Contract Documents.

Where multi-discipline engineering work is depicted on the same Working Drawing and the design or design-checking Engineer or both are unable to seal and sign the Working Drawing for all aspects of the work, the drawing shall be sealed and signed by as many additional design and design-check Engineers as necessary.

As a minimum, the Working Drawings shall include the following information:

a) Detailed dimensions.

b) Plans, elevations, sections, and details to show pole structural details.

c) Equipment and hardware layout.

d) Pole weight.

e) List of hardware items.

f) Nameplate details.

2421.04.02.02 Certification

A certificate signed by the manufacturer's Engineer stating that all steel and cementing materials used in the production of spun concrete poles supplied meet the requirements of this specification shall be submitted with the Working Drawings.

2421.05 MATERIALS

2421.05.01 Cementing Materials

Cementing materials shall be according to OPSS 1301 and CAN/CSA A3001.

Silica fume or blended cement containing silica fume shall not be used.

2421.05.02 Water

Water used in the production of spun concrete poles shall be according to OPSS 1302.

2421.05.03 Air Entraining, Chemical, and Superplasticizing Admixtures

Air entraining, chemical, and superplasticizing admixtures shall be according to OPSS 1303. Relative density and pH of air entraining admixtures and non-volatile content and relative density of chemical and superplasticizing admixtures shall be within tolerances stated in OPSS 1303, and to the requirements shown in the MTO's pre-qualified products list or, when specified in the Contract Documents, the Owner's pre-qualified products list.

2421.05.04 Reinforcement

When mill test certificates originate from a mill outside of Canada or the United States of America, the Contractor shall have the information on the mill test certificate verified by testing by a Canadian laboratory. This laboratory shall be accredited by the Standards Council of Canada to comply with the requirements of ISO/IEC DIS 17025 for the specific tests or types of tests required by the material standard specified on the mill test certificate. The mill test certificates shall be stamped with the name of the Canadian laboratory and appropriate wording stating that the material is in accordance with the specified Contract requirements. The stamp shall include the appropriate material specification number, testing date, and the signature of an authorized officer of the Canadian laboratory.

2421.05.04.01 Non-Prestressed Longitudinal Reinforcing Steel

Non-prestressed longitudinal reinforcing steel shall be according to CAN/CSA A14 and shall be weldable according to CSA G30.18.

2421.05.04.02 Prestressed Longitudinal Reinforcing Steel and Helical Reinforcement

Prestressed longitudinal reinforcing steel and helical reinforcement shall be according to CAN/CSA A14.

2421.05.05 Apertures and Handholes

Apertures and handholes shall be according to CAN/CSA A14 and the Contract Documents.

2421.07 PRODUCTION

2421.07.01 General

Dimensions and class of the pole shall be as specified in the Contract Documents.

Concrete for poles shall be placed monolithically.

The pole top shall have a smooth finish plane at right angles to the axis of the pole.

Apertures in poles shall be of a size and if necessary shall be locally reinforced or framed so that the required bending capacity at the aperture is sustained.

Apertures shall have a smooth inside finish without sharp corners.

The handhole cover plate shall be formed to suit the contour of the pole.

2421.07.02 Concrete

Concrete shall be produced to meet the compressive strength as specified in CAN/CSA A14.

Sufficient cylinders shall be cast to verify the 28-Day compressive strength of the poles supplied to the Contract. Compressive strength testing shall be according to CAN/CSA A14.

Concrete shall be tested according to the frequency and requirements of CAN/CSA A14.

2421.07.03 Grounding

A stranded #6 AWG bare copper grounding conductor shall be attached to the non-prestressed longitudinal reinforcing steel rod brazed to the zinc cast handhole frame with a 13 mm standard lug.

2421.07.04 Marking

Each pole shall have the following identification markings located approximately 100 mm above the top of the handhole:

a) Manufacturer's name or trademark.

b) Year of manufacture.

c) Overall length.

d) Class identification number.

e) Prestressed poles shall be marked and identified by the letter P.

These markings shall be on a corrosion-resistant metal plate securely attached to the surface of the pole.

The pole shall have the pick-up point or points for unloading purposes marked with black tape around the complete circumference.

2421.07.05 Packaging and Shipping

Each pole shall be shipped complete with hardware suitably packaged to ensure that all parts are delivered as an entity.

The Owner shall be notified of the shipping date a minimum of 3 Business Days prior to delivery.

2421.08 QUALITY ASSURANCE

2421.08.01 General

All work is subject to an inspection by the Owner's representative prior to shipment.

Poles not meeting the requirements of this specification shall be rejected by the Owner.

The Owner shall be notified a minimum of 1 Business Day in advance of the date that the fabrication of the poles is to commence.

The Owner's representative shall have free access to the place of fabrication for the purpose of inspecting and examining plant records; certificates; materials used; fabrication process, including welding and galvanizing; and to make any tests as may be considered necessary, while the poles are being fabricated.

The manufacturer's Engineer shall provide a stamped certification that the poles supplied to the Work meet the requirements of the Contract Documents and the requirements of CAN/CSA A14.

2421.08.02 Acceptance or Rejection

2421.08.02.01 Structural Testing

Acceptance shall be according to a stamped certification by the manufacturer's Engineer that ongoing testing has been performed and evaluated according to CAN/CSA A14 and that the most recent two tests for classification, torsion, and transverse testing meet the requirements of the Contract Documents and the requirements of CAN/CSA A14. All required supporting test data and certificates shall be less than 12 months old at the time of submission.

2421.08.02.02 Marking

Markings not meeting the requirements of the Marking subsection shall be rejected by the Owner.