

**AMENDMENT TO OPSS 1821, MAY 1993 - Air Void System Parameters, Salt Scaling and Concrete Cover Measurements of Precast Hardened Concrete**

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Special Provision No. 118S03

February 2017

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**1821.02 REFERENCES**

Section 1821.02 of OPSS 1821, is amended by the addition of the following:

**Ministry of Transportation, Ontario, Laboratory Testing Manual:**

LS-100 Method for Rounding–Off of Test Data and Other Numbers  
LS-412 Method of Test for Scaling Resistance of Concrete Surfaces Exposed to De-icing Chemicals

**1821.05 MATERIALS**

**1821.05.01 Concrete**

Subsection 1821.05.01 of OPSS 1821 is amended by deletion of clauses 1821.05.01.01, 1821.05.01.04 and 1821.05.01.05 and replacing them with the following:

**1821.05.01.01 General**

Concrete shall be according to OPSS 1350 except that the air void system parameters of wet cast concrete shall be according to this special provision and the allowable replacement of Portland cement by ground granulated blast furnace slag in dry cast concrete shall be limited to a maximum of 40% by mass of total cementing materials.

**1821.05.01.04 Air Void System in Hardened Concrete - Wet Cast Concrete**

The air void system in hardened concrete, when tested in conformance to ASTM C457, shall be:

Air Content 3.0% minimum  
Spacing Factor 0.200 mm maximum

**1821.05.01.05 Salt Scaling - Dry Cast Concrete**

For dry cast concrete, the salt scaling resistance when tested according to laboratory test method LS-412 and this specification shall have a mass loss of not more than 0.8 kg/m<sup>2</sup>.

OPSS 1821 is further amended by that addition of the following section:

**1821.06 EQUIPMENT**

**1821.06.01 Batching Plant**

The batching plant used for producing concrete for production purposes shall be internal to the manufacturing plant.

External sources of concrete supply or external batching plants used for production purposes shall possess a valid and current Certificate of Ready Mixed Concrete Production Facilities as issued by the Ready Mix Concrete Association of Ontario (RMCAO).

## **1821.07                    PRODUCTION**

### **1821.07.10                Quality Control**

Subsection 1821.07.10 of OPSS 1821 is amended by the addition of the following clauses:

#### **1821.07.10.06            Testing of Air Void Content of Hardened Concrete in Wet Cast Concrete**

The manufacturer shall achieve an air void system in the hardened concrete as specified in the materials section.

For evaluation of air void system parameters, the manufacturer shall remove cores from hardened concrete and shall have the cores tested in accordance with ASTM C457, except that a magnification of 100 X to 125 X shall be used. Testing shall be carried out by a laboratory and an operator(s) who participate in the MTO Air Void Analysis Correlation Program and are on the Ministry's list of qualified laboratories and operators for this test. The air content shall be reported to one decimal place and spacing factor shall be reported to three decimal places. Rounding-off of test data shall be done in accordance with LS-100. The cores shall be obtained and treated according to CSA A23.2

As a minimum, two 100 x 200 mm cores will be removed and tested for every 1000 square meters of floor area of box culvert or box sewer. All cores shall be taken when the concrete is a minimum 7 days of age. Cores shall be cut lengthwise into two halves, with one half to be tested by the Manufacturer in accordance with ASTM C457 "Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete" and the other forwarded to the Ministry (Manager, Concrete Section, Room 15, Building C, 145 Sir William Hearst Avenue, Downsview, Ontario, M3M 1J8) within two weeks of extracting the core.

Air void analysis results obtained by the manufacturer shall be forwarded to the Contract Administrator within 30 days of removal of the cores from the hardened concrete. Air void samples shall be retained by the manufacturer for a period of one year from the date of testing and shall be provided to the Contract Administrator on request.

Acceptance of air void system parameters shall be based on individual core results for air content, and the average of each pair of cores for spacing factor. Concrete, which fails to meet the requirements for air void system parameters as specified here, will be considered unacceptable. The manufacturer may submit proposals for remedial action to the Contract Administrator, or may elect to remove and replace the deficient precast product.

#### **1821.07.10.07            Concrete Cover Measurement**

Concrete cover measurement shall be made on two box units, selected at random, per group of 15 box units or fraction thereof of each continuous production run of a single size.

Measurement shall be obtained on a one-metre grid on all interior and exterior surfaces of the box unit, including the ends of the unit.

Cover measurements shall be carried out by a method acceptable to the Contract Administrator and shall be reported in writing to the Contract Administrator prior to installation of the units.

**1821.07.10.08                      Salt Scaling Resistance in Dry Cast Concrete**

For evaluation of the salt scaling resistance of the dry cast concrete, the manufacturer shall cut and test a set of two specimens for every 1000 square meters of floor area from finished and cured box culvert or box sewer. The specimens shall be 300 x 300 mm and shall be tested according to LS-412 without further curing.

The salt scaling result shall be the average of a set.

Salt scaling results obtained by the manufacturer shall be forwarded to the Contract Administrator within 14 weeks of casting the box culvert or box sewer.