



## **MATERIAL SPECIFICATION FOR WATER**

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**1302.01 SCOPE**

This specification covers the requirements for water used in the production, fog misting and curing of concrete and mortar.

**1302.02 REFERENCES**

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

**Ontario Ministry of Transportation Publications**

MTO Forms:

PH-CC-340 Field Sample Data Sheet - Concrete

**CSA Standards**

A23.1-19 Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete

A23.2-9C Compressive Strength of Cylindrical Concrete Specimens\*

A283-06(R2016) Qualification Code for Concrete Testing Laboratories

\* [Part of A23.1-19/A23.2-19 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete]

**ASTM International**

D512-23 Test Method for Chloride Ion in Water

D516-22 Test Method for Sulfate Ion in Water  
D4192-15 Test Method for Potassium in Water by Atomic Absorption Spectrophotometry  
C403/C403M-23 Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance

## Other

Technical Support Document for Ontario Drinking Water Quality Standards, Objectives and Guidelines

## Provincial Statutes

Ontario Regulation 169/03, Ontario Drinking Water Quality Standards under *Safe Drinking Water Act*, 2002 S.O. 2002, c. 32

### 1302.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

**Potable Water** means water supplied by a municipality or non-municipal source, meeting the Ontario Regulation 169/03, Ontario Drinking-Water Quality Standards.

**Recycled Water** means water recovered from processes of hydraulic cement concrete production that includes wash water from mixers or that was a part of a concrete mixture; water collected in a basin as a result of storm water runoff at a concrete production facility; or water that contains quantities of concrete ingredients.

### 1302.04 DESIGN AND SUBMISSION REQUIREMENTS

#### 1302.04.01 Submission Requirements

##### 1302.04.01.01 General

The test certificate shall not be required for potable water supplied by a municipality.

##### 1302.04.01.01 Submission for Potable Water from Non-Municipal Source

For potable water from non-municipal source, documentation shall be submitted to the Contract Administrator a minimum of 7 Days prior to the placement of concrete verifying that the water is according to the Potable Water from Non-Municipal Source clause.

##### 1302.04.01.02 Submission for Non-Potable Water

For non-potable water the following shall be submitted to the Contract Administrator a minimum 7 Days prior to placement of concrete:

- a) Test certificates from an independent testing laboratory that the water is according to the Non-Potable Water clause.
  - i. The test certificate for chloride, sulphate, alkalis, and total solids shall be from a laboratory accredited by Standards Council of Canada (SCC) for water testing using methods listed in Protocol of Accepted Drinking Water Testing Methods or test methods validated and accredited by SCC for water testing.
- b) Test certificate for compressive strength and time of set shall be from a laboratory certified by organization accredited by SCC according to the requirements of CSA A283 for Category I - Intermediate Tests and which is also equipped to carry out the specified testing of time of set.

**1302.05 MATERIALS**

**1302.05.01 Water**

**1302.05.01.01 General**

When potable water supplied by a municipality is used testing is not required.

**1302.05.01.02 Potable Water from Non-Municipal Source**

When potable water from non-municipal source is used for production, fog misting and curing of concrete and mortar shall meet the following requirement:

- a) Potable water from non-municipal source shall meet the requirements of the Ontario Regulation 169/03, Ontario Drinking-Water Quality Standards.
- b) The water shall additionally meet the requirements for chloride, sulphate, sodium, alkalinity and total dissolved solids according to the Technical Support Document for Ontario Drinking Water Quality Standards, Objectives and Guidelines.

**1302.05.01.03 Non-Potable Water**

Non-potable water used for production, fog misting and curing of concrete and mortar shall meet the following requirements:

- a) 7-Day compressive strength of concrete made with the water to be used in the work shall not be less than 90% of that of the control concrete when tested according to CSA A23.2-9C and this specification.
- b) Time of set of concrete made with the water to be used in the work shall be no more than 60 minutes than the time of set of the control concrete when tested according to ASTM C403 and this specification.
- c) The chloride, sulphate, alkalis, and total solids content of the water shall meet the requirements of Table 9, Water used for making concrete - Optional of CSA A23.1.

**1302.05.01.03.01 Determination of 7-Day Compressive Strength and Time of Set**

For determination of 7-Day compressive strength and time of set, the testing laboratory shall prepare test and control concrete. The test concrete shall be made with a representative sample of the water to be used in the work and a control mix shall be made with potable water from a municipal source. Both mixes shall be produced using the same materials and proportions, and same dosages of chemical admixtures. The test and control concrete mixes used to assess the water shall have a strength of 25 MPa or greater. The concrete mixes do not need to be the same as mixes used in the work.

The water shall not change the initial setting time of the test concrete by more than 1 hour when compared to a reference concrete prepared with potable water from a municipal source.

Water shall be clean and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances.

**1302.07 PRODUCTION**

**1302.07.01 General**

Potable water from a municipal source may be used in production, fog misting, or curing of concrete and mortar, without testing.

Potable water from non-municipal source and non-potable water may be used in production, fog misting, or curing of concrete and mortar, if the water meets the requirements of this specification.

Recycled water shall not be used in production, fog misting, or curing of concrete and mortar.

**1302.07.02                      Sampling for Testing by the Owner**

Samples of the water other than the potable water supplied by a municipality shall be supplied for testing by the Owner and delivered to the designated laboratory. Samples shall be taken:

- a) At the beginning of concrete placement in each calendar year.
- b) No more than 30 Days prior to concrete placement.
- c) One additional set of samples shall be taken during the calendar year.
- d) Additional samples shall be taken every time there is a change in material source.

Two samples of water shall be taken during each sampling. Each sample shall be at least 1 litre. One sample shall be used for acceptance testing and the other shall be reserved for referee testing. Water samples shall be contained in a clean 1 litre bottle of a suitable plastic, with a lid and shall be accompanied by MTO form PH-CC-340, Field Sample Data Sheet - Concrete.

**1302.08                              QUALITY ASSURANCE**

**1302.08.01                      Acceptance of Chemical Analysis Testing of Water**

**1302.08.01.01                  General**

Water that is not according to this specification shall not be used for making, fog misting and curing of concrete and mortar.

Individual test results shall be forwarded to the Contractor as they become available.

**1302.08.01.02                  Acceptance of Potable Water from Non-Municipal Source**

Testing of potable water from non-municipal source shall meet the requirements according to the Potable Water from Non-Municipal Source clause.

**1302.08.01.03                  Acceptance of Non-Potable Water**

Testing of non-potable water for chloride, sulphate, alkalis, and total solids content shall be according to test methods specified in Table 9, Water used for making concrete - Optional limits of CSA A23.1. Water to be used in the work shall meet the requirements in Table 9, Water used for making concrete - Optional of CSA A23.1.

**1302.08.02                      Referee Testing**

Referee testing of the water shall be carried out according to the Protocol of Accepted Drinking Water Testing Methods or test methods validated and accredited by SCC for water testing. Referee testing shall be carried out on the reserved referee samples and transported to the referee laboratory by the Owner within 3 Business Days of invoking referee testing.