



# Proper Field Testing of Ready Mixed Concrete



Ready Mixed Concrete Association of Ontario

## CSA A23.2-19 Test methods and standard practices for concrete

- A23.2-1C – Sampling
- A23.2-3C – Cylinders
- A23.2-4C – Air Test
- A23.2-5C – Slump of Concrete
- A23.2-17C – Temperature

### Sampling Plastic Concrete

#### A23.2-1C

##### General

- Truly representative of the nature and conditions of the concrete
- Avoid segregation
- Between 10% and 90% points of the discharge
- Pass a receptacle completely through the discharge stream or completely divert the discharge into a sample container

##### Sampling for Evaluation of Concrete Quality

- One grab sample (more than one container may be used)

##### Sampling for Uniformity

- Three grab samples from widely separated portions of the batch

##### Sample Size – Strength, Uniformity

- For three 100 x 200 mm cylinders = minimum 20 L
- For three 150 x 300 mm cylinders = minimum 30 L

##### Protection

- Protect sample from sun, wind, and other sources of rapid evaporation, and from contamination

### Making and Curing Concrete Compression and Flexural Test Specimens

#### A23.2-3C

##### Time Constraint

- Complete within 20 min after obtaining representative sample

##### Place of Moulding

- Level, rigid surface, free of vibration and other disturbances
- As close proximity as is practicable to the place where they are stored during initial curing

##### Rodding

- 100 mm cylinders using 10 mm diam. rod
  - 20 strokes per layer, 3 layers
- 150 mm cylinders using 16 mm diam. rod
  - 25 strokes per layer, 3 layers

##### Consolidation

- Tap sides of mould 10-15 times to close voids

##### Finishing

- Strike off the surface until it is flat and even with the edge of the mould

##### Curing

- Cover cylinders
- Place on rigid horizontal surface free from vibration
- Cylinders stored in controlled environment that maintains temperature at  $20 \pm 5^\circ\text{C}$
- Record maximum and minimum temperatures within curing enclosure

##### Transport

- After minimum 20 hours
- Maintain  $20 \pm 5^\circ\text{C}$  and protect from any shock or adverse conditions



## Air Content of Plastic Concrete by the Pressure Method

### A23.2-4C

#### Time Constraint

- Complete within 10 min after obtaining representative sample

#### Calibration and Operation of Air Meter

- As per manufacturers' specifications

#### Rodding

- 25 times per layer, 3 layers

#### Consolidation and Strike-off

- Tap smartly 10 or more times
- Strike-off the top surface until it is smooth and level



#### Measuring

- Ensure a complete seal and prevent leakage
- Remove all entrapped air

#### Air Content

- Read and record to the nearest 0.1%

## Slump of Concrete

### A23.2-5C

#### Time Constraint

- Complete within 10 min after obtaining representative sample

#### Test Surface

- Flat, moist, non-absorbent (rigid) surface or acceptable base plate



#### Filling and Rodding

- 1/3 of volume per layer, 3 layers
- Using 16 mm diam. rod
  - 25 strokes per layer, 3 layers

#### Mould Removal

- Approximately 5 sec by a steady upward lift
- Lateral or torsional movement must be avoided

#### Slump

- Measure height difference between mould and average height of concrete surface
- Record to nearest 5 mm

## Temperature of Freshly Mixed Hydraulic Cement Concrete

### A23.2-17C

#### Time Constraint

- Complete within 5 min after obtaining representative sample

#### Thermometer Accuracy

- Measure 0°C - 50°C
- Accurate to  $\pm 0.5^\circ\text{C}$



#### Measuring

- Minimum 75 mm into concrete
- Close void left by placement

#### Temperature

- Leave the device in the concrete for minimum 2 min or until the reading stabilizes
- Read and record to the nearest 0.5°C

## Field Testing Certification

### CSA A23.1 Clause 4.4.1.7

Field sampling and test procedures undertaken to assess concrete quality shall be carried out in accordance with the requirements of CSA A23.2 by personnel certified under an industry-recognized program.

Examples of industry-recognized programs:

1. CCIL Certified Concrete Testing Technician
2. ACI Concrete Field Testing Technician – Grade 1



#### IMPORTANT NOTE:

*Concrete tests not sampled, made, cured and handled in accordance to CSA A23.1/2 shall not be considered valid and will not be accepted by the Ready Mixed Concrete Producer.*

Distribution of Cylinder Reports as per CSA A23.2-25C Section 6, including distribution to the Concrete Supplier.

Source:

Clause 4.4.1.7, CSA A23.1:19/CSA A23.2:19 Concrete materials and methods of concrete construction/Test methods and standard practices for concrete. © 2009 Canadian Standards Association

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Technical information prepared by:  
Ready Mixed Concrete Association of Ontario  
102B - 1 Prologis Blvd.  
Mississauga ON L5W 0G2  
T: 905.564.2726  
F: 905.564.5680  
[info@concreteontario.org](mailto:info@concreteontario.org)  
[ConcreteOntario.org](http://ConcreteOntario.org)

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