TECHNICAL SPECIFICATIONS

Basics of Concrete - Compressive Strength Testing

RMCAO

TESTING FOR COMPRESSIVE STRENGTH OF CONCRETE AND INTERPRETING THE RESULTS

This data sheet has been prepared in the interest of preventing unnecessary problems and delays at construction sites occurring when test cylinders break below specified strengths, caused by:

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1. Improper preparation and handling of test cylinders
2. Inability to interpret test reports correctly

This can result in:

- The performance properties of the concrete being improperly identified
- Automatic requests for additional, costly testing of the concrete resulting in construction delays pending the outcome of the secondary investigation

Complete understanding of and compliance with the respective sections of the current editions of the CSA A23.1/.2 standards are essential if compressive strength test results are to be accepted as indicative of the strength of the concrete they represent.

Testing and Curing of Test Specimens

Samples of concrete must be obtained and cast in accordance with CSA-A23.2. These test specimens must be placed immediately in, and maintained at, a temperature of 20 ± 5°C, protected to prevent loss of moisture and moved to a testing laboratory after a minimum setting time of 20 hours. **Field cured tests are not to be used as a basis of acceptance or rejection of concrete.**

Strength Requirements

A strength test result is the average of two test cylinders made from the same sample of fresh concrete and tested at 28 days. *Concrete shall be considered satisfactory if:*

- *the averages of all sets of three consecutive strength tests equal or exceed the specified strength*
- *no individual strength test is more than 3.5 MPa below the specified strength*

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Additional action to be taken if these criteria as not met are contained in CSA-A23.1. The foregoing outlines the basic requirements for evaluating test results and emphasizes that a test result up to 3.5 MPa below specified strength, does not necessarily call for additional testing or for the rejection of the concrete.

THE Power of Concrete

The key components of a concrete evaluation system include:

- Identifying the test methods and subsequent acceptance limits that will be applied to each concrete element of the project
- Identifying the necessary testing frequency for material performance verification
- Utilizing the services of a certified field technician and concrete laboratory to conduct the material evaluation
- Conducting all concrete testing as per CSA A23.1/.2 testing requirements. Improper testing will result in the discarding of the affected test results.
- Promptly reporting and distributing the test information to the Designer, Contractor and Concrete Producer via systems such as CMATS™
- Evaluating the resulting test data and identifying any material performance trends (such as the Graphing Feature of CMATS™)

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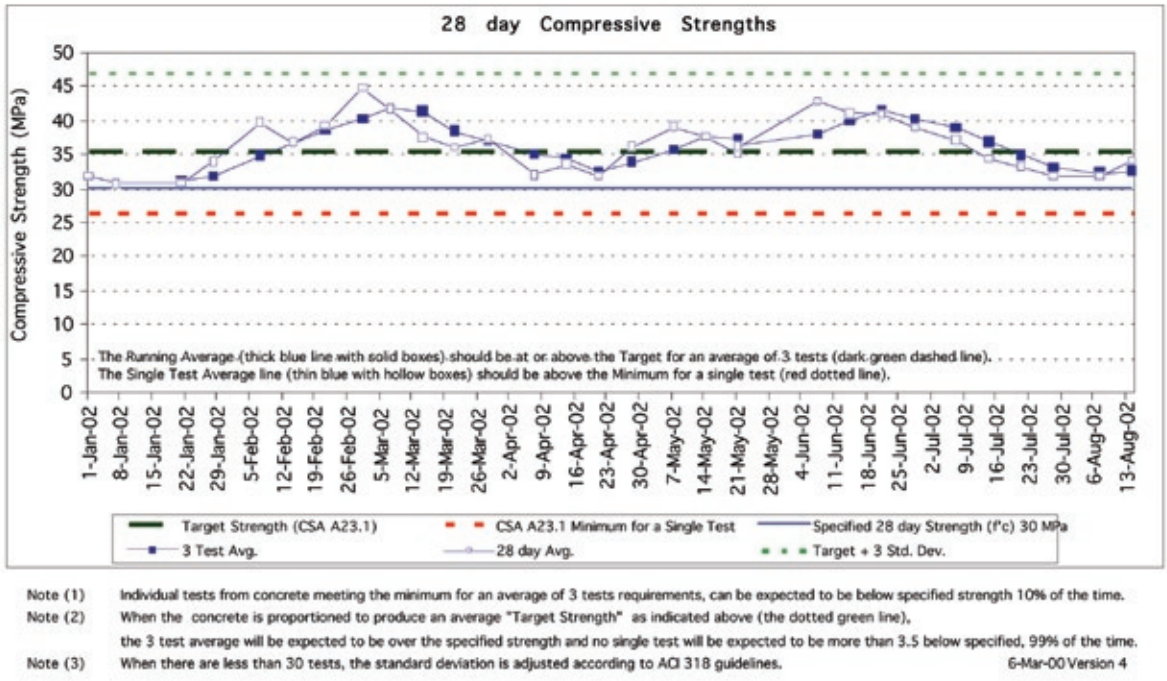
We ask you to ensure that the recognized test procedures are followed throughout. If they are not, any test results obtained must be discarded since they do not accurately represent the properties of the concrete tested.

You will appreciate that a concrete producer cannot be expected to accept the responsibility for the cost of additional testing which subsequently proves to be unnecessary, when initial concrete testing was not performed as per the requirements of CSA A23.1/.2.



Note (1) Individual tests from concrete meeting the minimum for an average of 3 tests requirements, can be expected to be below specified strength 10% of the time.
Note (2) When the concrete is proportioned to produce an average "Target Strength" as indicated above (the dotted green line), the 3 test average will be expected to be over the specified strength and no single test will be expected to be more than 3.5 below specified, 99% of the time.
Note (3) When there are less than 30 tests, the standard deviation is adjusted according to ACI 318 guidelines. 6-Mar-00 Version 4

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Ready Mixed Concrete Association of Ontario
365 Brunel Road, Unit #3 • Mississauga, Ontario L4Z 1Z5
Tel: 905.507.1122 • Fax: 905.890.8122 • Email: info@rmcao.org
www.rmcao.org

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