



Standard Practice for Estimating Concrete Strength by the Maturity Method¹

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1. Scope*

1.1 This practice provides a procedure for estimating concrete strength by means of the maturity method. The maturity index is expressed either in terms of the temperature-time factor or in terms of the equivalent age at a specified temperature.

1.2 This practice requires establishing the strength-maturity relationship of the concrete mixture in the laboratory and recording the temperature history of the concrete for which strength is to be estimated.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. (Warning—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.²)*

2. Referenced Documents

2.1 ASTM Standards:³

- C31/C31M Practice for Making and Curing Concrete Test Specimens in the Field
- C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C78 Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
- C109/C109M Test Method for Compressive Strength of

Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)

C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

C403/C403M Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance

C511 Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes

C684 Test Method for Making, Accelerated Curing, and Testing Concrete Compression Test Specimens (Withdrawn 2012)⁴

C803/C803M Test Method for Penetration Resistance of Hardened Concrete

C873/C873M Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds

C900 Test Method for Pullout Strength of Hardened Concrete

C918/C918M Test Method for Measuring Early-Age Compressive Strength and Projecting Later-Age Strength

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *datum temperature*—the temperature that is subtracted from the measured concrete temperature for calculating the temperature-time factor according to Eq 1.

3.1.2 *equivalent age*—the number of days or hours at a specified temperature required to produce a maturity equal to the maturity achieved by a curing period at temperatures different from the specified temperature.

3.1.3 *maturity*—the extent of the development of a property of a cementitious mixture.

3.1.3.1 *Discussion*—While the term is used usually to describe the extent of relative strength development, it can also be applied to the evolution of other properties that are dependent on the chemical reactions that occur in a cementitious mixture. At any age, maturity depends on the curing history.

¹ This practice is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.64 on Nondestructive and In-Place Testing.

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² Section on Safety Precautions, Manual of Aggregate and Concrete Testing, *Annual Book of ASTM Standards*, Vol 04.02.

³ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ The last approved version of this historical standard is referenced on www.astm.org.