

## Colorado Procedure 69-18

### *Standard Method for*

### **Estimating the In-Place Concrete Strength by a Maturity Method**

(This procedure modifies ASTM C 1074-11. The current ASTM C 1074 is to be used in conjunction with this procedure.)

#### **1. SCOPE**

- 1.1 This provides a procedure for estimating in-place concrete strength using 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 procedure is identical to ASTM C1074 Estimating Concrete Strength by the Maturity Method, with the following exceptions:

#### **8. PROCEDURE TO DEVELOP STRENGTH-MATURITY RELATIONSHIP**

Delete Subsection 8.4 from ASTM C 1074 and replace it with the following Subsections:

- 8.4 Test the cylinders in pairs at times that yield compressive strengths in which at least three sets are at or below 3000 psi (17 MPa), at least two sets are between 3000 psi and 4500 psi, and at least one set is above 4500 psi (17 MPa). Perform compression tests per ASTM C 39. When the specified compressive strength of the concrete is greater than 4500 psi, at least two sets shall have a compressive strength between 4500 psi and the specified compressive strength. If the range of the compressive strength of the two cylinders exceeds 10% of their average strength, test another cylinder and compute the average of three tests. If a test result is due to a defective specimen, discard the test result.
  - 8.4.1 When a strength other than 3000 psi is specified for opening a structure, at least three sets of cylinders shall be tested below the specified strength, and at least one set of cylinders shall be tested above the specified strength.
- 8.8 Testing to determine datum temperature or activation energy will not be required.

#### **9. PROCEDURE TO ESTIMATE IN-PLACE STRENGTH**

Delete Subsections 9.5 to 9.5.4 from ASTM C 1074 and replace them with the following Subsections:

- 9.5 Verification of the Strength Maturity Relationship. Verification of the Strength Maturity Relationship is performed when safety-critical elements are identified by the Engineer.
  - 9.5.1 Cast at least three field-molded cylinders. The size of the cylinders shall be 6" by 12". A maturity meter will be placed in the center mass of one cylinder. The maturity meter will be activated when concrete comes in contact with the meter.

- 9.5.2 These cylinders shall be cured together in identical conditions.
- 9.5.3 When the compressive strength of the cylinder as indicated by the maturity meter is 90 to 110 percent of the target compressive strength, the compressive strength of at least two of the remaining cylinders will be determined and averaged. If the average compressive strength of the cylinders deviates by more than 10 percent from the compressive strength of the maturity meter, the Strength Maturity Relationship is no longer valid and a new Strength Maturity Relationship shall be developed.