



Technical Bulletin

Field Testing to Support Concrete Crack-Reducing Technology

Overview

ASTM C 1581/C 1581M, “Standard Test Method for Determining Age at Cracking and Induced Tensile Stress Characteristics of Mortar and Concrete Under Restrained Shrinkage,” (a.k.a. “Ring Test”) is not intended as a field test. The use of strain gages, data loggers, and a controlled temperature and humidity environment conditions make it challenging to perform the test outside the laboratory.

Therefore, Master Builders Solutions Corporation (Admixture Systems) has adapted the “Ring Test” for use outside the laboratory by eliminating the need for instrumentation and a controlled environment and, instead, using it more as a visual indication of the cracking tendency of a concrete mixture. The field ring test uses the same test apparatus detailed in the ASTM standard, as shown in the photo to the right. Using the Field Ring Test, the maximum nominal size of the coarse aggregate is 0.5 in. (13 mm) or less.

Benefits of the Field Ring Test

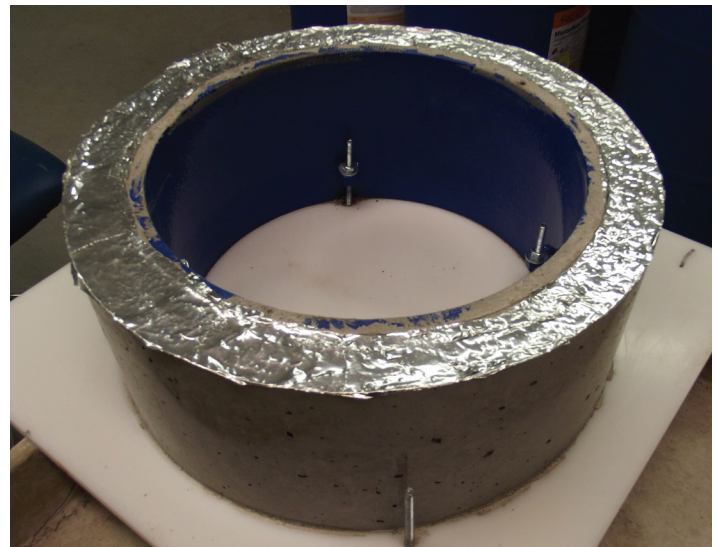
The field ring test can be used to assess the cracking tendency of a concrete mixture or to compare the relative performance of different concrete mixtures with respect to cracking. It can also be used to determine the approximate age at which cracking occurs and the initial crack width providing an indication of mix performance.

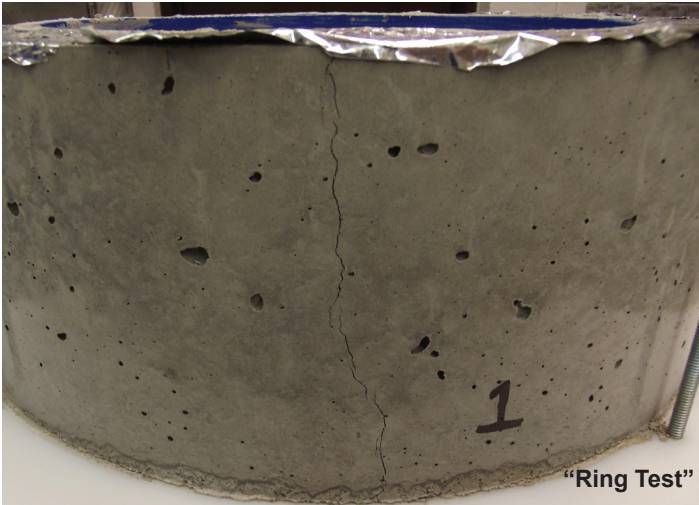
This test method can further be used to determine the relative effects of material variations on cracking potential. These variations include, but are not limited to, aggregate type and gradation, cement type, supplementary cementitious materials, water-cementitious materials ratio, fibers, or shrinkage-reducing admixture technologies.

How to Perform the Field Ring Test

The procedure for performing the field ring test is summarized below.

1. Assemble mold and place concrete between the inner and outer steel rings;
2. Remove the outer ring 24 h after casting and seal the top surface using paraffin wax (preferred) or adhesive aluminum foil tape.
3. Allow the concrete to dry under the desired ambient conditions;
4. Monitor the specimen and observe when cracking, if any, occurs due to restraint from the inner steel ring;
5. Use a crack comparator gage to measure the crack width and to monitor changes in crack width over time.

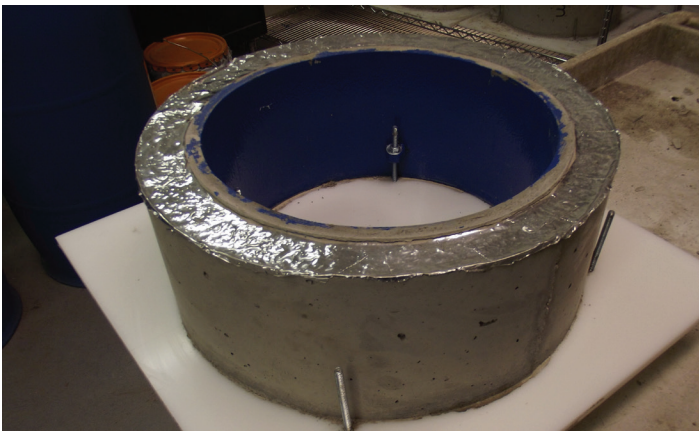




The photo above shows a field (untreated) concrete test specimen that was stripped and allowed to dry. Note the large, distinctive crack in the test specimen.

The benefit of the field “Ring Test” is that the cracking tendency of concrete mixtures made with local materials can be evaluated easily under prevailing ambient conditions outside of the laboratory environment.

The photo below shows a field “Ring-Test” with concrete treated with 1.5 gal/yd³ (7.5 L/m³) of MasterLife® CRA 007 admixture. Under identical drying conditions, the concrete treated with MasterLife CRA 007 admixture has not cracked.



Concrete containing MasterLife CRA 007 provides “Crack-Free” performance in a beautiful celebrity patio application in California.

**Master Builders Solutions
Admixtures US, LLC**

23700 Chagrin Boulevard
Beachwood, Ohio, 44122-5544
800-628-9990

Master Builders Solutions Canada, Inc.

1800 Clark Boulevard
Brampton, Ontario L6T 4M7
800-387-5862

Visit us at:

www.master-builders-solutions.com/en-us

Email: admixtures@masterbuilders.com

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