



Designation: C 289 – 02

Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)¹

This standard is issued under the fixed designation C 289; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope *

1.1 This test method covers chemical determination of the potential reactivity of an aggregate with alkalis in portland-cement concrete as indicated by the amount of reaction during 24 h at 80°C between 1 N sodium hydroxide solution and aggregate that has been crushed and sieved to pass a 300-μm sieve and be retained on a 150-μm sieve.

1.2 The values stated in SI units are to be regarded as standard.

1.3 *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.* A specific precautionary statement is given in 5.7.1.

2. Referenced Documents

2.1 ASTM Standards:

- C 114 Test Methods for Chemical Analysis of Hydraulic Cement²
- C 227 Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)³
- C 295 Guide for Petrographic Examination of Aggregates for Concrete³
- C 702 Practice for Reducing Samples of Aggregate to Testing Size³
- C 1005 Specification for Reference Masses and Devices for Determining Mass and Volume for Use in the Physical Testing of Hydraulic Cements²
- D 75 Practice for Sampling Aggregates⁴
- D 1193 Specification for Reagent Water⁵
- D 1248 Specification for Polyethylene Plastics Extrusion

Materials for Wire and Cable⁶

E 11 Specification for Wire Cloth and Sieves for Testing Purposes⁷

E 60 Practice for Analysis of Metals, Ores, and Related Materials by Molecular Absorption Spectrometry⁸

2.2 *American Chemical Society Documents:*
Reagent Chemicals, American Chemical Society Specifications

NOTE 1—For suggestions on the testing of reagents not listed by the American Chemical Society, see “Reagent Chemicals and Standards,” by Joseph Rosin, D. Van Nostrand Co., Inc., New York, NY, and the “United States Pharmacopeia.”

3. Significance and Use

3.1 This test method may be used in combination with other methods to evaluate the potential reactivity of siliceous aggregate with alkalis in portland-cement concrete. Reactions between a sodium hydroxide solution and siliceous aggregate have been shown to correlate with the performance of the aggregate in concrete structures and should be used where new aggregate sources are being evaluated or alkali-silica reactivity is anticipated.

3.2 The results from this test method can be obtained quickly, and, while not completely reliable in all cases, they provide useful data that may show the need for obtaining additional information through Test Method C 227 and Guide C 295.

4. Apparatus

4.1 *Scales*—The scales and weights used for weighing materials shall conform to the requirements prescribed in Test Method C 1005.

4.2 *Balances*—The analytical balance and weights used for determining dissolved silica by the gravimetric method shall conform to the requirements prescribed in Test Methods C 114.

4.3 *Crushing and Grinding Equipment*—A small jaw crusher and disk pulverizer or other suitable equipment capable of crushing and grinding aggregate to pass a 300-μm sieve.

¹ This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.26 on Chemical Reactions of Materials.

Current edition approved July 10, 2002. Published July 2002. Originally published as C 289 – 52. Last previous edition C 289 – 01.

² *Annual Book of ASTM Standards*, Vol 04.01.

³ *Annual Book of ASTM Standards*, Vol 04.02.

⁴ *Annual Book of ASTM Standards*, Vol 04.03.

⁵ *Annual Book of ASTM Standards*, Vol 11.01.

⁶ *Annual Book of ASTM Standards*, Vol 08.01.

⁷ *Annual Book of ASTM Standards*, Vol 14.02.

⁸ *Annual Book of ASTM Standards*, Vol 03.05.

*A Summary of Changes section appears at the end of this standard.