



Standard Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete¹

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1. Scope

1.1 This guide provides guidance on how to address the potential for deleterious alkali aggregate reaction (AAR) in concrete construction. This guide addresses the process of identifying both potentially alkali-silica reactive (ASR) and alkali-carbonate reactive (ACR) aggregates through standardized testing procedures and the selection of mitigation options to minimize the risk of expansion when ASR aggregates are used in concrete construction. Mitigation methods for ASR aggregates are selected using either prescriptive or performance-based alternatives. Preventive measures for ACR aggregates are limited to avoidance of use. Because the potential for deleterious reactions depends not only on the concrete mixture but also the in-service exposure, guidance is provided on the type of structures and exposure environments where AAR may be of concern.

1.2 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the 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.*

2. Referenced Documents

2.1 ASTM Standards:²

C33/C33M Specification for Concrete Aggregates

¹ This guide is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.50 on Risk Management for Alkali Aggregate Reactions.

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² 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.

C125 Terminology Relating to Concrete and Concrete Aggregates

C150/C150M Specification for Portland Cement

C294 Descriptive Nomenclature for Constituents of Concrete Aggregates

C295 Guide for Petrographic Examination of Aggregates for Concrete

C311 Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete

C586 Test Method for Potential Alkali Reactivity of Carbonate Rocks as Concrete Aggregates (Rock-Cylinder Method)

C595 Specification for Blended Hydraulic Cements

C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

C823/C823M Practice for Examination and Sampling of Hardened Concrete in Constructions

C856 Practice for Petrographic Examination of Hardened Concrete

C989 Specification for Slag Cement for Use in Concrete and Mortars

C1105 Test Method for Length Change of Concrete Due to Alkali-Carbonate Rock Reaction

C1157 Performance Specification for Hydraulic Cement

C1240 Specification for Silica Fume Used in Cementitious Mixtures

C1260 Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)

C1293 Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction

C1567 Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)

2.2 ACI Standard:³

ACI 318 Building Code Requirements for Structural Concrete and Commentary

³ Available from American Concrete Institute (ACI), P.O. Box 9094, Farmington Hills, MI 48333-9094, <http://www.concrete.org>.