



Standard Practice for Petrographic Examination of Hardened Concrete¹

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1. Scope

1.1 This practice outlines procedures for the petrographic examination of samples of hardened concrete. The samples examined may be taken from concrete constructions, they may be concrete products or portions thereof, or they may be concrete or mortar specimens that have been exposed in natural environments, or to simulated service conditions, or subjected to laboratory tests. The phrase “concrete constructions” is intended to include all sorts of objects, units, or structures that have been built of hydraulic cement concrete.

NOTE 1—A photographic chart of materials, phenomena, and reaction products discussed in Sections 7-12 and Tables 1-6 are available as Adjunct C856 (ADJCO856).

1.2 The petrographic procedures outlined herein are applicable to the examination of samples of all types of hardened hydraulic-cement mixtures, including concrete, mortar, grout, plaster, stucco, terrazzo, and the like. In this practice, the material for examination is designated as “concrete,” even though the commentary may be applicable to the other mixtures, unless the reference is specifically to media other than concrete.

1.3 Annex A1 outlines an uranyl acetate method for identifying locations where alkali-silica gel may be present. It is a requirement that the substances in those locations must be identified using any other more definitive techniques, such as petrographic microscopy.

1.4 The purposes of and procedures for petrographic examination of hardened concrete are given in the following sections:

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1.5 The values stated in inch-pound units are to be regarded as the standard. The SI units in parentheses are provided for information purposes only.

1.6 *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 hazard statement is given in 5.2.10.1.

2. Referenced Documents

2.1 ASTM Standards:²

- C 215 Test Method for Fundamental Transverse, Longitudinal, and Torsional Frequencies of Concrete Specimens
- C 227 Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
- C 342 Test Method for Potential Volume Change of Cement-Aggregate Combinations³
- C 441 Test Method for Effectiveness of Pozzolans or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete Due to the Alkali-Silica Reaction
- C 452 Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate
- C 457 Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete
- C 496 Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
- C 597 Test Method for Pulse Velocity Through Concrete
- C 803/C 803M Test Method for Penetration Resistance of Hardened Concrete
- C 805 Test Method for Rebound Number of Hardened Concrete
- C 823 Practice for Examination and Sampling of Hardened Concrete in Constructions
- C 1012 Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution
- C 1260 Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
- E 3 Practice for Preparation of Metallographic Specimens

¹ This practice is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.65 on Petrography.

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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.

³ Withdrawn.