



Designation: C 1084 – 97

Standard Test Method for Portland-Cement Content of Hardened Hydraulic-Cement Concrete¹

This standard is issued under the fixed designation C 1084; 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.

1. Scope

1.1 This test method covers the determination of portland-cement content of a sample of hardened hydraulic-cement concrete.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information purposes only.

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.* Disposal of some or all of the chemicals used in this method may require adherence to EPA or other regulatory guidelines.

2. Referenced Documents

2.1 ASTM Standards:

C 42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete²

C 114 Test Methods for Chemical Analysis of Hydraulic Cement³

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials³

C 823 Practice for Examination and Sampling of Hardened Concrete in Constructions²

C 856 Practice for Petrographic Examinations for Hardened Concrete²

D 1193 Specification for Reagent Water⁴

E 11 Specification for Wire-Cloth Sieves for Testing Purposes²

E 832 Specification for Laboratory Filter Papers⁵

3. Significance and Use

3.1 This test method consists of two independent procedures: an oxide-analysis procedure that consists of two sub-

procedures and an extraction procedure. Each procedure requires a substantial degree of chemical skill and relatively elaborate chemical instrumentation. Except for the influence of known interferences, determined cement contents are normally equal to, or slightly greater than, actual values except for the Maleic Acid procedure where results can also be significantly low when the paste is carbonated (Note 1).

NOTE 1—With certain limitations, the procedure is also applicable for estimating the combined content of portland cement and pozzolan or slag in concretes made with blended hydraulic cement and blends of portland cement with pozzolans or slags. The results of this test method when applied to concretes made with blended cements or pozzolans depend on the composition of the pozzolan, the age of the concrete, the extent of reaction of the pozzolan and the fact that this test method may determine only the portland-cement component of a blended cement. The test method should be applied to determination of the blended cement content or the pozzolanic content only by use of calibration concrete samples or other information. Earlier versions of this test method can provide useful information as detailed by Hime⁶ and Minnick.⁷

4. Interferences

4.1 Many constituents of concrete may interfere with the analysis of the concrete for portland-cement content. The following limited lists of materials have been provided as a guide. The rocks, minerals or mineral admixtures listed will interfere with the cement content determination to the extent of their solubility during the dissolution procedure used. The solubility of rocks, minerals or mineral admixtures may depend on the fineness of the test sample, the water-cement ratio of the concrete, the extent of hydration, and the age of the concrete (extended exposure to the high pH of the concrete may affect the solubility of some minerals).

4.2 Substances Affecting Calcium Oxide Sub-procedure:

4.2.1 The following are soluble in even the cold dilute hydrochloric acid of this procedure and will contribute a high bias to the cement content calculated from the soluble calcium oxide: limestone, marble, dolomitic limestone, calcareous

¹ This method is under the jurisdiction of ASTM Committee C-9 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.69 on Miscellaneous Tests.

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² *Annual Book of ASTM Standards*, Vol 04.02.

³ *Annual Book of ASTM Standards*, Vol 04.01.

⁴ *Annual Book of ASTM Standards*, Vol 11.01.

⁵ *Annual Book of ASTM Standards*, Vol 15.09.

⁶ Hime, W. G., "Cement Content," *Significance of Tests and Properties of Concrete and Concrete-Making Materials*, ASTM STP 169B, ASTM, 1978, pp. 462–470, and "Analyses for Cement and Other Materials in Hardened Concrete," Chapter 29, *Significant of Tests and Properties of Concrete and Concrete-Making Materials*, ASTM STP 169C, 1994, pp. 315–319.

⁷ Minnick, L. J., "Cement-Content, Hardened Concrete," *Significance of Tests and Properties of Concrete and Concrete-Making Materials*, ASTM STP 169A, ASTM, 1966, p. 326–329.