



Designation: ~~C1324—20~~ C1324 – 20a

Standard Test Method for Examination and Analysis of Hardened Masonry Mortar¹

This standard is issued under the fixed designation C1324; 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 procedures for petrographic examination and chemical analysis of samples of masonry mortars. Based upon such examination and analysis, proportions of components in masonry mortars can be determined.

NOTE 1—This method is also applicable to hydraulic cement-based stucco and plaster. Some historic mortars may contain non-resolvable constituents that may interfere. However, significant information may be obtained by petrographic examinations.

1.2 Interpretations and calculations of chemical results are dependent upon results of the petrographic examination. The use of the chemical results alone is contrary to the requirements of this test method.

1.3 Procedures for sampling, petrographic examination, chemical analysis, and calculations of component proportions are given in the following sections:

Sampling	Section
Petrographic examination	7
Chemical analysis	8
Mortar proportion calculations	10
Report	11

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee C12 on Mortars and Grouts for Unit Masonry and is the direct responsibility of Subcommittee C12.02 on Research and Methods of Test.

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

2. Referenced Documents

2.1 ASTM Standards:²

C114 Test Methods for Chemical Analysis of Hydraulic Cement

C125 Terminology Relating to Concrete and Concrete Aggregates

C144 Specification for Aggregate for Masonry Mortar

C270 Specification for Mortar for Unit Masonry

C295/C295M Guide for Petrographic Examination of Aggregates for Concrete

C457/C457M Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete

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

C856/C856M Practice for Petrographic Examination of Hardened Concrete

C926 Specification for Application of Portland Cement-Based Plaster

C1084 Test Method for Portland-Cement Content of Hardened Hydraulic-Cement Concrete

C1180 Terminology of Mortar and Grout for Unit Masonry

D1193 Specification for Reagent Water

3. Terminology

3.1 Terms used in this test method are defined in Terminology standards C125, C1180, or the other referenced ASTM standards.

4. Significance and Use

4.1 This test method provides procedures for petrographic examination and chemical analysis of mortar for components of masonry mortar. These components may include portland cement, hydrated calcitic or dolomitic lime, masonry cement, aggregates, and air.

4.2 The test method consists of procedures and sub-procedures, each requiring a substantial degree of petrographic and chemical skills and relatively elaborate instrumentation.

4.3 The chemical data considered together with results of petrographic examination of a mortar provide for calculation of component proportions and thus allow a determination of mortar composition as represented by Types M, N, S, and O in Table 1 (Proportion Specification Requirements) of Specification C270.

4.4 Failure of a mortar to have the composition of any type as defined in Table 1 of Specification C270 does not necessarily mean that the mortar does not meet the requirements of Specification C270. The mortar may meet the alternative requirements of Table 2 (Property Specification Requirements) of Specification C270.

4.5 The maleic acid method of analysis is not applicable for the analysis of mortar because it is greatly influenced by carbonation and does not provide for the determination of calcium.

5. Qualifications of Petrographer and Chemist

5.1 Petrographer:

5.1.1 The petrographic examination requires the skill of a petrographer well versed in the petrographic methods of Practice C856/C856M, Test Method C457/C457M, and Guide C295/C295M, and in the evaluations of portland cement-containing materials and of masonry mortars.

5.1.2 The interpretation and evaluation of the petrographic data requires detailed knowledge of the requirements of Specification C270.³

5.2 Chemist:

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 Erlin, Bernard and Hime, William G., "Evaluating Mortar Deterioration," Association for Preservation Technology, 1987.