



Designation: C1222 – 23

Standard Practice for Evaluation of Laboratories Testing Hydraulic Cement¹

This standard is issued under the fixed designation C1222; 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 practice covers the technical training and experience of laboratory testing personnel and identifies the minimum technical requirements for laboratory equipment used in testing of hydraulic cement as prescribed by ASTM.

1.2 This practice provides minimum criteria for evaluating the capability of a laboratory to perform chemical or physical tests listed in the various specifications on hydraulic cement (see [Note 1](#)).

NOTE 1—Relevant hydraulic cement specifications are Specifications [C91/C91M](#), [C150/C150M](#), [C595/C595M](#), [C845/C845M](#), and [C1157/C1157M](#).

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

1.4 *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.*

1.5 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

[C91/C91M](#) Specification for Masonry Cement

[C109/C109M](#) Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens)

[C114](#) Test Methods for Chemical Analysis of Hydraulic Cement

[C125](#) Terminology Relating to Concrete and Concrete Aggregates

[C150/C150M](#) Specification for Portland Cement

[C151/C151M](#) Test Method for Autoclave Expansion of Hydraulic Cement

[C185](#) Test Method for Air Content of Hydraulic Cement Mortar

[C187](#) Test Method for Amount of Water Required for Normal Consistency of Hydraulic Cement Paste

[C191](#) Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle

[C204](#) Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus

[C219](#) Terminology Relating to Hydraulic and Other Inorganic Cements

[C230/C230M](#) Specification for Flow Table for Use in Tests of Hydraulic Cement

[C266](#) Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles

[C305](#) Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency

[C430](#) Test Method for Fineness of Hydraulic Cement by the 45-μm (No. 325) Sieve

[C451](#) Test Method for Early Stiffening of Hydraulic Cement (Paste Method)

[C490/C490M](#) Practice for Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete

[C511](#) Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes

[C595/C595M](#) Specification for Blended Hydraulic Cements

[C845/C845M](#) Specification for Expansive Hydraulic Cement

[C1005](#) Specification for Reference Masses and Devices for Determining Mass and Volume for Use in Physical Testing of Hydraulic Cements

[C1157/C1157M](#) Performance Specification for Hydraulic Cement

[C1506](#) Test Method for Water Retention of Hydraulic Cement-Based Mortars and Plasters

¹ This practice is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.95 on Coordination of Standards.

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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.

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

E4 Practices for Force Calibration and Verification of Testing Machines

3. Terminology

3.1 Definitions:

3.1.1 For additional definitions of terms used in this practice, refer to Terminology **C125**, Terminology **C219**, and Practices **E4**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *evaluation authority, n*—an independent entity, apart from the organization being evaluated, that can provide an unbiased evaluation of the organization and shall have the capability to assess the technical activities of testing laboratories.

3.2.1.1 *Discussion*—One such evaluation authority is the Cement and Concrete Reference Laboratory (CCRL).³ Laboratory inspection is broadened into accreditation programs by such independent authorities as the National Voluntary Laboratory Accreditation Program (NVLAP),⁴ AASHTO Accreditation Program (AAP),⁵ American Association for Laboratory Accreditation (A2LA),⁶ and others established.

3.2.2 *inspection, n*—a process of measuring, examining, testing, gaging, or using other procedures to ascertain the quality or state, detect errors or defects, or otherwise appraise materials, products, services, systems, or environments when compared to preestablished criteria.

3.2.3 *laboratory technician, n*—an employee of the laboratory who is assigned to perform the actual testing operation—primarily conducted in the laboratory.

3.2.4 *quality systems, n*—those internal procedures and practices that a laboratory utilizes to ensure continued compliance with applicable testing standards.

3.2.5 *subcontracting, n*—employing another organization to provide testing services that the laboratory contracted to provide.

3.2.6 *testing laboratory*—an organization that measures, examines, performs tests, or otherwise determines the characteristics or performance of materials or products.

3.2.6.1 *Discussion*—This may include organizations that offer commercial testing services, an in-house quality control function, an academic institution, or any other organization providing the specified testing services.

4. Significance and Use

4.1 The testing of hydraulic cement is an important element in obtaining quality construction. A testing laboratory must be selected with care.

4.2 A testing laboratory shall be deemed qualified to perform and report the results of its tests if the laboratory meets the requirements of this practice.

4.3 This practice provides guidance for evaluating the organization, personnel, facilities, and quality systems of the laboratory. This practice may be supplemented by criteria and requirements for particular projects.

5. Documentation of Organization

5.1 The following information shall be readily available for review:

5.1.1 A description of the organization, including the complete legal name and address of the main office and each laboratory location, names and positions of the principal officers and the individual in charge of the laboratory,

5.1.2 A description of the organization management structure, and

5.1.3 A listing of the range of services offered.

6. Human Resources

6.1 The manager of the laboratory is responsible for regular on-site administration of the laboratory operations, including safety, quality, and testing. The manager of the laboratory shall have training and experience to ensure testing of hydraulic cement conducted by the laboratory meets the requirements of the applicable standards. The manager of the laboratory shall also have managerial experience or training, or both.

7. Testing and Additional Requirements

7.1 *Testing Requirements*—The organization shall have the capability of performing tests associated with its range of services (see **Note 2**). The laboratory shall have the facilities and equipment required for preparing, storing, conditioning, and testing specimens.

NOTE 2—The range of services of a testing laboratory may involve either chemical testing or physical testing, or both. The laboratory need not perform all tests listed in the applicable ASTM specification, but rather have the required equipment and demonstrate the ability to perform the procedures within its reported range of services.

7.1.1 The laboratory shall use the latest version of each referenced ASTM standard within one year of its publication in the *Annual Book of ASTM Standards* except where an earlier version is specifically required.

7.1.2 Laboratory personnel shall have convenient access to applicable standards.

7.2 *Additional Requirements*—The following requirements apply to only those tests performed by the laboratory. They are intended to supplement certain provisions of the standard test methods.

7.2.1 Analytical balances and reference masses shall be checked at least annually and shall conform to the requirements of Test Methods **C114**.

7.2.2 Air-permeability apparatus and related accessory equipment shall be calibrated and checked for conformance to Test Methods **C204** at least every 2½ years.

7.2.2.1 Check determinations shall be made against standard or secondary standard reference samples every six

³ NVLAP, Standards Services Division, National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 2140, Gaithersburg, MD 20899-2140.

⁴ American Association for Laboratory Accreditation (A2LA), 5202 Presidents Ct Suite 220, Frederick, MD 21703, www.a2la.org.

⁵ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, www.transportation.org.

⁶ American Association for Laboratory Accreditation (A2LA), 5202 Presidents Ct Suite 220, Frederick, MD 21703, www.a2la.org.