Designation: C204 – 24

American Association State
Highway and Transportation Officials Standard
AASHTO No.: T 153

Standard Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus[1]

This standard is issued under the fixed designation C204; 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 determination of the fineness of hydraulic cement, using the Blaine air-permeability apparatus, in terms of the specific surface expressed as total surface area in square centimetres per gram, or square metres per kilogram, of cement. Two test methods are given: Test Method A is the Reference Test Method using the manually operated standard Blaine apparatus, while Test Method B permits the use of automated apparatus that has in accordance with the qualification requirements of this test method demonstrated acceptable performance. Although the test method may be, and has been, used for the determination of the measures of fineness of various other materials, it should be understood that, in general, relative rather than absolute fineness values are obtained.

1.1.1 This test method is known to work well for portland cements. However, the user should exercise judgement in determining its suitability with regard to fineness measurements of cements with densities, or porosities that differ from those assigned to Standard Reference Material No. 114 or No. 46h.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 **Warning—***Mercury has been designated by many regulatory agencies as a hazardous substance that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Safety Data Sheet (SDS) for additional information. Users should be aware that selling mercury and/or mercury containing products into your state or country may be prohibited by law.*

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]

A582/A582M Specification for Free-Machining Stainless Steel Bars

C125 Terminology Relating to Concrete and Concrete Aggregates

C219 Terminology Relating to Hydraulic and Other Inorganic Cements

C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

E832 Specification for Laboratory Filter Papers

2.2 *NIST Standards:*[3]

No. 46h National Institute of Standards and Technology Standard Reference Material

No. 114 National Institute of Standards and Technology Standard Reference Material

2.3 *Other Document:*

BS 4359: 1971 British Standard Method for the Determination of Specific Surface of Powders: Part 2: Air Permeability Methods[4]

[1] This test method is under the jurisdiction of ASTM Committee C01 on Cement and is the direct responsibility of Subcommittee C01.25 on Fineness.

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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] Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, http://www.nist.gov.

[4] Available from British Standards Institute (BSI), 389 Chiswick High Rd., London W4 4AL, U.K., http://www.bsi-global.com.

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

TEST METHOD A: REFERENCE METHOD

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology C125 and C219.

4. Apparatus

4.1 *Nature of Apparatus*—The Blaine air-permeability apparatus consists essentially of a means of drawing a definite quantity of air through a prepared bed of cement of definite porosity. The number and size of the pores in a prepared bed of definite porosity is a function of the size of the particles and determines the rate of airflow through the bed. The apparatus, illustrated in Fig. 1, shall consist specifically of the parts described in 4.2 – 4.8.

4.2 *Permeability Cell*—The permeability cell shall consist of a rigid cylinder with a smooth bore of inside diameter 12.70 mm ± 0.10 mm, constructed of austenitic stainless steel. The top of the cell shall be at right angles to the principal axis of the cell. The lower portion of the cell must be able to form an airtight fit with the upper end of the manometer, so that there is no air leakage between the contacting surfaces. A ledge ½ mm to 1 mm in width shall be an integral part of the cell or be firmly fixed in the cell 55 mm ± 10 mm from the top of the cell for support of the perforated metal disk. The top of the permeability cell shall be fitted with a protruding collar to facilitate the removal of the cell from the manometer.

NOTE 1—Specification A582/A582M Type 303 stainless steel (UNS

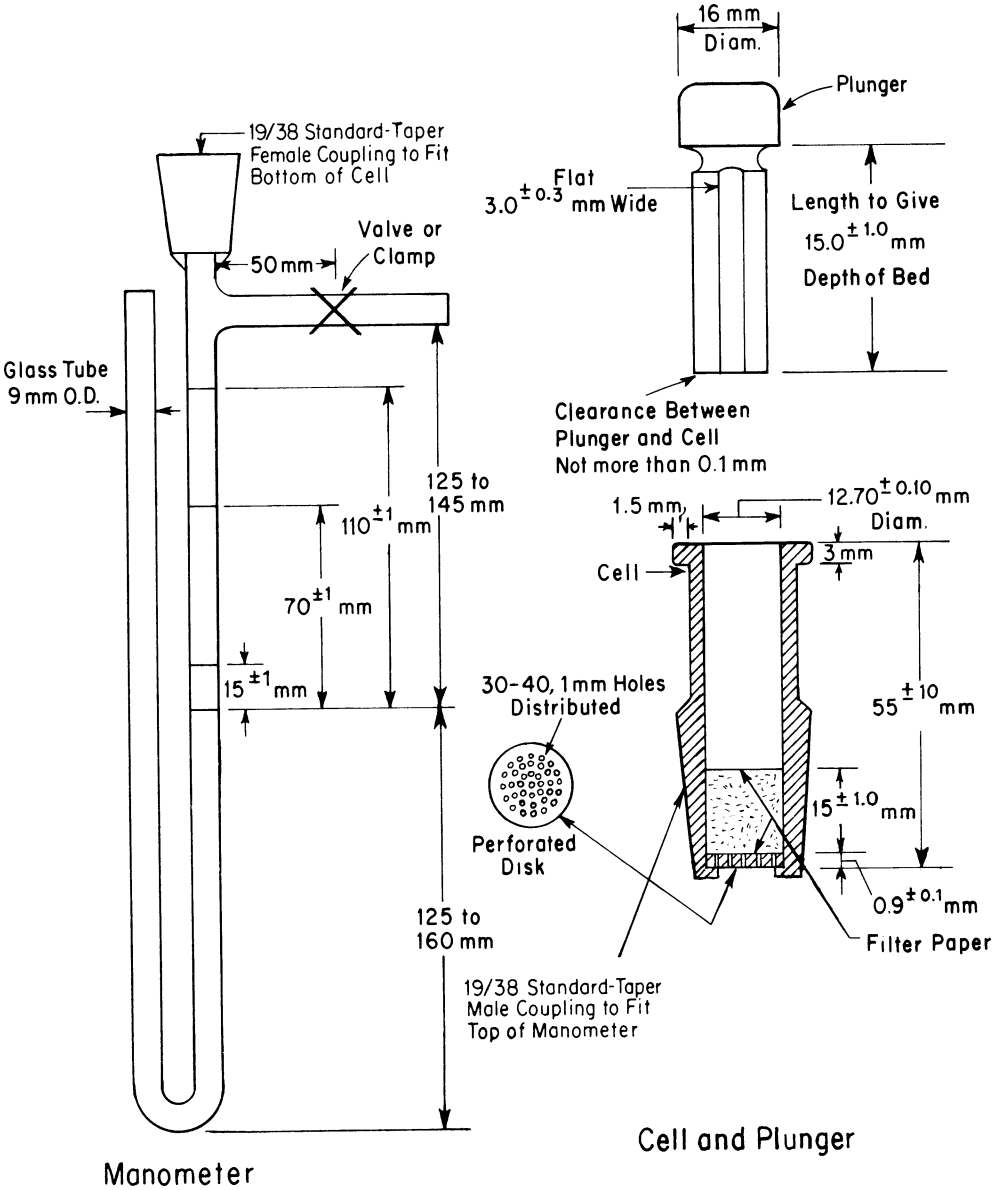

FIG. 1 Blaine Air-Permeability Apparatus