
Standard Specification for Flow Table for Use in Tests of Hydraulic Cement

AASHTO Designation: M 152M/M 152-22¹

Technically Revised: 2022

Technical Subcommittee: 3a, Cement, Lime, and Concrete Materials

ASTM Designation: C230/C230M-21



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. This specification covers requirements for the flow table and accessory apparatus (see Note 1) used in making flow tests for consistency of mortars in tests of hydraulic cement such as, but not limited to, ASTM C1437.
- Note 1**—To help clarify the design of the flow table and accessory apparatus, see the drawing in Figure 1 (SI units) or Figure 2 (U.S. Customary units). This drawing is for informational purposes only.
- 1.2. The values stated in either SI units or inch-pound units shall be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the standard. It is permissible to use an inch-pound caliper and mold with an SI flow table or an SI caliper and mold with an inch-pound flow table. It is not permissible to mix an SI mold with an inch-pound caliper or an inch-pound mold with an SI caliper.
- 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.*

2. REFERENCED DOCUMENTS

- 2.1. *ASTM Standards:*
- C125, Terminology Relating to Concrete and Concrete Aggregates
 - C219, Terminology Relating to Hydraulic and Other Inorganic Cements
 - C1437, Standard Test Method for Flow of Hydraulic Cement Mortar
 - *Manual of Cement Testing, Annual Book of ASTM Standards*, Vol. 04.01

3. TERMINOLOGY

- 3.1. *Definitions:*
- 3.1.1. The terms in this standard specification are defined in ASTM C125 and C219.

4. FLOW TABLE AND FRAME

- 4.1. The flow table apparatus shall consist of an integrally cast rigid iron frame and a circular rigid tabletop 255.0 ± 2.5 mm [10 ± 0.1 in.] in diameter, with a shaft attached perpendicular to the tabletop by means of a screw thread. The tabletop and shaft with contact shoulder shall be mounted on a frame in such a manner that it can be raised and dropped vertically through the specified height of 12.7 ± 0.13 mm [0.500 ± 0.005 in.] for new tables and 12.7 ± 0.38 mm [0.500 ± 0.015 in.] for tables in use, by means of a rotated cam. The tabletop shall have a fine machined plane surface, free of blowholes and surface defects. The top shall be scribed with eight equidistant lines 68 mm [$2\frac{5}{8}$ in.] long, extending from the outside circumference toward the center of the table. Each line shall end with a scribed arc, 6 mm [$\frac{1}{4}$ in.] long, whose center point is the center of the table top with a radius of 59.5 mm [$2\frac{3}{8}$ in.]. The scribe lines shall be made with a 60-degree tool to a depth of 0.25 mm [0.01 in.]. The tabletop shall be of cast brass or bronze having a Rockwell hardness number not less than 25 HRB with an edge thickness of 7.5 mm [0.3 in.] and shall have six integral radial stiffening ribs. The tabletop and attached shaft shall have a mass of 4.08 ± 0.05 kg [9 ± 0.1 lb], and the mass shall be symmetrical around the center of the shaft.
- 4.2. The cam and vertical shaft shall be of medium carbon machinery steel, hardened on the end of the shaft contacting the cam and the tip of the cam contacting the shaft. The shaft shall be straight, and the difference between the diameter of the shaft and the diameter of the bore of the frame shall be not less than 0.05 mm [0.002 in.] and not more than 0.08 mm [0.003 in.] for new tables and shall be maintained at 0.05 to 0.25 mm [0.002 to 0.010 in.] for tables in use. The end of the shaft shall not fall on the cam at the end of the drop, but shall make contact with the cam not less than 120 degrees from the point of drop. The face of the cam shall be a smooth spiraled curve of uniformly increasing radius from 13 to 32 mm [$\frac{1}{2}$ to $1\frac{1}{4}$ in.] in 360 degrees, and there shall be no appreciable jar as the shaft comes into contact with the cam. The cam shall be so located, and the contact faces of the cam and shaft shall be such that the table does not rotate more than one revolution in 25 drops. The surfaces of the frame and of the table that come into contact at the end of the drop shall be maintained smooth, plane, and horizontal and parallel with the upper surface of the table and shall make continuous contact over a full 360 degrees.
- 4.3. The supporting frame of the flow table shall be integrally cast of fine-grained, high-grade cast iron. The frame casting shall have three integral stiffening ribs extending the full height of the frame and located 120 degrees apart. The top of the frame shall be chilled to a depth of approximately 6.0 mm [$\frac{1}{4}$ in.], and the face shall be ground and lapped square with the bore to give 360 degrees contact with the shaft shoulder. The underside of the base of the frame shall be ground to secure complete contact with the steel plate beneath.
- 4.4. The flow table shall be driven by a motor (see Note 2) connected to the camshaft through an enclosed worm gear speed reducer and flexible coupling. The speed of the camshaft shall be approximately 100 rpm. The motor drive mechanism shall not be fastened or mounted on the table base plate or frame.
- Note 2**—A 40 W ($\frac{1}{20}$ hp) motor has been found adequate.
- 4.5. The performance of a flow table shall be considered satisfactory if, in verification tests, the table gives a flow value that does not differ by more than five percentage points from flow values obtained with suitable verification material² (See Note 3.) Perform the verification at least every $2\frac{1}{2}$ years.

Note 3—Some causes of and solutions to unsatisfactory performance of the flow table may be found in the section on flow tables in the *ASTM Manual of Cement Testing*.