



# Standard Test Methods for Working, Initial Setting, and Service Strength Setting Times of Chemical-Resistant Resin Mortars<sup>1</sup>

This standard is issued under the fixed designation C 308; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 These test methods cover the determination of the working, initial setting, and service strength setting times of chemical-resistant resin mortars.

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

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

- C 279 Specification for Chemical-Resistant Masonry Units
- C 307 Test Method for Tensile Strength of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing
- C 904 Terminology Relating to Chemical-Resistant Non-metallic Materials

## 3. Terminology

3.1 *Definitions*—For definitions of terms used in these test methods, see Terminology C 904.

## 4. Significance and Use

4.1 These test methods offer a means of determining the working time, initial setting time and service strength setting time of chemical-resistant resin mortars. The results obtained

should serve as a guide in, but not as the sole basis for, selection of a chemical-resistant mortar for a particular application.

## 5. Apparatus

5.1 *Weighing Equipment*—Shall be capable of weighing materials or specimens to  $\pm 0.3\%$  accuracy.

5.2 *Mixing Equipment:*

5.2.1 *Porcelain Enameled Pan*—Measuring approximately 250 mm long by 400 mm wide by 50 mm deep (10 in. by 16 in. by 2 in.).

5.2.2 *Bricklayer's Triangular Trowel*—Approximately 100 mm (4 in.) in length.

5.3 *Bricks*—As per Specification C 279, Type III.

5.4 *Vicat Apparatus*—The Vicat apparatus shall consist of a frame, A (see Fig. 1), bearing a movable rod, B, weighing 300 g, one end, C, the plunger end, being 10 mm in diameter for a distance of at least 50 mm and the other end having a removable steel needle, D, for initial setting time determination, 1 mm in diameter and 50 mm in length. The rod, B, is reversible, and can be held in any desired position by a set screw, E, and has an adjustable indicator, F, which moves over a scale (graduated in millimetres) attached to the frame, A. In addition to the above, the Vicat apparatus shall conform to the following requirements:

5.4.1 *Weight of Plunger*— $300 \pm 0.5$  g.

5.4.2 *Diameter of Larger End of Plunger*— $10 \pm 0.05$  mm.

5.4.3 *Diameter of Needle*— $1 \pm 0.05$  mm.

5.4.4 *Graduated Scale*—The graduated scale, when compared with a standard scale accurate to within 0.1 mm at all points, shall not show a deviation at any point greater than 0.25 mm.

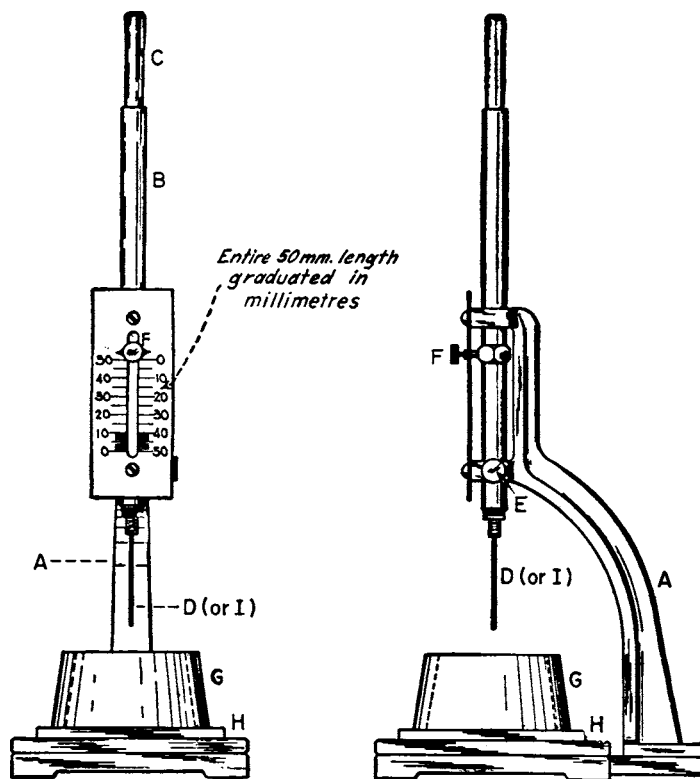
## 6. Temperature

6.1 All materials used in this method shall be stored for at least 16 h prior to use at the standard test temperature of  $23 \pm 2^\circ\text{C}$  ( $73 \pm 4^\circ\text{F}$ ). The standard temperature for the working and initial setting time tests shall be  $23 \pm 2^\circ\text{C}$  ( $73 \pm 4^\circ\text{F}$ ). Other

<sup>1</sup> These test methods are under the jurisdiction of Committee C03 on Chemical-Resistant Nonmetallic Materials and are the direct responsibility of Subcommittee C03.01 on Mortars and Carbon Brick.

Current edition approved Oct. 1, 2005. Published October 2005. Originally approved in 1953. Last previous edition approved in 2000 as C 308-00.

<sup>2</sup> 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.



NOTE 1—Ring, G, and plate, H, are not required for this test.

FIG. 1 Vicat Apparatus

test temperatures are acceptable upon agreement between the manufacturer and user provided that they are reported with the test data.

### 7. Preparation of Mortar

7.1 Prepare a 1000-g sample of mortar, using proportionate amounts of filler and liquid as recommended by the manufacturer. If the proportions specified are by volume, weigh the materials and report the corresponding proportions by weight. Pour an appropriate amount of liquid into the pan, gradually add the powder to the liquid resin, and mix thoroughly with the trowel until a uniform mixture is obtained (this shall be complete within 3 min). Continue the mixing operation for 1 min after an apparently uniform mixture is obtained. Spread out the mortar in a layer of uniform thickness covering the entire surface of the mixing pan.

7.2 For a multicomponent resin mortar, the procedure described in 7.1 may be modified slightly to permit the addition of the catalyst to the mortar within the specified time limit.

### 8. Working Time

8.1 Remove approximately 25-g portions of the resin mortar at specific intervals and trowel on the horizontal surface of clean, dry freezer paper. In order that sufficient data will be obtained with the minimum quantity of material, it is recommended that the testing be done every 5 min until the material begins to curl behind the trowel. The sample shall be removed from a portion of the mortar located at least 50 mm (2 in.) from the side of the pan. The material used for tests shall not be

returned to the mixing pan. The working time shall be recorded as the longest time (in minutes) at which the mortar does not curl behind the trowel.

### 9. Initial Setting Time

9.1 Immediately after mixing is complete, remove and butter a sufficient amount of the mortar on the sides of two clean, dry bricks to provide a 6 mm (1/4 in.) joint. The bricks should be laid on freezer paper and the buttered sides pushed together to form a joint approximately 6 mm (1/4 in.) wide. Care should be taken to eliminate voids when pushing the bricks together. It is advantageous to establish the joint thickness by inserting a dowel rod near each end of the joint. Strike off any excess material above the joint by use of the trowel.

9.2 Examine the joint qualitatively, at 1-h intervals, with the point of the trowel until indentation becomes difficult. Continue the test with the Vicat needle (at 20 to 30-min intervals) until the indentation of the needle during a 10-min period is less than 1 mm. Record the initial setting time as the time interval in hours at which the indentation of the Vicat needle is less than 1 mm.

### 10. Service Strength Setting Time

10.1 Make a minimum of three tension test specimens for testing at each time interval. This normally requires 12 or more specimens. Prepare tension specimens in accordance with Test Method C 307. Make the first test 24 h after the initial mixing time and continue every 48 h until 90 % of the manufacturer's published value for tensile strength is reached.



10.2 Record the service strength setting time as the time in days between initial mixing of the component parts at a specified temperature and the time at which the mortar has acquired at least 90 % of the manufacturer's published value for tensile strength.

## 11. Report

11.1 The report shall include the following:

- 11.1.1 Identification of mortar tested,
- 11.1.2 Working time,
- 11.1.3 Initial setting time,

- 11.1.4 Service strength setting time,
- 11.1.5 Number of specimens tested, and
- 11.1.6 Any variation from the standard procedure.

## 12. Precision and Bias

12.1 A statement of precision and bias will be added at a later date.

## 13. Keywords

13.1 chemical-resistant mortars; service strength setting time; initial setting time; working time

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*