



# Standard Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles<sup>1</sup>

This standard is issued under the fixed designation C 266; 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 This test method covers the determination of the time of setting of hydraulic-cement paste by means of the Gillmore needles.

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.* See Note 1 for a specific warning statement.

**NOTE 1—Warning:** Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure. The use of gloves, protective clothing, and eye protection is recommended. Wash contact area with copious amounts of water after contact. Wash eyes for a minimum of 15 min. Avoid exposure of the body to clothing saturated with the liquid phase of the unhardened material. Remove contaminated clothing immediately after exposure.

## 2. Referenced Documents

### 2.1 ASTM Standards:

- C 151 Test Method for Autoclave Expansion of Portland Cement<sup>2</sup>
- C 183 Practice for Sampling and the Amount of Testing of Hydraulic Cement<sup>2</sup>
- C 187 Test Method for Normal Consistency of Hydraulic Cement<sup>2</sup>
- C 305 Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency<sup>2</sup>
- C 490 Practice for Use of Apparatus for the Determination of Length Change of Hardened Cement Paste, Mortar, and Concrete<sup>2</sup>
- C 511 Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes<sup>2</sup>
- C 670 Practice for Preparing Precision and Bias Statements

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee C-1 on Cement and is the direct responsibility of Subcommittee C01.30 on Time of Set.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.01.

- for Test Methods for Construction Materials<sup>3</sup>
- C 1005 Specification for Reference Masses and Devices for Determining Mass for Use in the Physical Testing of Hydraulic Cements<sup>2</sup>
- D 1193 Specification for Reagent Water<sup>4</sup>

## 3. Summary of Test Method

3.1 Sufficient water is added to the cement that is being tested to produce a paste of normal consistency. A specimen is molded from this paste and is tested for setting times by means of the Gillmore initial and final needles. The initial setting time is the time required for the test specimen to bear the initial Gillmore needle without appreciable indentation, while the time required for the test specimen to bear the final Gillmore needle without appreciable indentation is the final setting time.

## 4. Significance and Use

4.1 The purpose of this test method is to establish whether a cement complies with a specification limit on setting time. The time of setting is affected not only by the percentage and temperature of the water used, and the amount of kneading the paste received, but also by the temperature and humidity of the air.

## 5. Apparatus

- 5.1 *Trowel*, having a steel blade 100 to 150 mm (4 to 6 in.) in length, with a straight edge.
- 5.2 *Mixer, Bowl, Paddle, and Scraper*, conforming to the requirements of Practice C 305.
- 5.3 *Glass Graduates*, conforming to the requirements of Specification C 490.
- 5.4 *Mass Determining Devices*, conforming to the requirements of Specification C 1005.
- 5.5 *Plane Non-absorptive Plates*, 102 mm  $\pm$  3 mm (4 in.  $\pm$  0.125 in.) square.
- 5.6 *Gillmore Needles*, conforming to the following requirements:
  - 5.6.1 The initial setting-time needle shall have a weight of 113.4  $\pm$  0.5 g (0.250  $\pm$  0.001 lb) and a tip diameter of 2.12  $\pm$  0.05 mm (0.084  $\pm$  0.002 in.).
  - 5.6.2 The final setting time needle shall have a weight of

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.02.

<sup>4</sup> Annual Book of ASTM Standards, Vol 11.01.