



Designation: C 414 – 99

Standard Test Method for Working, Setting, and Service Strength Setting Times of Chemically Setting Chemical-Resistant Silicate and Silica Mortars¹

This standard is issued under the fixed designation C 414; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of the working time, setting time, and service strength setting time of chemically setting, chemical-resistant silicate and silica mortars.

NOTE 1—For chemical-resistant resin mortars refer to Test Methods C 308.

1.2 The values stated in inch-pound 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:

C 308 Test Methods for Working, Setting, and Service Strength Setting Times of Chemical-Resistant Resin Mortars²

C 579 Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes²

C 904 Terminology Relating to Chemical-Resistant Non-Metallic Materials²

3. Terminology

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

4. Significance and Use

4.1 This test method offers a means of determining the working time, initial setting time and curing time of chemically setting chemical-resistant silicate and silica mortars.

¹ This test method is under the jurisdiction of ASTM Committee C-3 on Chemical-Resistant Nonmetallic Materials and are the direct responsibility of Subcommittee C03.01 on Test Methods.

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² *Annual Book of ASTM Standards*, Vol 04.05.

5. Apparatus

5.1 *Equipment*, capable of weighing materials or specimens to $\pm 0.3\%$ accuracy.

5.2 *Mixing Pan*—A metal or porcelain enameled pan measuring approximately 8 by 8 by 2 in. (200 by 200 by 50 mm) deep.

5.3 *Trowel*—A bricklayer's triangular trowel approximately 4 in. (100 mm) in length.

5.4 *Aluminum Foil Dish*—A flat-bottomed container $2\frac{1}{4}$ in. (60 mm) in diameter by $\frac{5}{8}$ in. (16 mm) high. An aluminum foil dish for milk analysis is suitable.

5.5 *Gillmore Needle*—The Gillmore needle shall conform to the following requirements:

Initial Needle	
Weight	113.4 $\pm$ 0.5 g
Diameter	0.083 $\pm$ 0.002 in.
Final Needle	
Weight	453.6 $\pm$ 0.5 g
Diameter	0.042 $\pm$ 0.002 in.

5.5.1 The needle tips shall be cylindrical for a distance of about $\frac{3}{16}$ in. (4.8 mm). The needle ends shall be plane and at right angles to the axis of the rod and shall be maintained in a clean condition. The Gillmore needles should preferably be mounted as shown in Fig. 1.

6. Temperature Conditions

6.1 All material used in this test method shall be stored for at least 16 h prior to use at the standard test temperature of 73 $\pm$ 4°F (23 $\pm$ 2°C). The standard temperature for the working, initial setting, and service strength setting times shall be 73 $\pm$ 4°F.

6.2 Other 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 4.4 lb (2000 g) sample of mortar using the proportionate amounts of powder filler and liquid recommended by the manufacturer. If the proportions are specified by volumes, weigh the volumes and report the corresponding weights. Pour the liquid into the mixing pan and gradually add the powder filler to the liquid while mixing with the trowel or