



Designation: C403/C403M – 16

Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance¹

This standard is issued under the fixed designation C403/C403M; 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 U.S. Department of Defense.

1. Scope*

1.1 This test method covers the determination of the time of setting of concrete, with slump greater than zero, by means of penetration resistance measurements on mortar sieved from the concrete mixture.

1.2 This test method is suitable for use only when tests of the mortar fraction will provide the information required.

1.3 This test method may also be applied to prepared mortars and grouts.

1.4 This test method is applicable under controlled laboratory conditions, as well as under field conditions.

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.6 *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:²

C125 Terminology Relating to Concrete and Concrete Aggregates

C143/C143M Test Method for Slump of Hydraulic-Cement Concrete

C172 Practice for Sampling Freshly Mixed Concrete

C173/C173M Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

C231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

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

C802 Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction Materials

D1558 Test Method for Moisture Content Penetration Resistance Relationships of Fine-Grained Soils

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E2251 Specification for Liquid-in-Glass ASTM Thermometers with Low-Hazard Precision Liquids

3. Terminology

3.1 **Definitions**—Definitions are given in Terminology **C125**.

4. Summary of Test Method

4.1 A mortar sample is obtained by sieving a representative sample of fresh concrete. The mortar is placed in a container and stored at a specified ambient temperature. At regular time intervals, the resistance of the mortar to penetration by standard needles is measured. From a plot of penetration resistance versus elapsed time, the times of initial and final setting are determined.

5. Significance and Use

5.1 Since the setting of concrete is a gradual process, any definition of time of setting must necessarily be arbitrary. In this test method, the times required for the mortar to reach specified values of resistance to penetration are used to define times of setting.

5.2 This test method can be used to determine the effects of variables, such as water content; brand, type and amount of cementitious material; or admixtures, upon the time of setting

¹ This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.23 on Chemical Admixtures.

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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.

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