



Designation: C1712 – 09

Standard Test Method for Rapid Assessment of Static Segregation Resistance of Self-Consolidating Concrete Using Penetration Test¹

This standard is issued under the fixed designation C1712; 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.

1. Scope

1.1 This test method covers the rapid assessment of static segregation resistance of normal-weight self-consolidating concrete (SCC). The test does not measure static segregation resistance directly, but provides an assessment of whether static segregation is likely to occur.

1.2 The test apparatus and protocol were developed based on tests with SCC mixtures containing saturated surface dry (SSD) coarse aggregates ranging in relative density from 2.67 to 2.79 and in nominal maximum size from 9.5 mm to 25 mm. For SCC mixtures outside these ranges, testing is recommended to establish a correlation between penetration depth and static segregation measured in accordance with Test Method C1610/C1610M. This test method shall not be used to assess the static segregation resistance of self-consolidating concrete containing lightweight aggregates or heavyweight aggregates without prior testing to establish a correlation.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes shall not be considered as requirements of the standard.

1.5 *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. (Warning—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.)²*

¹ This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.47 on Self-Consolidating Concrete.

Current edition approved Oct. 1, 2009. Published November 2009. DOI: 10.1520/C1712-09.

² Section on Safety Precautions, Manual of Aggregate and Concrete Testing, *Annual Book of ASTM Standards*, Vol. 04.02.

2. Referenced Documents

2.1 *ASTM Standards*:³

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

C1610/C1610M Test Method for Static Segregation of Self-Consolidating Concrete Using Column Technique

C1611/C1611M Test Method for Slump Flow of Self-Consolidating Concrete

3. Terminology

3.1 *Definitions*:

3.1.1 For definitions of terms used in this test method, refer to Terminology C125.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *static segregation resistance, n*—resistance of a concrete mixture to segregation of the mortar component from the coarse aggregate while the concrete is at rest and before initial setting.

4. Summary of Test Method

4.1 This test method uses a penetration apparatus (shown in Figs. 1 and 2) and an inverted slump mold (Fig. 3). A sample of freshly mixed self-consolidating concrete is placed in an inverted slump mold without tamping or vibration. The hollow cylinder attached to a metal rod is aligned in the center of the inverted slump mold as shown in Fig. 3. The hollow cylinder is then lowered onto the surface of the concrete and released to

³ 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.

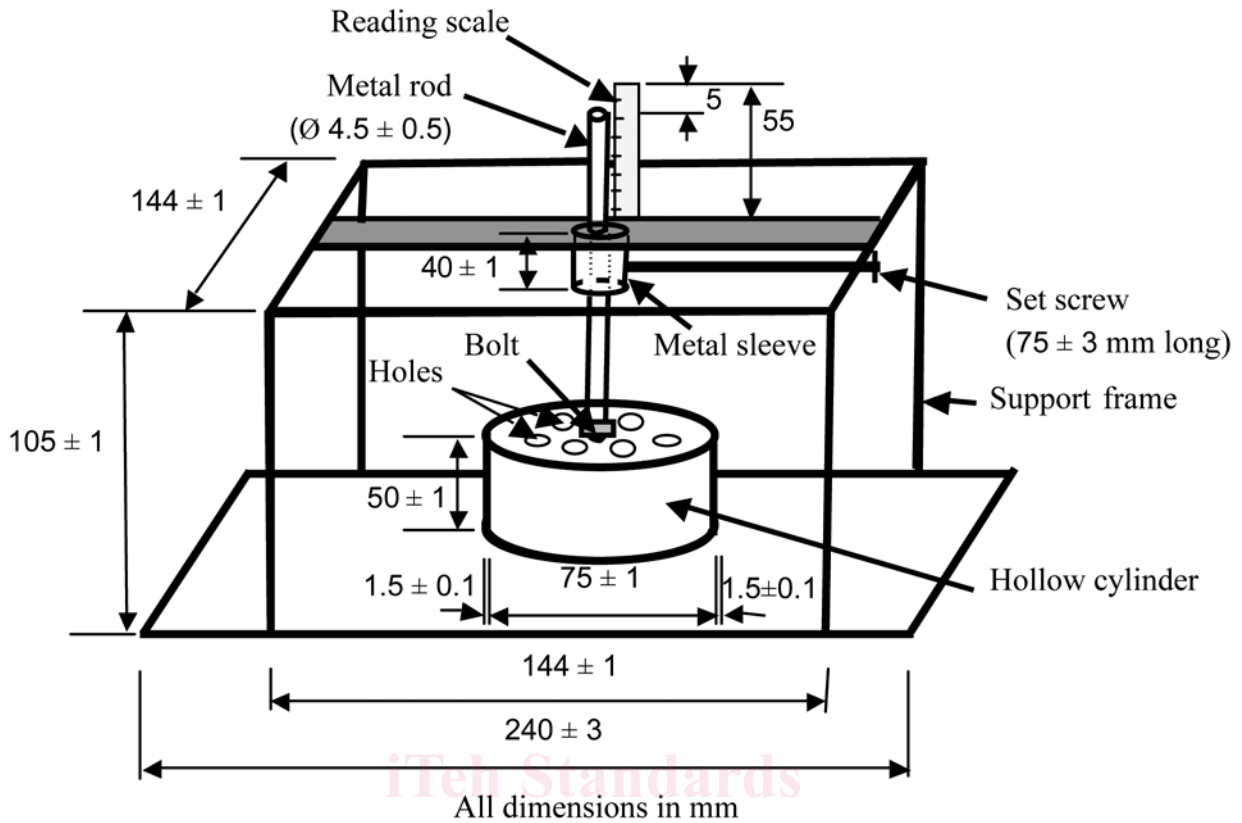


FIG. 1 Dimension of Penetration Apparatus



FIG. 2 Penetration Apparatus

freely penetrate into the fresh concrete. The penetration depth (Pd) is determined and used to assess the static segregation resistance of the self-consolidating concrete mixture (1-5).⁴

⁴ The boldface numbers in parentheses refer to a list of references at the end of this standard.

5. Significance and Use

5.1 This test method is for the rapid assessment of the static segregation resistance of self-consolidating concrete.

5.2 The method is useful for rapid assessment of the static segregation resistance of self-consolidating concrete during mixture development in the laboratory as well as prior to