



Designation: **C1621/C1621M—09b** C1621/C1621M – 14

Standard Test Method for Passing Ability of Self-Consolidating Concrete by J-Ring¹

This standard is issued under the fixed designation C1621/C1621M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This test method covers determination of the passing ability of self-consolidating concrete (SCC) by using the J-Ring in combination with a mold.

1.2 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.

1.3 The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

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

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

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 *halo, n*—an observed cement paste or mortar ring that has clearly separated from the coarse aggregate, around the outside circumference of concrete after flowing from the mold.

3.2.2 *J-ring, n*—an apparatus consisting of a rigid ring supported on sixteen 16 mm [$\frac{5}{8}$ in.] diameter rods equally spaced on a 300 mm [12 in.] diameter circle 100 mm [4 in.] above a flat surface as shown in Fig. 1.

3.2.3 *J-ring flow, n*—the distance of lateral flow of concrete using the J-Ring in combination with a mold.

3.2.4 *passing ability, n*—the ability of self-consolidating concrete to flow under its own weight (without vibration) and fill completely all spaces within intricate formwork, containing obstacles, such as reinforcement.

4. Summary of Test Method

4.1 A sample of freshly mixed concrete is placed in a mold, either in the upright or inverted position, that is concentric with the J-Ring (Fig. 2). The concrete is placed in one lift without tamping or vibration. The mold is raised, and the concrete is allowed

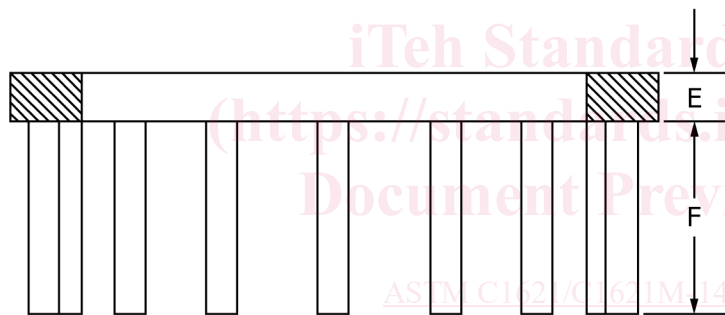
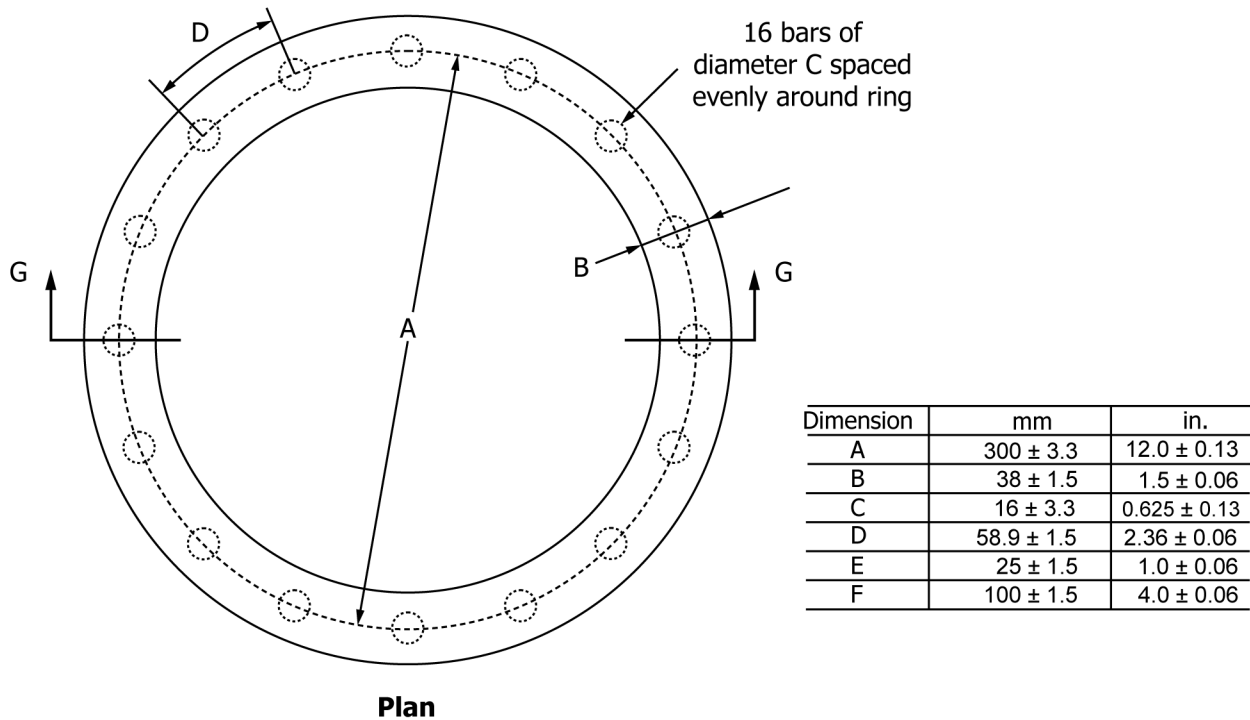
¹ This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.47 on Self-Consolidating Concrete.

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

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.

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



Section G-G

FIG. 1 J-Ring Apparatus

to spread through the J-Ring (Fig. 3). After spreading ceases, two diameters of the concrete mass are measured in approximately orthogonal directions. J-Ring flow is the average of the two diameters. The test is repeated without the J-Ring to obtain the slump flow. The difference between the slump flow and J-Ring flow is an indicator of the passing ability of the concrete.

5. Significance and Use

5.1 This test method provides a procedure to determine the passing ability of self-consolidating concrete. This test method is applicable for laboratory use in comparing the passing ability of different concrete mixtures. It is also applicable in the field as a quality control test.

5.2 The difference between the slump flow and J-Ring flow is an indication of the passing ability of the concrete. A difference less than 25 mm [1 in.] indicates good passing ability and a difference greater than 50 mm [2 in.] indicates poor passing ability. The orientation of the mold for the J-Ring test and for the slump flow test without the J-Ring shall be the same.

5.3 This test method is limited to self-consolidating concrete with nominal maximum size of aggregate of up to 25 mm [1 in.].

6. Apparatus

6.1 *J-Ring*—The apparatus shall consist of a steel (or equivalent nonabsorbent, rigid material) ring measuring 300 mm [12 in.] in diameter at the center of the ring and 25 mm [1 in.] in thickness, and sixteen 16 mm [$\frac{5}{8}$ in.] diameter smooth steel rods spaced evenly around the ring measuring 100 mm [4 in.] in length (see Fig. 1).

6.2 *Mold*—The mold used in this test method shall conform to that described in Test Method C143/C143M, except that the foot pieces are removed when the test is performed with the mold in the upright position (Procedure A).

6.3 *Base Plate*—A nonabsorbent, smooth, rigid plate having a minimum diameter of 915 mm [36 in.].

NOTE 1—Field experience has shown that base plates made from sealed or laminated plywood, rigid plastic, or steel are suitable for performing this test.

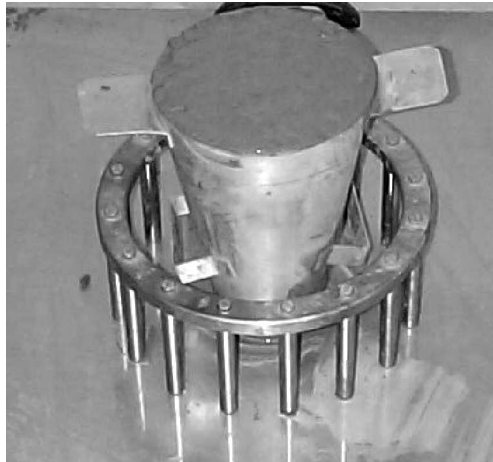


FIG. 2 J-Ring Setup with Inverted Mold Filled with Concrete

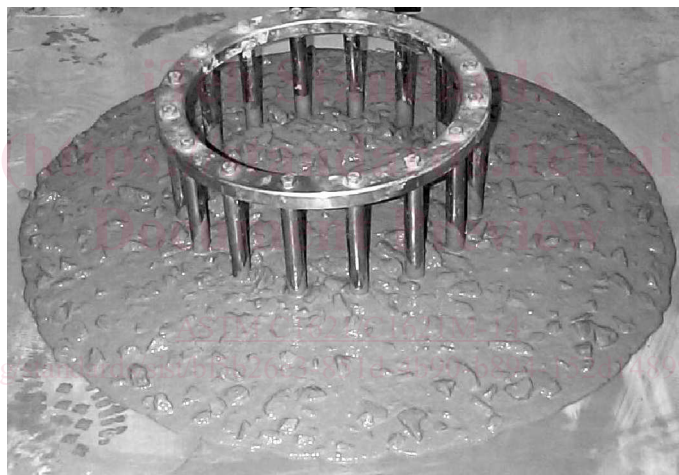


FIG. 3 J-Ring Flow

6.4 *Strike-off Bar*—As described in Test Method C173/C173M.

6.5 *Measuring Device*—A ruler, metal roll-up measuring tape, or similar rigid or semi-rigid measuring instrument marked in increments of 5 mm [1/4 in.] or less.

6.6 *Sample Receptacle*—A pan or wheelbarrow that is water-tight, has a nonabsorbent surface, and is large enough to allow both remixing of the entire sample and retain a volume of concrete sufficient to fill the mold.

6.7 *Pouring Vessel for SCC*—A water-tight container having a volume such that concrete is not spilled during placement in the mold.

NOTE 2—A pouring vessel with a pouring lip is useful in reducing the probability of concrete spilling while filling the mold.

6.8 *Other Tools*—Items such as shovels and scoops capable of remixing the concrete in the sample receptacle, filling the pouring vessel, or both.

7. Sample

7.1 ~~The Obtain a sample of concrete from which test specimens are freshly-mixed self-consolidating concrete in accordance with Practice C172 made shall be representative of the entire batch. It shall be obtained in accordance with Practice and place it in the sample receptacle. C172.~~