



Designation: C1621/C1621M – 17 (Reapproved 2023)

# Standard Test Method for Passing Ability of Self-Consolidating Concrete by J-Ring<sup>1</sup>

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 reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 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, health, and environmental 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.<sup>2</sup>)*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>3</sup>

<sup>1</sup> 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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<sup>2</sup> Section on Safety Precautions, Manual of Aggregate and Concrete Testing, *Annual Book of ASTM Standards*, Vol 04.02.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- 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
- C1758/C1758M Practice for Fabricating Test Specimens with 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.

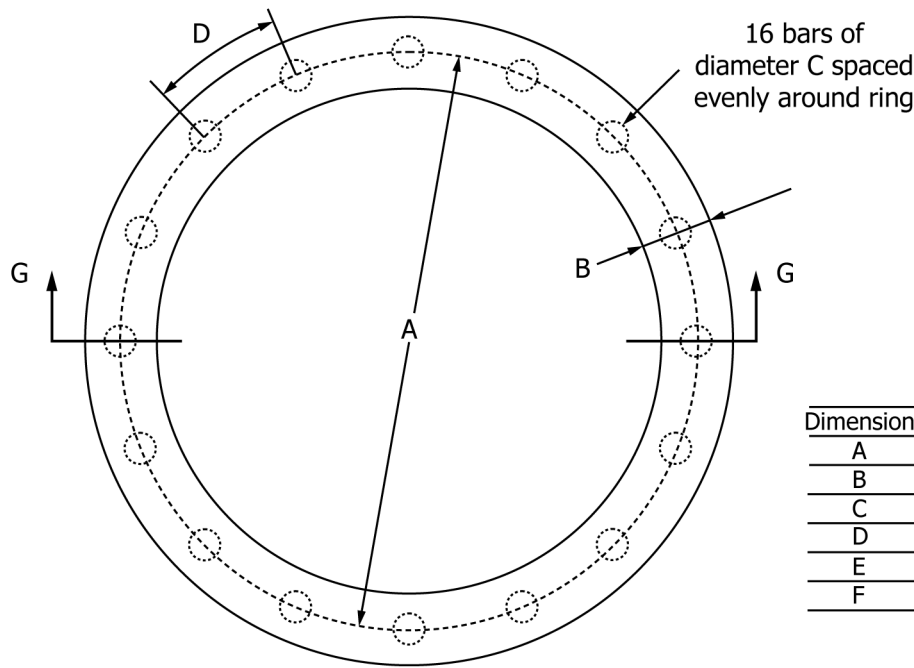
3.2.3 *J-ring flow, n*—the distance of lateral flow of concrete using the J-Ring in combination with a mold.

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

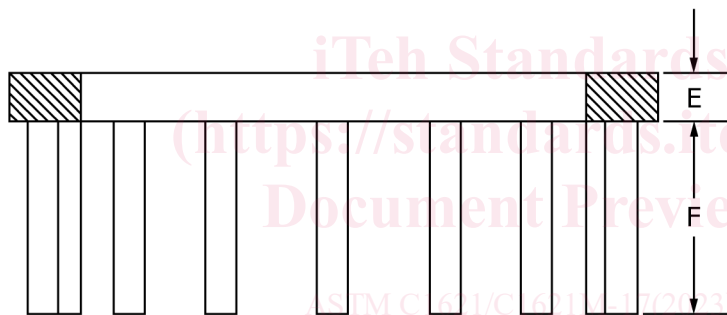
4.1 A sample of freshly mixed concrete is placed in a mold, either in the upright or inverted position, that is concentric with the J-Ring (Fig. 2). The concrete is placed in one lift without tamping or vibration. The mold is raised, and the concrete is allowed to spread through the J-Ring (Fig. 3). 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.

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



Dimension	mm	in.
A	300 ± 3.3	12.0 ± 0.13
B	38 ± 1.5	1.5 ± 0.06
C	16 ± 3.3	0.625 ± 0.13
D	58.9 ± 1.5	2.36 ± 0.06
E	25 ± 1.5	1.0 ± 0.06
F	100 ± 1.5	4.0 ± 0.06

Plan



Section G-G

FIG. 1 J-Ring Apparatus

## 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.