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.

Designation: C1890 – 19

Standard Test Method for K-slump of Freshly Mixed Concrete[1]

This standard is issued under the fixed designation C1890; 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 determination the K-slump of freshly mixed concrete, both in the laboratory and in the field.

1.2 The values stated SI units are the standard. No other units of measurement are included in this standard.

1.3 The text of this standard refers to 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.*[2])

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:*[3]

C31/C31M Practice for Making and Curing Concrete Test Specimens in the Field

C125 Terminology Relating to Concrete and Concrete Aggregates

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

C172/C172M Practice for Sampling Freshly Mixed Concrete

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

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 *K-slump, n*—the height of the mortar fraction of fresh concrete that penetrates into a specified perforated tube inserted into a sample of fresh concrete for 60 seconds, expressed as number from 0 to 11.

3.2.1.1 *Discussion*—The K-slump is related to the ability of the fresh concrete to flow. The greater the value of K-slump, the greater the ability of the concrete to flow.

4. Summary of Test Method

4.1 The K-slump apparatus comprises a hollow tube with prescribed perforations and a floating rod with a graduated scale. The tube is inserted into a sample of freshly mixed concrete to a prescribed depth. The mortar fraction of the concrete is allowed to flow into the perforated tube for a period of 60 s. The floating rod is then lowered onto the surface of the mortar that has penetrated into the tube. The height of the mortar in the tube is read from the scale marked from 0 to 11 on the portion of the floating rod protruding from the top of the tube.

5. Significance and Use

5.1 This test method permits a rapid assessment of the consistency of freshly mixed concrete.

5.2 This test method can be used to provide information on the change in consistency with time of a freshly mixed concrete mixture. It is especially valuable for assessing the consistency of flowing or self-consolidating concrete mixtures.

5.3 This test method can be used to assess batch-to-batch variations in consistency of freshly mixed concrete.

5.4 There is no general reliable relationship between the K-slump value and slump measured in accordance with Test

[1] This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.60 on Testing Fresh 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.

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Method C143/C143M or slump flow measured in accordance with Test Method C1611/C1611M. However, this test method is useful as a quality control tool. For example, the user can make trial batches in the laboratory and determine the range in K-slump corresponding to an acceptable range in slump or slump flow. That range in K-slump can be used to check the consistency of field batches.

5.5 This test method is not suitable as the basis for acceptance or rejection of concrete.

6. Apparatus

6.1 Details of the K-slump apparatus are shown in Figs. 1-5. The apparatus, shown in Figs. 1 and 2, consists of the following principal components: (1) a graduated measuring rod, (2) a reading scale datum, (3) a hollow tube with round holes and longitudinal slots, (4) a holding pin, (5) a collar floater, and (6) a tube point.

6.1.1 The measuring rod shown in Fig. 3 consists of a hollow tube, 13 mm in outside diameter, 248 mm long, with a wall thickness of 1.5 mm, and it is capped at both ends with 13 mm long caps. The top cap is tapered from an outside diameter of 16.5 mm to 14.5 mm as shown in Fig. 3. The bottom cap has a uniform outside diameter of 14.5 mm. The rod is marked with graduations that are 2.5 mm apart. Every fourth graduation mark shall be marked sequentially with a number from 0 to 11.

6.1.2 The reading scale datum shown in Fig. 2 and Fig. 5 is 25 mm long with a 29 mm outside diameter and a wall thickness of 3.8 mm. The 21.5 mm inside diameter of the reading scale datum fits over the end of the hollow tube. A 4-mm socket head cap screw is used to hold the reading scale datum firmly on the perforated tube. The top of the reading scale datum has a 13.5 mm diameter central hole and a wall thickness of 3.5 mm to accommodate the measuring rod and allow the rod to move freely in and out of the tube. The reading scale datum is used to read the K-slump value on the measuring rod and is adjusted so that the reading is 0 when the measuring rod rests on the bottom of the empty hollow tube.

6.1.3 The hollow tube has an outside diameter of 20 mm, it is 216 mm long with a wall thickness of 1.5 mm. The tube has 22 round holes, 6.5 mm in diameter, and four longitudinal slots, 6 mm wide by 50 mm long, which are distributed at 90 degrees around the circumference of the tube as shown in Fig. 4. The round holes are distributed in alternating rows of 5 and 6 holes per row. The center-to-center distance of the holes in each row is 10 mm. The ends of the slots are semi-circles with a diameter of 6 mm.

6.1.4 The holding pin is 4 mm in diameter and protrudes 1.5 mm inside the tube. It is used to hold the measuring rod in its extended position at the start of the test.

6.1.5 The collar floater is a plate 2 mm thick, with an outside diameter of 64 mm and inside diameter of 20 mm. The collar floater is connected to the hollow tube at a distance of 129 mm from the bottom end of the hollow tube.

6.1.6 The tube point is made from 20 mm diameter round stock and is machined into a conical shape as shown in Fig. 5. The overall height is 41 mm, and the height of the cone is 33.5 mm. It is secured to the bottom end of hollow tube, and it is used to facilitate insertion of the assembly into the fresh concrete.

6.1.7 All dimensions shall have a tolerance of ±1% of their indicated value.

6.1.8 All parts of the apparatus shall be made of non-corrosive materials that are not affected by the chemicals found in fresh concrete.

6.2 Other apparatus to conduct this test include: a small wood float or screed, a container to hold the fresh concrete sample, and a stopwatch readable to 1 s.

7. Sampling and Test Specimen

7.1 For testing in the field, obtain the sample in accordance with the requirements of Practice C172/C172M. For testing in the laboratory, obtain a representative sample of the concrete made in accordance with Practice C192/C192M.

7.2 Place the sample for the determination of the K-slump into a container that is least 175 mm deep. There shall be a clear distance of at least 60 mm from the edge of the container and the outside of the hollow tube.

8. Procedure

8.1 Place the concrete sample into a container. Use a small wood float or screed to bring the concrete surface to a flat condition. Work the surface as little as possible to avoid formation of a mortar layer. Begin the measurement of K-slump within 1 minute after filling the container. During the K-slump measurement, do not agitate, vibrate, or jar the concrete.

8.2 Verify that the measuring rod indicates a value of 0 when the rod is inserted fully into the empty tube. If necessary, adjust the reading scale datum so that the reading is 0. Wet the apparatus and shake off excess water. Raise the measuring rod, and let it rest on the holding pin inside the tube.

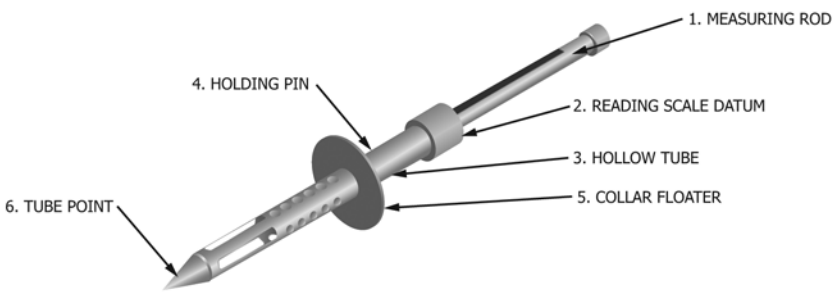

FIG. 1 Isometric View of K-slump Apparatus