



Standard Test Method for Flow Consistency of Controlled Low Strength Material (CLSM)¹

This standard is issued under the fixed designation D 6103; 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 procedure for determination of the flow consistency of fresh Controlled Low Strength Material (CLSM). This test method applies to flowable CLSM with a maximum particle size of 19.0 mm (¾ in.) or less, or to the portion of CLSM that passes a 19.0 mm (¾ in.) sieve.

1.2 The values stated in SI units are to be regarded as standard. The inch-pound equivalents are given for information only.

1.3 CLSM is also known as flowable fill, controlled density fill, soil-cement slurry, soil-cement grout, unshrinkable fill, K-Krete, and other similar names.

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.*

2. Referenced Documents

2.1 ASTM Standards:

C 143 Test Method for Slump of Hydraulic Cement Concrete²

C 172 Practice for Sampling Freshly Mixed Concrete²

D 653 Terminology Relating to Soil, Rock, and Contained Fluids³

D 3740 Practice for Minimum Requirements of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction³

D 4832 Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders³

D 5971 Practice for Sampling Freshly Mixed Controlled Strength Material⁴

D6023 Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Controlled Low Strength Material⁴

D 6024 Test Method for Ball Drop on Controlled Low Strength Material to Determine Suitability for Load Application⁴

3. Terminology

3.1 *Definitions*—Except as follows in 3.2, all definitions are in accordance with Terminology D 653

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *controlled low strength material (CLSM), n*—a mixture of soil or aggregates, cementitious material, fly ash, water and sometimes chemical admixtures, that hardens into a material with a higher strength than the soil, but less than 84 000 kPa (1200 psi). Used as a replacement for compacted backfill, CLSM can be placed as a slurry, a mortar, or a compacted material and typically has strengths of 350 to 700 kPa (50 to 100 psi) for most applications.

3.2.2 *flow consistency, n*—a measurement of the spread of a predetermined volume of CLSM achieved by removal of the flow cylinder within a specified time.

4. Summary of Test Method

4.1 An open-ended cylinder is placed on a flat, level surface and filled with fresh CLSM. The cylinder is raised quickly so the CLSM will flow into a patty. The average diameter of the patty is determined and compared to established criteria.

5. Significance and Use

5.1 This test method is intended to provide the user with a procedure to determine the fluidity of CLSM mixtures for use as backfill or structural fill.

5.2 This test method is considered applicable to fresh CLSM containing only sand as the aggregate or having coarse aggregate small than 19.0 mm (¾ in.). If the coarse aggregate is larger than 19.0 mm (¾ in.), the test method is applicable when it is made on the fraction of CLSM passing a 19.0 mm (¾ in.) sieve, with the larger aggregate being removed in accordance with the section on Additional Procedures for Large Maximum size Aggregate Concrete in Practice C 172.

NOTE 1—Removing the coarse aggregate will alter the characteristics of the mix and therefore will give information only about the remaining material. It is suggested that for mixes containing coarse aggregate 19.0 mm (¾ in.) or larger, a measurement of the slump is more appropriate.

5.3 For nonflowable CLSM, or for mixtures that do not come out of the flow cylinder easily, measure the slump as outlined in Test Method C 143.

5.4 This test method is one of a series of quality control tests that can be performed on CLSM during construction to monitor compliance with specification requirements. The other tests

¹ This test method is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.15 on Stabilization with Admixtures.

Current edition approved March 10, 1997. Published September 1997.

² Annual Book of ASTM Standards, Vol 04.02.

³ Annual Book of ASTM Standards, Vol 04.08.

⁴ Annual Book of ASTM Standards, Vol 04.09.