



## Standard Practice for Sampling Freshly Mixed Controlled Low-Strength Material<sup>1</sup>

This standard is issued under the fixed designation D 5971; 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 practice explains the procedure for obtaining a representative sample to test of freshly mixed controlled lowstrength material (CLSM) as delivered to the project site (Note 1). This practice includes sampling from revolving-drum truck mixers and from agitating equipment used to transport central-mixed CLSM.

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

NOTE 1—Composite samples are required by this practice unless specifically excepted by procedures governing the tests to be performed, such as tests to determine uniformity of consistency and mixer efficiency. Procedures used to select the specific test batches are not described in this practice. It is recommended that random sampling be used to determine overall specification compliance.

1.3 *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.*

1.4 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgement. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a projects many unique aspects. The word “standard” in the title of this document means only that the document has been approved through the ASTM consensus process.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 653 Terminology Relating to Soil, Rock, and Contained Fluids<sup>2</sup>

<sup>1</sup> This practice 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 Nov. 10, 2001. Published February 2002. Originally published as PS 30 – 95. Last previous edition D 5971 – 96.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.08.

D 3740 Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction<sup>2</sup>

D 4832 Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders<sup>2</sup>

D 6023 Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Controlled Low Strength Material (CLSM)<sup>3</sup>

D 6103 Test Method for Flow Consistency of Controlled Low Strength Material (CLSM)<sup>3</sup>

### 3. Terminology

3.1 *Definitions:* For common definitions of terms in this standard, refer to Terminology D 653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *composite sample, n*—a sample that is constructed by combining equal portions of grab samples taken at two or more regularly spaced intervals during discharge of the middle portion of the batch of CLSM.

3.2.2 *controlled low-strength material (CLSM), n*—a mixture of Portland cement, fly ash, aggregates, water, and possibly chemical admixtures that, as the cement hydrates, forms a soil replacement material. The CLSM is a self compacting, flowable, cementitious material that is primarily used as a backfill or structural fill instead of compacted fill or unsuitable native soil. Depending on the amount of water used in the CLSM mixture, it can be placed as a non-flowable compacted material or as a mortar.

3.2.3 *flow consistency, n*—measured by the average diameter of the spread achieved by removal of the flow cylinder.

### 4. Significance and Use

4.1 This practice shall be used to provide a representative sample of the material for the purpose of testing various properties. The procedures used in sampling shall include the use of every precaution that will assist in obtaining samples that are truly representative of the nature and condition of the CLSM.

NOTE 2—The quality of the result produced by this standard is dependent on the competence of the personnel performing it and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D 3740 are generally considered capable of competent

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.09.

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

and objective testing/sampling/inspection/ and the like. Users of this standard are cautioned that compliance with Practice D 3740 does not in itself assure reliable results. Reliable results depend on many factors. Practice D 3740 provides a means of evaluating some of these factors.

## 5. Sampling

5.1 *Size of Sample*—The sample of CLSM for compressive strength testing shall be a minimum of 14 L (0.5 ft<sup>3</sup>). For other tests, the composite size shall be large enough to perform the test and to ensure a representative sample of the batch was taken.

## 6. Procedure

6.1 *Sampling from Revolving-Drum Truck Mixers or Agitators*—Sample the CLSM at two or more regularly spaced intervals during discharge of the middle portion of the batch. These grab samples shall be obtained within the time limit specified in 6.2 and composited into one sample for test purposes. In any case do not obtain samples until after all water has been added to the mixer; also do not obtain samples from the very first or last portions of the batch discharge. Sample by repeatedly passing a receptacle through the entire discharge stream or by completely diverting the discharge into a sample container. Regulate the rate of discharge of the batch by the rate of revolution of the drum and not by the size of the gate opening.

NOTE 3—Sampling normally should be performed on the CLSM as delivered from the truck to the job site excavation.

6.2 The elapsed time between obtaining the first and final portions of the composite sample shall be as short as possible and in no instance shall it exceed 2 min.

6.3 Transport the composite samples to the place where fresh CLSM tests are to be performed or where test specimens are to be molded. The composite sample shall be combined and remixed with a shovel or scoop the minimum amount necessary to ensure uniformity and compliance with the minimum time limits specified in 6.4.

6.4 Start tests for flow consistency (Test Method D 6103), unit weight, and air content (Test Method D 6023) within 5 min after obtaining the final portion of the composite sample. Complete these tests as expeditiously as possible. Start molding specimens for strength tests (Test Method D 4832) within 10 min after obtaining the final portion of the composite sample. Keep the elapsed time between obtaining and using the sample as short as possible and protect the sample from the sun, wind, and other sources of rapid evaporation, and from contamination.

## 7. Keywords

7.1 air content; CLSM; composites; flow consistency; quality control; sampling; unit weight

## SUMMARY OF CHANGES

This section identifies the principle changes to this guide that have been incorporated since the last issue.

- (1) SI units made the standard.
- (2) Added section 1.4 the “Professional Judgement” caveat.
- (3) Revised sections 2.1 and 6.4 to reflect current titles of standards.

(4) Revised section 3 on Terminology in accordance with D18’s Standards Preparation Manual.

(5) Added Note 2 referencing Practice D3740 in accordance with D18 policy. Renumbered subsequent notes.

(6) Added “Summary of Changes” section.

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).*