



Designation: C1436 – 08

## Standard Specification for Materials for Shotcrete<sup>1</sup>

This standard is issued under the fixed designation C1436; 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 specification covers materials for use in hydraulic-cement concrete mixtures to be placed by shotcreting. It does not cover mixing, placement, curing, or protection of the concrete placed by shotcreting.

1.2 This specification covers materials for both wet-mix and dry-mix shotcreting.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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 the 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:*<sup>2</sup>

C33 Specification for Concrete Aggregates

C125 Terminology Relating to Concrete and Concrete Aggregates

C150 Specification for Portland Cement

C330 Specification for Lightweight Aggregates for Structural Concrete

C595 Specification for Blended Hydraulic Cements

C1116/C1116M Specification for Fiber-Reinforced Concrete

C1141/C1141M Specification for Admixtures for Shotcrete

C1157 Performance Specification for Hydraulic Cement

C1385/C1385M Practice for Sampling Materials for Shotcrete

C1602/C1602M Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

<sup>1</sup> This specification is under the jurisdiction of Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.46 on Shotcrete.

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<sup>2</sup> 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.

### 3. Terminology

3.1 For definitions of terms used in this specification, refer to Terminology C125.

### 4. Ordering Information

4.1 In the absence of designated applicable general specifications, the purchaser shall include the following information in the purchase contract or order, if applicable:

4.1.1 The specification designation and date of issue,

4.1.2 Specification for cement and type (see 5.1.1),

4.1.3 Grading number for total combined aggregates required (see 5.1.2),

4.1.4 Specification, type, and grade(s) for admixtures required (see 5.1.4), and

4.1.5 Specification, type, length, and, if appropriate, the diameter (or equivalent cross-sectional dimensions) of fiber required (see 5.1.5).

### 5. Material Requirements

5.1 In the absence of designated applicable specifications covering requirements for quality of materials, the following requirements shall govern:

5.1.1 *Cement*—Cement shall be in accordance with Specification C150, Specification C595, or Performance Specification C1157. If special properties are required, the purchaser shall limit the choice of cements to those suitable for the special use.

5.1.2 *Aggregates*—Aggregates shall be in accordance with Specification C33 or Specification C330 if lightweight shotcrete is specified by the purchaser except that the grading of the total aggregate constituent of the shotcrete shall be in accordance with the requirements prescribed in Table 1 for the grading number specified.

NOTE 1—The ranges shown in Table 1 are by necessity wide in order to accommodate nationwide conditions. For quality control of any specific operation, a producer should develop an average grading for the particular source and production facilities, and control the grading within reasonable tolerances from this average.

5.1.3 *Water*—The mixing water shall be in accordance with Specification C1602/C1602M.

5.1.4 *Admixtures*—Mineral and chemical admixtures shall be in accordance with Specification C1141/C1141M.

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

**TABLE 1 Grading Limits for Combined Aggregate for Shotcrete**

Percent by Mass Passing Individual Sieve		
Sieve Size, U.S. Standard <sup>A</sup>	Grading, No. 1	Grading, No. 2
12.5 mm (½ in.)	-	100
9.5 mm (¾ in.)	100	90 - 100
4.75 mm (No. 4)	95 - 100	70 - 85
2.36 mm (No. 8)	80 - 98	50 - 70
1.18 mm (No. 16)	50 - 85	35 - 55
600 µm (No. 30)	25 - 60	20 - 35
300 µm (No. 50)	10 - 30	8 - 20
150 µm (No. 100)	2 - 10	2 - 10

<sup>A</sup>The sieve designations in parentheses are provided for information only; the only standard sieve sizes are those stated in Specification **E11** in SI units.

5.1.5 *Fibers*—Fibers shall be in accordance with the requirements for fibers prescribed in Specification **C1116/C1116M**.

## 6. Sampling

6.1 Access shall be provided to the purchaser for sampling, either at the point of manufacture or at the site of the work, as

specified by the purchaser. Sampling of materials shall be in accordance with Practice **C1385/C1385M**.

## 7. Number of Tests and Retests

7.1 Testing, number of tests, and retests to be performed on specified materials shall be in accordance with the referenced ASTM standard.

## 8. Inspection

8.1 Inspection of the materials shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

## 9. Rejection, Certification, and Product Marking

9.1 Rejection, certifications, and product markings on specified materials shall be in accordance with the referenced ASTM specification.

## 10. Keywords

10.1 dry-mix shotcrete, materials for; ordering; shotcrete; specification; testing; wet-mix shotcrete

## SUMMARY OF CHANGES

Committee C09 has identified the location of selected changes to this specification since the last issue, C1436 – 99(2004), that may impact the use of this specification. (Approved December 15, 2008)

(1) Updated Referenced Documents.

(2) Revised **Table 1**.

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