



## Standard Test Method for Organic Fiber Content of Asbestos-Cement Products<sup>1</sup>

This standard is issued under the fixed designation C458/C458M; 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.

<sup>ε1</sup> NOTE—Units information was editorially corrected in January 2012.

### 1. Scope

1.1 This test method covers the determination of the organic fiber content of asbestos-cement products.

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 **Warning**—Breathing of asbestos dust is hazardous. Asbestos and asbestos products present demonstrated health risks for users and for those with whom they come into contact. In addition to other precautions, when working with asbestos-cement products, minimize the dust that results. For information on the safe use of chrysotile asbestos, refer to “Safe Use of Chrysotile: A Manual on Preventive and Control Measures.”<sup>2</sup>

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*:<sup>3</sup>

**C114** Test Methods for Chemical Analysis of Hydraulic Cement

**D2946** Terminology for Asbestos and Asbestos-Cement Products

**E11** Specification for Woven Wire Test Sieve Cloth and Test Sieves

**E50** Practices for Apparatus, Reagents, and Safety Considerations for Chemical Analysis of Metals, Ores, and Related Materials

2.2 *BNQ Standard*:<sup>4</sup>

**P2639-230** *Asbestos-Cement Sheets: Methods of Test and Control*

### 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *organic fiber content*—the percentage of organic matter expressed as the equivalent percentage of cellulose in a dried sample.

3.1.2 For additional definitions refer to Terminology **D2946**.

### 4. Apparatus

4.1 *Sieve*—A150-μm (No. 100) sieve, conforming to Specification **E11**.

4.2 *Drying Oven*, ventilated, capable of being maintained at 100 to 105°C [212 to 220°F].

4.3 *Apparatus for Determination of Total Carbon by Direct Combustion*—Apparatus No. 1 of Practices **E50**.

### 5. Reagent

5.1 *Hydrochloric Acid* (1 + 17)—Dilute 1 part by volume of concentrated hydrochloric acid (HCl, sp gr 1.19) with 17 parts of water.

### 6. Procedure

6.1 Grind a 100 ± 10-g sample of the asbestos-cement to pass a 150-μm (No. 100) sieve. Avoid excessive, or high energy grinding that may cause partial thermal decomposition of organic matter. Dry 1 g of the ground sample to constant mass in a ventilated oven at a temperature of 212 or 220°F [100 to 104.4°C] and cool to room temperature in a desiccator. Determine the mass of the dried sample to the nearest 0.001 g. (**Warning**—See 1.3. )

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee **C17** on Fiber-Reinforced Cement Products and is the direct responsibility of Subcommittee **C17.03** on Asbestos - Cement Sheet Products and Accessories.

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<sup>2</sup> Available from The Asbestos Institute, [http://www.chrysotile.com/en/sr\\_use/manual.htm](http://www.chrysotile.com/en/sr_use/manual.htm).

<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.

<sup>4</sup> Available from Bureau de Normalisation du Québec, Département of Industry and Commerce, 50 St-Joseph Street East, Québec, QC, Canada G1K 3A5.

6.2 Transfer the dried sample to a 100-cm<sup>3</sup> beaker, add 50 cm<sup>3</sup> of HCl (1 + 17), and digest on a steam bath for 20 min. After this treatment, filter the sample on a washed and ignited Gooch crucible pad and dry at a temperature of 100 to 105°C [212 to 220°F].

6.3 Transfer the sample and crucible pad to a combustion boat and burn in a current of oxygen in a combustion furnace. Absorb the resultant carbon dioxide (CO<sub>2</sub>) by the procedure described in 9.3.3 and 9.3.4 of BNQ Methods P2639-230. Make a blank determination, following the same procedure and using the same amounts of all materials except the sample.

## 7. Calculation

7.1 Calculate the organic fiber content, in mass percent, as follows (**Note 1**):

$$\text{Organic fiber (cellulose), \%} = [(A - B) \times 0.614/C] \times 100$$

where:

- $A$  = mass of CO<sub>2</sub>, g,
- $B$  = correction for CO<sub>2</sub> in blank, g,
- $C$  = mass of dry sample, g, and
- 0.614 = gravimetric factor (C<sub>6</sub>H<sub>10</sub>O<sub>5</sub>/6CO<sub>2</sub>) for converting CO<sub>2</sub> absorbed to cellulose.

**NOTE 1**—Asbestos-cement products may include water-repellent substances that would produce CO<sub>2</sub> in this test method for organic fiber. Such water-repellent substances are usually soluble in chloroform. In case of dispute, the chloroform-soluble organic substance shall be determined as described in Sections 69 to 72 of Test Methods C114. A 40.0-g sample of the ground, oven-dried material shall be used for this test method. Water-repellent substances contain a higher percentage of carbon than cellulose. To correct for this, 1.8 times the percentage of chloroform-soluble organic substance, so determined, shall be subtracted from the calculated percentage of organic fiber (cellulose).

**NOTE 2**—This test method does not provide a correction for organic pigments, which would likewise produce CO<sub>2</sub> in this test method for organic fiber.

## 8. Precision and Bias

8.1 *Repeatability*—The intra-laboratory single apparatus, operator and specimen repeatability of the mass of organic fiber content determined is as follows:

Concentration	Mean, g	Standard Deviation, g	Relative Standard Deviation, %
Low	0.00571	0.00081	15.9
High	0.06202	0.00149	2.4

8.2 *Bias*—Bias has not yet been established in accordance with the requirements of ASTM.

## 9. Keywords

9.1 asbestos; asbestos-cement; organic fiber

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