Designation: C 458 – 98 (Reapproved 2002)

Standard Test Method for Organic Fiber Content of Asbestos-Cement Products[1]

This standard is issued under the fixed designation C 458; 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 determination of the organic fiber content of asbestos-cement products.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 114 Test Methods for Chemical Analysis of Hydraulic Cement[2]

D 2946 Terminology for Asbestos and Asbestos-Cement Products[3]

E 11 Specification for Wire-Cloth Sieves for Testing Purposes[4]

E 50 Practices for Apparatus, Reagents, and Safety Considerations for Chemical Analysis of Metals, Ores, and Related Materials[5]

2.2 *BNQ Standard:*

P2639-230 *Asbestos-Cement Sheets:* Methods of Test and Control[6]

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 D 2946.

4. Apparatus

4.1 *Sieve*—A 150-µm (No. 100) sieve, conforming to Specification E 11.

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 E 50.

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—**Avoid creating airborne dust when grinding asbestos-cement products and handling the crushed product. Prolonged breathing of significant concentrations of silica or asbestos dust may cause serious bodily harm. When dust creation is inevitable, effective protective measures must be taken to prevent inhalation.)

6.2 Transfer the dried sample to a 100-cm^3 beaker, add 50 cm^3 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_2) 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):

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

[1] 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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[2] *Annual Book of ASTM Standards*, Vol 04.01.

[3] *Annual Book of ASTM Standards*, Vol 04.05.

[4] *Annual Book of ASTM Standards*, Vol 14.02.

[5] *Annual Book of ASTM Standards*, Vol 03.05.

[6] Available from Bureau de Normalisation du Québec, Département of Industry and Commerce, 50 St-Joseph Street East, Québec, QC, Canada G1K 3A5.

where:

A = mass of CO_2, g,
B = correction for CO_2 in blank, g,
C = mass of dry sample, g, and
0.614 = gravimetric factor ($C_6H_{10}O_5/6CO_2$) for converting CO_2 absorbed to cellulose.

NOTE 1—Asbestos-cement products may include water-repellent substances that would produce CO_2 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 C 114. A40.0-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_2 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