



Standard Test Method for Sampling Amphibole Asbestos¹

This standard is issued under the fixed designation D 3879; 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.

ε¹ NOTE—Asbestos warning was moved from 7.1.1 to 1.5 in September 2004.

1. Scope

1.1 This test method describes the procedure for taking a composite sample or a master composite sample (at the mine, at the factory, or from a consignment) from a lot of commercial milled amphibole fibers, conditioning the sample, and reducing it in quantity so as to provide a series of relatively small test specimens of loose asbestos fiber, each of which may be regarded as representative of the lot. (See Appendix X1 for sampling strategy.)

1.2 This test method is suitable for taking test specimens of amphibole asbestos for the following test methods: C 1119, C 1120, C 1121, C 1122, C 1123, C 1124, C 1125, C 1162, D 1118, D 2589, D 2752, D 2947, D 2985, D 2987, D 3639, D 3752, and D 3880.

1.3 For sampling chrysotile asbestos, use Method D 2590.

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

1.5 **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 Asbestos: A Manual on Preventive and Control Measures.”²

1.6 *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. See 1.5 for a specific hazard warning.*

2. Referenced Documents

2.1 ASTM Standards:³

- C 1119 Test Method for Vacuum Drainage of Asbestos-Cement Mixes
- C 1120 Test Method for Wash Test of Asbestos
- C 1121 Test Method for Turner and Newall (T and N) Wet-Length Classification of Asbestos
- C 1122 Test Method for Wet Volume of Asbestos
- C 1123 Test Method for Compressibility and Recovery of Asbestos
- C 1124 Test Method for Kerosene Retention of Asbestos
- C 1125 Test Method for Penetration Index of Asbestos
- C 1162 Test Method for Loose Density of Asbestos
- D 1118 Test Method for Magnetic Rating of Asbestos Fiber and Products
- D 2589 Test Method for McNett Wet Classification of Asbestos Fibers
- D 2590 Test Method of Sampling Chrysotile Asbestos
- D 2752 Test Methods for Air Permeability of Asbestos Fibers
- D 2946 Terminology Relating to Asbestos and Asbestos-Cement Products
- D 2947 Test Method for Screen Analysis of Asbestos Fibers
- D 2985 Test Method for Color of Asbestos
- D 2987 Test Method for Moisture Content of Asbestos Fiber
- D 3639 Test Method for Classification of Asbestos Fibers by Quebec Standard Test
- D 3752 Test Method for Strength Imparted by Asbestos to a Cement Matrix
- D 3880 Test Method for Asbestos Strength Units

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

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.

Current edition approved June 1, 2004. Published August 2004. Originally approved in 1980. Last previous edition approved in 1999 as D 3879 – 91 (1999).

² Available from The Asbestos Institute, http://www.chrysotile.com/en/sr_use/manual.htm.

³ 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.

3.1.1 *accessible bag*—a bag (in a pile of bags of asbestos fiber) of which at least one side or one end is fully exposed.

3.1.2 *accessible surface*—in a pile of bags of asbestos fiber, a side (of the pile) in which all the bags are accessible bags.

3.1.3 *amphibole asbestos, n*—asbestiform amphibole silicate minerals including the orthorhombic anthophyllite series and the monoclinic cummingtonite [grunerite asbestos (amosite)] series, the tremolite-actinolite series, and the alkali amphibole [riebeckite asbestos (crocidolite)] series among others. The amphiboles contain essential (OH) groups in their structure, and the Si:O ratio is 4:11. A considerable amount of elemental substitution can take place in these varieties of asbestos. The crystal structures are composed of strips or ribbons of linked polyhedra that join to form fibrils. The individual strips are made up from three components; these are two double chains of linked (Si, Al) O₄ tetrahedra and a strip of linked MgO₆, FeO₆ or AlO₆ octahedra (see Tables 1 and Tables 2 in Terminology D 2946).

3.1.4 *bag*—any quantity of asbestos fiber corresponding to one particular grade that is packed in a suitable container.

NOTE 1—In the asbestos industry the typical quantity contained in a bag is 45 kg (100 lb approximately).

3.1.5 *composite sample*—a set of unit samples of asbestos fiber (drawn systematically or at random) taken from a lot, comprising not less than 2 and not more than 200 bags, for use in the laboratory as a test sample, that is, as a source of test specimens.

3.1.6 *conditioning*—the process by which the fiber is put into a consistent condition to be tested.

3.1.7 *contaminants*—any foreign matter (other than associated minerals and fines) in a sample of asbestos fiber.

3.1.8 *grade*—asbestos fiber that has the same chemical, physical, and mechanical properties and that is designated by a particular code corresponding to any given specification.

3.1.9 *handful, n—in sampling*, as much fiber as the hand can contain.

3.1.10 *lot*—not less than 2 and not more than 2000 bags of asbestos fiber of the same type and grade offered at any one time for delivery or testing.

3.1.11 *master composite sample*—not less than 2 and not more than 10 composite samples so combined and reduced as to form a test sample that represents a lot that consists of more than 200 bags but not more than 2000 bags.

3.1.12 *milled asbestos, n*—all grades of asbestos that are recovered as a result of mechanical comminution and screen classification or air classification of asbestos ore.

3.1.13 *random composite sample*—a composite sample in which each individual bag in the lot that is being sampled has an equal chance of being included in the composite sample.

3.1.14 *systematic composite sample*—a composite sample that is obtained by taking every *n*th bag in the lot being sampled.

3.1.15 *systematic sample, n—in asbestos*, the sample is systematic if it is formed of every *n*th bag of the lot to be examined.

3.1.16 *test specimen*—the specific portion of a test sample upon which a test is to be performed, and that is obtained by

systematically reducing the size of the sample until a representative fiber specimen of the required mass is obtained.

3.1.17 *unit sample*—a sample drawn from one bag.

3.2 *Definitions*—Definitions of terms relating to asbestos fiber are given in Terminology D 2946.

4. Summary of Test Method

4.1 Lots consisting of more than 200 bags are divided into sublots comprising about 200 bags. From each subplot a composite sample is taken consisting of one handful from each of 20 bags selected either systematically or at random.

4.2 Each composite sample is passed through a fluffer (conditioner) to disperse lumps before combining and mixing with the others. The combined sample is then reduced by coning and quartering.

4.3 Test specimens are drawn from the sample by coning and quartering. Specimens for Test Method D 3639 are further pressed and repassed through the conditioner.

5. Significance and Use

5.1 Sampling and conditioning are equally as important as testing. The reliability of the test results depends primarily upon how well the specimens tested represent the true character and condition of the lot of asbestos fiber. Much care and effort are required to be sure that all the sampling operations are systematic or at random, and are representative. Failure to provide a test specimen that accurately represents the lot from which it is drawn will produce misleading test results regardless of the accuracy and the precision of the test method.

6. Apparatus

6.1 *Fiber Conditioner and Fiber Press*^{4,5}—Refer to Fig. 1 and Fig. 2.

6.2 *Sampling Ring and Cross*—The ring shall be of 3-mm-thick hoop iron and shall have a diameter of approximately 600 mm and a height of about 50 mm. The cross shall be of a suitable metal, plywood, or plastic material, and the arms of the cross shall be of equal length and shall be 75 mm high and 3 mm thick. The length of the arms shall be such that the cross fits loosely in the ring. All surfaces of the ring and of the cross shall have a smooth finish.

6.3 *Fiber Knife*, of a plywood or plastic material, rectangular in shape, and approximately 300 mm long, 75 mm wide, and 3 mm thick.

7. Sampling

7.1 *Obtaining Composite Samples and Master Composite Samples*:

7.1.1 If a lot consists of more than 200 bags, divide it into sublots each comprising about 200 bags. From each lot comprising not less than 20 and not more than 200 bags, or each sub-lot, as relevant, take (preferably as in 7.1.2, or, when

⁴ Information on the fiber conditioner and fiber press is obtainable from the South African Bureau of Standards, Private bag X191, Pretoria 0001, Republic of South Africa.

⁵ Detailed drawings of the fiber conditioner are available from ASTM International Headquarters at a nominal price. Request Adjunct No. 12-425900-00 to Test Method D 2590.