



Designation: D1118/D1118M – 95 (Reapproved 2017)

Standard Test Method for Magnetic Rating of Asbestos Fiber and Asbestos Textiles¹

This standard is issued under the fixed designation D1118/D1118M; 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 procedure for the determination of the magnetic rating of asbestos fiber and asbestos textile products. This test method is used primarily for testing asbestos insulating materials.

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

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. For specific safety hazard, see .*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:³

D123 Terminology Relating to Textiles

D2100 Specification for Asbestos Textiles Used for Electrical Insulating Purposes

D2590 Test Method for Sampling Chrysotile Asbestos

D2946 Terminology for Asbestos and Asbestos-Cement Products

D2947 Test Method for Screen Analysis of Asbestos Fibers

D3879 Test Method for Sampling Amphibole Asbestos (Withdrawn 2009)⁴

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

2.2 ASTM Adjuncts:

Metallic Analyzer Drawings⁵

3. Terminology

3.1 For definitions of other textile terms used in this test method, refer to Terminology D123. For terms relating to asbestos, refer to Terminology D2946.

3.2 Definitions:

3.2.1 *asbestos fiber, n*—The hydrous magnesium silicate serpentine mineral designated as chrysotile and having the empirical formula $\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$.

3.2.2 *atmosphere for testing textiles, n—for asbestos*, air maintained at a relative humidity of $50 \pm 2\%$ at $70 \pm 2^\circ\text{F}$ [$21 \pm 1^\circ\text{C}$].

3.2.3 *magnetic rating (MR), n*—an empirical value reflecting the effect of the magnetic particles, such as magnetic iron compounds, in asbestos material as measured by a magnetic effect analyzer. It is not a quantitative measure of the magnetic particles in the material. — Magnetic rating is affected by the

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, 2017. Published July 2017. Originally approved in 1950. Last previous edition approved in 2009 as D1118/D1118M – 95(2009)^{e1}. DOI: 10.1520/D1118_D1118M-95R17.

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.

⁴ The last approved version of this historical standard is referenced on www.astm.org.

⁵ Available from ASTM International Headquarters. Order Adjunct No. ADJD1118. Original adjunct produced in 1986.

quantity, concentration, particle size, shape, and orientation of the magnetic particles in the material.

3.2.4 *unit magnetic rating (1 MR), n*—a calibrating standard with an MR of one is defined as containing 0.18 g of U.S. National Institute of Standards and Technology standard sample No. 29(a) or iron ore (magnetite) uniformly distributed over the space specified for a 10-g test specimen (19 mm [0.75 in.] diameter by 73 mm [2.875 in.] long), by dispersion in a magnetically inert material. A10-g specimen has one unit magnetic rating when it produces a magnetic effect equivalent to that of 0.18 g of standard magnetite as described above. Conversely, a 10-g specimen producing a magnetic effect such that the resulting induced current in the magnetic analyzer galvanometer is k times that of the 0.18 g of standard magnetite as described above, would have a magnetic rating (MR) of k .

4. Summary of Test Method

4.1 The unknown electromagnetic effects of a sample of asbestos-containing material is compared with those of a reference standard in a magnetic analyzer. The inductive imbalance caused by the magnetic particles in the asbestos samples is amplified and measured with the magnetic analyzer.

5. Significance and Use

5.1 This test method for the determination of magnetic rating is considered satisfactory for acceptance testing of commercial shipments of asbestos fibers, papers, felts, yarns, rovings, textile products, rigid sheet products, and granular or powdered products.

5.2 Magnetic rating is one of the measurements used for determining the suitability of an asbestos material for electrical insulation.

5.3 The electrical insulating properties of asbestos materials vary inversely with the magnetic rating. Therefore, a low magnetic iron content is required for good electrical insulating.

5.4 The types of asbestos textiles classified by magnetic rating are described in Specification **D2100**.

6. Apparatus

6.1 *Magnetic Analyzer*—Either the Mapes type analyzer or the Turner & Newall⁶ type analyzer may be used. Other analyzers using an inductance bridge and functioning on the same principles may be used if agreed upon by the interested parties.

6.1.1 The Mapes type analyzer is described in **Annex A1**.

6.1.2 The Turner & Newall⁶ type analyzer is described in **Annex A2**.

NOTE 1—The apparatus and procedure described in this revision of Test Method D1118 are preferred. The method and apparatus described in previous issues of Test Method D1118 may be used if agreed upon by the purchaser and the seller.

⁶ The apparatus known as the “Turner and Newall Magnetic Analyzer” can be purchased from Turner and Newall Ltd., Asbestos Fiber Laboratory, Trafford Park, Manchester 17, England. Detailed information on the preparation of calibration standards is available from ASTM International Headquarters, 100 Barr Harbor Drive, W. Conshohocken, PA 19428. Request Adjunct **ADJD1118**.

6.1.3 *Magnetic Analyzer Accessories*, including *specimen tube, holder, spacer rod, and stopper*.

6.1.4 *Calibration Standards*,⁶ supplied by the vendor of the magnetic analyzer, or prepared as in **A3.5.1** to **A3.5.10**.

7. Hazards

7.1 **Warning**—see .

8. Sampling, Test Specimens, and Test Units

8.1 *Sampling*:

8.1.1 *Chrysotile Fiber*—Sample chrysotile asbestos fiber in accordance with Test Method **D2590**.

8.1.2 *Amphibole Fiber*—Sample amphibole asbestos fiber in accordance with Test Method **D3879**.

8.1.3 *Asbestos Textiles*:

8.1.3.1 Refer to appropriate ASTM standards for the lot size of each type of material to be tested.

8.1.3.2 Take sufficient samples at random from each lot to prepare specimens as directed in **8.2**.

8.1.3.3 Refer to Section 11 for conditioning requirements.

8.1.4 *Papers, Scrims, Felts, and other Nonwoven Products*—Refer to appropriate ASTM standards for the lot sizes and conditioning requirements.

8.2 *Test Specimens*—Test at least five specimens per sample.

8.2.1 *Asbestos Textiles*:

8.2.1.1 *Cloth and Lap*—Sample cloth or lap products by cutting across the warp strips 73 mm in width and of sufficient length to give a mass of 15 ± 0.1 g. Roll these specimens into a scroll with an external diameter just less than 19 mm for insertion into specimen holders.

8.2.1.2 *Roving, Wick, Rope, Yarn, Thread, Tubing, and Tape*—Cut enough pieces 73 mm in length to get a mass of 15 ± 0.1 g. To adjust the mass precisely, when sample dimensions allow it, cut the last portion of piece needed lengthwise. If dimensions are too small to cut lengthwise, as in the case of a thread, cut across the length. Cord the pieces to form a cylindrical bundle with a diameter just less than 19 mm and wrap this with a sheet of paper 73 mm in width to facilitate introduction into a specimen holder.

8.2.2 *Papers, Scrims, Nonwoven Products, and Felts*—Cut across the machine direction into strips 73 mm in width and long enough to give a mass of 15 ± 0.1 g. Roll these specimens into a scroll with an external diameter just less than 19 mm for insertion into specimen holders.

8.2.3 *Granular or Powdered Products*—To 15 ± 0.1 g specimens add sufficient nonmagnetic diluents, such as those described in **A3.5.2**, to increase the bulk enough to fill the specimen holder cavity with moderate compaction. Load the diluted specimen into a sample holder in small pinches by means of a funnel, and depress to the required volume by pressing with the stopper or with a tamper. Remove the tamper and maintain the volume required by means of the stopper.

8.2.4 *Asbestos Fiber*:

8.2.4.1 Take an approximately 2-kg [4-lb] sample of asbestos as directed in Test Method **D2590** for chrysotile or Test Method **D3879** for amphibole fiber.