



Standard Specification for Asbestos Tubular Sleeving¹

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^{ε1} NOTE—Units information was corrected editorially in March 2010.

1. Scope

1.1 This specification covers woven and braided asbestos tubular sleeving having a minimum of 75 mass % of asbestos fiber, excluding the mass of other inorganic strands which may be present.

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 The following safety hazards caveat pertains only to the test methods, Section 13, described in this specification. *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 1.3.*

2. Referenced Documents

2.1 ASTM Standards:³

D76 Specification for Tensile Testing Machines for Textiles

¹ This specification 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 Available from The Asbestos Institute, Online, 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.

D123 Terminology Relating to Textiles

D299 Specification for Asbestos Yarns

D1118 Test Method for Magnetic Rating of Asbestos Fiber and Asbestos Textiles

D1682 Test Method for Breaking Load and Elongation of Textile Fabric (Withdrawn 1992)⁴

D1777 Test Method for Thickness of Textile Materials

D1910 Methods of Test for Construction Characteristics of Woven Fabrics; Replaced by D 3773, D 3774, D 3775, D 3776, D 3882, D 3883 (Withdrawn 1981)⁴

D1918 Test Method for Asbestos Content of Asbestos Textiles

D2100 Specification for Asbestos Textiles Used for Electrical Insulating Purposes

D2946 Terminology for Asbestos and Asbestos-Cement Products

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

3. Terminology

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

3.2 Definitions:

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

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

3.2.3 *sleeving, n*—in textiles, woven or braided fabric of tubular form.

4. Classification

4.1 *Classes*—The classes of asbestos tubular sleeving are based on the nature of the yarns from which they are braided or woven.

4.1.1 *Class A*—Tubular sleeving constructed of asbestos yarns containing no reinforcing strands.

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

4.1.2 *Class B*—Tubular sleeving constructed of asbestos yarns containing wire reinforcement.

4.1.3 *Class C*—Tubular sleeving constructed of asbestos yarns containing organic reinforcing strands.

4.1.4 *Class D*—Tubular sleeving constructed of asbestos yarns containing nonmetallic inorganic reinforcing strands.

4.1.5 *Class E*—Tubular sleeving constructed of two or more of the yarns used in sleeving of Classes A through D.

4.2 *Grades*—The grades of asbestos tubular sleeving are based on the mass % of asbestos content as stated in **Table 1**.

4.3 *Electrical Insulation Classification:*

4.3.1 Asbestos tubing as made for the electrical industry is furnished in three types, classified on the basis of magnetic rating determined by Test Method **D1118**, which serve to identify performance limits.

Type II—Magnetic Rating 0.75 maximum

Type IV—Magnetic Rating 2.00 maximum

Type VI—Magnetic Rating 4.00 maximum

4.3.2 *Type II* is intended only for special applications where the asbestos is of primary importance as electrical insulation used on magnet wire and when used primarily as a dielectric.

4.3.3 *Type IV* is intended for use where the asbestos is of secondary importance as electrical insulation and where it is applied in combination with other materials of comparably higher dielectric strength, as in the construction of heat and flame resistant electrical insulating walls over unit conductors of electric cables.

4.3.4 *Type VI* is intended for use where the asbestos is of minor importance as a dielectric, as in the construction of filler, or heat and flame resistant walls of electric cables, or when used as a lining for control enclosures (arc chutes) subject to exposure to electric arcs.

5. Ordering Information

5.1 The following information may be specified on the order:

5.2 *Dimensions*, including inside diameter, wall thickness, and the number of ends per bobbin.

5.3 *Materials and Manufacture*, including the number of carriers, the yarn number, and the class, grade, and type.

5.4 *Length per Unit Mass (Weight)*.

5.5 *Limits on the Number of Knots and Imperfections*.

5.6 *Braided or Woven Construction*.

5.7 *With or Without Any Surface Treatment*, such as dust suppressant or sizing treatment.

5.8 *Quantity Required*, expressed in length of tubing.

5.9 See Section **16**.

6. Materials and Manufacture

6.1 *Yarn*—Tubular asbestos sleeving shall be uniformly braided or woven from a specified grade of asbestos yarn with or without reinforcement.

6.2 *Wire Reinforcement*—The wire reinforcement may be brass, copper, zinc, nickel, nichrome, inconel, monel, or other metal or alloy as specified in the order.

6.3 *Organic Reinforcement*—The organic reinforcement may be cotton, nylon, rayon, or other spun or filament yarn(s) as specified in the order.

6.4 *Inorganic Reinforcement*—The inorganic reinforcement may be glass, or other ceramic or vitreous, spun or filament yarn(s) as specified in the order.

7. Chemical Composition

7.1 The asbestos content shall comply with the grade designation as in **Table 1**.

8. Physical Properties

8.1 Tubing for electrical insulation shall conform to Specification **D2100**.

8.2 The magnetic rating shall comply with the classification type in **4.3**.

9. Mechanical Properties

9.1 *Tensile (Breaking) Strength:*

9.1.1 *Braided Sleeving*—Tensile (breaking) strength is not a requirement.

9.1.2 *Woven Sleeving*—The tensile (breaking) strength (breaking load) of woven asbestos tubular sleeving shall be as agreed upon between the purchaser and the seller.

10. Dimensions, Mass, and Permissible Variations

10.1 *Inside Diameter*—The tolerances for the inside diameter of asbestos tubular sleeving shall be as agreed upon by the purchaser and the seller.

10.2 *Wall Thickness*—The wall thickness of asbestos tubular sleeving shall be within the following limits:

Nominal Wall Thickness, mm [in.]	Permissible Limits, mm [in.]
0.8 [$\frac{1}{32}$]	0.25 [± 0.010]
1.6 [$\frac{1}{16}$]	0.35 [± 0.015]
3.2 [$\frac{1}{8}$]	0.75 [± 0.030]

10.3 *Mass per Unit Length*—The mass of asbestos tubular sleeving shall be within $\pm 10\%$ of the specified mass.

10.4 *Fabric Count:*

10.4.1 *Woven Sleeving*—The number of warp ends per unit of length and the number of filling picks per unit of length in woven asbestos tubular sleeving shall be within $\pm 10\%$ of the specified fabric count.

10.4.2 *Braided Sleeving*—The number of picks or cross-overs per unit of length in braided asbestos tubular sleeving shall be within $\pm 10\%$ of the specified fabric count.

10.5 *Yarn Number (Cut)*—the yarn number (cut) shall be as specified and shall conform to the requirements stated in Specification **D299**.

TABLE 1 Grades of Asbestos Tubular Sleeving

Grade	Asbestos Content, mass %
Commercial	75 up to but not including 80
Underwriters	80 up to but not including 85
A	85 up to but not including 90
AA	90 up to but not including 95
AAA	95 up to but not including 99
AAAA	99 to 100 inclusive