



Designation: D 628 – 95 (Reapproved 1999)

An American National Standard

Standard Specification for Asbestos Tubular Sleeving¹

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

1.3 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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 76 Specification for Tensile Testing Machines for Textiles²
- D 123 Terminology Relating to Textiles²
- D 299 Specification for Asbestos Yarns³
- D 1118 Test Method for Magnetic Rating of Asbestos Fiber and Asbestos Textiles³
- D 1682 Test Methods for Breaking Load and Elongation of Textile Fabrics⁴
- D 1777 Method for Measuring Thickness of Textile Materials⁴
- D 1910 Test Methods for Construction Characteristics of Woven Fabrics⁵
- D 1918 Test Method for Asbestos Content of Asbestos Textiles³

¹ This specification is under the jurisdiction of ASTM Committee C-17 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 07.01.

³ Annual Book of ASTM Standards, Vol 04.05.

⁴ Discontinued, see 1991 Annual Book of ASTM Standards, Vol 07.01.

⁵ Discontinued, see 1981 Annual Book of ASTM Standards, Part 32.

D 2100 Specification for Asbestos Textiles Used for Electrical Insulating Purposes³

D 2946 Terminology Relating to Asbestos³

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods⁶

3. Terminology

3.1 For definitions of other textile terms used in this specification, refer to Terminology D 123. For asbestos terms, refer to Terminology D 2946.

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.

4.1.2 *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 D 1118, which serve to identify performance limits.

⁶ Annual Book of ASTM Standards, Vol 14.02.



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

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 D 2100.

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 D 299.

11. Sampling

11.1 Divide the material to be tested into lots as specified in Table 2. From each lot, take a lot sample of three rolls or spools randomly selected. Cut one specimen of at least 1 m (1 yd) from each roll or spool in the lot sample.

12. Specimen Preparation

12.1 Condition all specimens (without preconditioning) for a minimum of 4 h, or until the specimen shows no progressive change in mass of more than 0.1 % after an exposure of 0.5 h, in an atmosphere having a relative humidity of $50 \pm 2\%$ at $21 \pm 1^\circ\text{C}$.

TABLE 2 Lot Sizes for Sampling

Inside Diameter		Lot (or fraction thereof)	
mm	(in.)	kg	(lb)
13 and under	(0.5 and under)	50	(100)
over 13 to 25	(over 0.5 to 1)	150	(300)
over 25 to 150	(over 1 to 6)	300	(600)
over 150	(over 6)	500	(1000)

