Designation: C875 – 98 (Reapproved 2014)

Standard Specification for Asbestos-Cement Conduit[1]

This standard is issued under the fixed designation C875; 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 specification covers asbestos-cement conduit for use in electric-power systems and communication systems. The service is for both underground and exposed conditions.

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

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 chrysoltile 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.* See 1.3 for specific hazard warning.

2. Referenced Documents

2.1 *ASTM Standards:*[3]
C150 Specification for Portland Cement
C458 Test Method for Organic Fiber Content of Asbestos-Cement Products
C500 Test Methods for Asbestos-Cement Pipe
C595 Specification for Blended Hydraulic Cements
C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
D2946 Terminology for Asbestos and Asbestos–Cement Products

2.2 *Military Standard:*
MIL-STD-129 Marking for Shipment and Storage[4]

2.3 *Federal Standard:*
Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[4]

2.4 *Other Standards:*
Uniform Freight Classification Rules[5]
National Motor Freight Classification Rules[6]
AIA, RCP2, Asbestos-Cement Products

3. Terminology

3.1 *Definitions:*

3.1.1 *conduit, n*—asbestos-cement pipe used to protect wires for electric-power or communication systems, for both underground and exposed situations.

3.1.2 *coupling*—component made from a larger diameter pipe of the same type or Type II and of the same class or a higher class, or produced otherwise to yield at least equal performance, for joining asbestos-cement pipe that when properly installed, forms a silt-tight joint, allows alignment corrections and slight changes in direction, and provides an assembled joint equivalent in serviceability and strength to the pipe sections.

3.1.3 *fittings*—fittings such as adapters, reducers, increasers, bends, and bell ends, for use in laying asbestos-cement conduit as described in Section 5 and made to such dimensions as will provide equivalent strength and silt-tight joints when assembled with the conduit.

3.1.4 *lot*—a lot as used herein is defined as each 1000 lengths of conduit or less, of a given class, type, and size manufactured on one machine during a 24-h period.

3.2 Additional terminology is given in Terminology D2946.

4. Classification

4.1 The classes of conduit shall be as follows:

[1] This specification is under the jurisdiction of ASTM Committee C17 on Fiber-Reinforced Cement Products and is the direct responsibility of C17.03 on Asbestos - Cement Sheet Products and Accessories.

Current edition approved Dec. 1, 2014. Published December 2014. Originally approved in 1977. Last previous edition approved in 2008 as C875 – 98(2008). DOI: 10.1520/C0875-98R14.

[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] Available from Standardization Documents Order Desk, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

[5] Available from the Uniform Classification Commission, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.

[6] Available from National Motor Freight Inc., 1616 P St. NW, Washington, DC 20036.

Class B—Intended for use encased in concrete after installation.

Class C—Intended for use without concrete encasement, or for exposed services.

4.2 The types of conduit shall be known as Type I and Type II corresponding to the chemical requirements given in Section 6 of this specification. For a more thorough understanding and as a guide to the chemical resistance of asbestos-cement conduit, reference is made to Test Methods C500.

NOTE 1—To assist the purchaser in choosing the type of conduit most suitable for his use, the following descriptions of usage may be considered:

Type I—For use where nonaggressive water and soil of moderate sulphate content are expected to come in contact with the conduit.

Type II—For use where moderately aggressive water or water and soil of high sulphate content, or both, are expected to come in contact with the conduit.

4.3 The conduit shall be furnished in 40, 50, 75, 100, and 150 mm (1.5, 2, 3, 4, 5, and 6-in.) nominal sizes and shall have a circular cross section.

5. Materials and Manufacture

5.1 Asbestos-cement conduit shall be composed of an intimate mixture of portland cement conforming to Specification C150, or portland slag or pozzolan cements conforming to Specification C595, and asbestos fiber with or without finely divided silica or silica-containing mineral additives conforming to Specification C618 that can react to form calcium silicate reaction products; and asbestos fiber. The mixture shall not contain more than 0.2 % of non-deleterious organic components as determined by Test Method C458. The material shall be of laminar construction formed under pressure to a homogeneous structure and cured to meet the physical and chemical requirements of this specification.

6. Chemical Composition

6.1 When tested in accordance with Test Methods C500, the amount of uncombined calcium hydroxide shall not exceed 1.0 % for Type II conduit 2—There are no chemical requirements for Type I conduit.

7. Mechanical Properties

7.1 *Flexural Strength:*

7.1.1 Each 3 or 4-m (10 or 13-ft) standard length and each 2.9 m (9.5 ft) or longer random length conduit shall have sufficient flexural strength to withstand, without failure, the total load prescribed in Table 1, when tested in accordance with 7.1.1.1.

7.1.1.1 The specimen shall be mounted longitudinally on "V" blocks, preferably of hard wood or of steel, 5 cm (2 in.) long, 2 rad (120°) angle of "V," faces 13 × 5 cm (5 × 2 in.), and the load applied through a rectangular block, 5 cm (2 in.) in width, at the center of the span. The spans between the faces of supporting blocks shall be as given in Table 1 for the particular class of conduit. The breaking loads, the average of at least two specimens from each length, shall not be less than those given in Table 1 for the particular class of conduit.

7.2 *Crushing Strength*—Crushing tests shall be conducted before shipment. Thirty-centimetre (1-ft) lengths of conduit cut from the unmachined portion of the conduit shall have the minimum crushing strength prescribed in Table 2, when tested in accordance with Test Methods C500.

8. Dimensions, Mass, and Permissible Variations

8.1 The average inside diameter measured at the end of the conduit shall be ±3 mm (±0.1 in.) of the nominal inside diameter.

8.2 The bore of the conduit shall pass freely through a mandrel 1 m (3 ft) long and 6 mm (0.25 in.) less in diameter than the nominal inside diameter of the conduit.

8.3 The inner dimensions of the bends shall be such that a ball 1 cm (0.4 in.) less in diameter than the nominal inside diameter of the conduit, shall pass freely through them.

8.4 Couplings and coupling areas of the conduit shall be machined or otherwise finished to such dimensions as will provide silt-tight joints when assembled with proper accessories and put into the service for which the conduit is intended.

8.5 The standard lengths of conduit shall be 1.5, 2, 3, or 4 m ± 2.5 cm (5, 6.5, 10, or 13 ft ± 1 in.). At least 85 % of the total length of any one class, type, and size shall be furnished in standard lengths. The remaining 15 % may be in random lengths if not less than 1.5 m (5 ft) for standard 3 and 4-m (10 and 13-ft) lengths, or less than 1 m (3 ft) for standard 2 and 1.5-m (6.5 and 5 ft) lengths.

9. Workmanship, Finish, and Appearance

9.1 Machined ends of the conduit that receive the coupling shall be free of dents and gouges that will affect the silt-tightness of the joint.

9.2 Each conduit shall be free of bulges, dents, and tears on the inside surface that result in a variation of more than 5 mm (0.2 in.) from the adjacent unaffected portions of the surface.

TABLE 1 Flexural Strength Requirements

Nominal Inner Diameter		Test Span (Free Span)		Class B Applied Test Load		Class C Applied Test Load	
mm	(in.)	mm	(in.)	kN	(lbf)	kN	(lbf)
40	(1.5)	760	(30)	2.7	(600)	3.8	(850)
50	(2)	760	(30)	2.7	(600)	3.8	(850)
75	(3)	762	(30)	2.7	(600)	3.8	(850)
100	(4)	762	(30)	4.4	(980)	5.6	(1260)
130	(5)	1219	(48)	4.9	(1100)	6.7	(1500)
150	(6)	1372	(54)	5.8	(1300)	8.9	(2000)

TABLE 2 Crushing Strength Requirements

Nominal Diameter		Minimum Crushing Loads			
mm	(in.)	Class B		Class C	
		kN	(lbf)	kN	(lbf)
40	(1.5)	2.2	500	5.3	1200
50	(2)	2.2	500	5.3	1200
75	(3)	2.2	500	5.3	1200
100	(4)	2.2	500	5.3	1200
130	(5)	2.2	500	4.0	900
150	(6)	2.2	500	3.6	800

9.3 All inside edges of the conduit shall be rounded and smooth. The ends of each length of conduit shall be at right angles to the axis of the conduit.

10. Sampling

10.1 Test all material under this specification in a normal air-dried condition in equilibrium with atmospheric humidity.

10.2 For the flexural test, two specimens shall be cut from one full length of conduit from each lot.

10.2.1 **Warning**—see 1.3.

10.3 For the crushing test, two specimens shall be cut from one full length of conduit from each lot.

10.4 When uncombined calcium hydroxide tests are requested (Section 6), one sample shall be taken from each lot of conduit. The sample to be tested may be taken from any one of the specimens selected for the crushing test.

11. Inspection

11.1 All material furnished under this specification shall conform to the physical and chemical requirements stated herein and may be subject to factory inspection by the purchaser. All conduit shall be inspected by the manufacturer for compliance to dimensional tolerances and workmanship. The manufacturer shall accept to certify that his product conforms to the requirements of this specification.

11.2 On orders requiring inspection by the purchaser, the manufacturer shall arrange the time of testing so that the purchaser or his authorized inspector may be present to witness such tests at the purchaser's expense. The conduit to be tested will already have passed the routine inspection and testing of this specification. The number of tests to be conducted for flexural strength and crushing strength shall be limited to a maximum of one sample per each 1000 standard lengths of each size, type, and class of conduit on the order. If uncombined calcium hydroxide tests are required, the numbers of tests shall be one for each size, type, and class of pipe on the order. The purchaser or his authorized inspector may select the conduit to be tested.

12. Rejection and Rehearing

12.1 Failure of any specimen tested for flexural and crushing strength to withstand 75 % of the load specified in Section 7 shall be cause for rejection of the lot from which the test specimen was taken. When any specimen tested for flexural or crushing strength withstands over 75 % but under 100 % of the load specified in Section 7, one specimen shall be cut from each of two additional conduits of the same lot. Failure of either of these additional specimens to meet the strength requirements of Section 7 shall be cause for rejection of the entire lot from which the original sample was taken.

12.2 If the results of the uncombined calcium hydroxide test show the sample failed to meet the specification requirements, two additional specimens shall be selected and sampled for test. The failure of one of these two additional samples to meet the specification requirements of Section 6 shall be cause for rejection of the lot.

13. Product Marking

13.1 Each standard and random length of conduit shall be marked by the manufacturer with the trade name, nominal size, type, class, and the date of manufacture, in alkali resistant ink or indelible paint. Each carton containing coupling sleeves shall be marked by the manufacturer with the nominal size, type, and class for the conduit with which it shall be used.

14. Packaging

14.1 Conduit and couplings shall be prepared for commercial shipment so as to ensure acceptance by common or other carriers.

14.2 Refer also to S1.1.

15. Keywords

15.1 asbestos; asbestos-cement; conduit; specification

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply when material is supplied under this specification for U.S. Government procurement.

S1. Packaging for U.S. Government

S1.1 Unless otherwise specified in the contract, the material shall be packaged in accordance with the producer's standard practice which will be acceptable to the carrier at lowest rates. Containers and packing shall comply with Uniform Freight Classification Rules or National Motor Freight Classification Rules. Marking for shipment of such material shall be in accordance with Fed. Std. No. 123 for civil agencies and MIL-STD-129 for military agencies.

S2. Responsibility for Inspection

S2.1 Unless otherwise specified in the contract or pur-chase order, the producer is responsible for the testing of all material to assure compliance with the requirements specified herein. Except as otherwise specified in the contract or order, the producer may use his own or any other suitable facilities for the performance of the inspection and test requirements specified herein, unless disapproved by the purchaser. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification where such inspections are deemed necessary to assure that material conforms to pre-scribed requirements.