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Designation: C296/C296M – 00(Reapproved 2009)ε1

Standard Specification for Asbestos-Cement Pressure Pipe[1]

This standard is issued under the fixed designation C296/C296M; 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—Units information was corrected editorially in March 2010.

1. Scope

1.1 This specification covers asbestos-cement pressure pipe for use in supply lines and distribution systems that carry water under pressure. The specification also covers asbestos-cement pressure pipe for use in sewer force mains which carry sewage under pressure.

1.2 The text of this standard references notes and footnotes which provide explanatory material. Those notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.3 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.

1.4 **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: A Manual on Preventive and Control Measures."[2]

1.5 *This standard does not purport to address all of the safety problems, 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:*[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
D1869 Specification for Rubber Rings for Asbestos-Cement Pipe
D2946 Terminology for Asbestos and Asbestos–Cement Products

2.2 *Federal Standard:*

Fed. Std. No. 123 Marking for Domestic Shipment (Civilian Agencies)[4]

2.3 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage[4]

2.4 *Other Documents:*

AWWA C401 Standard Practice for the Selection of Asbestos-Cement Water Pipe[5]
Uniform Freight Classification Rules[6]
Motor Freight Classification Rules[7]

3. Terminology

3.1 *Definitions:*

[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 Nov. 1, 2009. Published March 2010. Originally approved in 1952. Last previous edition approved in 2004 as C296 – 00(2004) ε1. DOI: 10.1520/C0296_C0296M-00R09E01.

[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 American Water Works Association, 6666 West Quincey Avenue, Denver, CO 80235.

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

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

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3.1.1 *coupling*—section for joining asbestos-cement pipe that, when properly installed with the proper accessories, develops a joint equivalent in strength and serviceability to the pipe sections.

3.1.2 *lot*—for pipe sizes 525 mm [21 in.] in diameter and smaller, each 300 lengths of pipe or less, of identical class and size manufactured on each machine during a 24-h period. For pipe larger than 525 mm [21 in.] each 300 lengths of pipe or less, of identical class and size manufactured on each machine during a period of consecutive working days not exceeding seven days.

3.2 Definitions for the following terms are presented in Terminology D2946: accessories, crushing strength, cure, flexural strength (in pipes), free lime, hydrostatic strength, organic fiber content, purchaser, silica, supplier, and uncombined calcium.

4. Classification

4.1 Asbestos-cement pipe furnished under this specification shall conform to Classes 100, 150, and 200. These nominal designations in psi are equivalent to nominal SI units of 7, 10, and 14 kPa, respectively.

NOTE 1—The purchaser shall determine the proper class of pipe to be used under the installation and operation conditions anticipated. For this purpose refer to Standard Practice AWWA C401 – 83.

4.2 The types of pipe shall be known as Type I and Type II corresponding to the chemical requirements in Section 10 of this specification.

NOTE 2—To assist the purchaser in choosing the type of pipe most suitable for his use, guidelines for the definition of aggressiveness of water and of soil environments for selection of the proper type of asbestos-cement pipe are covered in Test Methods C500.

5. Materials and Manufacture

5.1 Asbestos-cement pressure pipe shall be composed of an intimate mixture of portland cement conforming to Specification C150, or portland slag cement or pozzolan cement conforming to Specification C595, and asbestos fiber, with or without finely divided silica or minerals containing such silica conforming to Specification C618, that is capable of reacting during autoclaving to form calcium silicate reaction products in the ratio of cement:silica equal to 3:2. The mixture shall contain no more than 0.2 % of nondeleterious organic additives 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. Rubber Rings

6.1 The rubber rings used to seal the joints of the asbestos-cement pipe shall conform to the requirements of Specification D1869.

7. Hydrostatic Strength

7.1 Each standard, random or short length of pipe (Section 12) and each coupling sleeve shall be hydrostatically tested by the manufacturer prior to shipment and shall have sufficient strength to withstand the internal hydrostatic pressure prescribed in Table 1, when tested in accordance with Test Methods C500.

7.2 From each lot which has passed the routine hydrostatic proof test, one length shall be selected by the inspector. Each selected length shall be hydrostatically tested in accordance with Test Methods C500 to a pressure of four times the rated working pressure for the class of pipe, maintaining such pressure for not less than 5 s. In case of failure under pressure, refer to 15.5. Each pipe so tested shall be retested in accordance with 7.1 of this specification.

8. Flexural Strength

8.1 Each length of pipe in sizes 100, 150, and 200 mm [4, 6, and 8 in.] shall have sufficient flexural strength to withstand, without failure, the total load prescribed in Table 2, when tested in accordance with Test Methods C500. In case of failure under load, refer to 15.4.

9. Crushing Strength

9.1 When specifically requested by the purchaser in his order, crushing tests shall be conducted before shipment at the purchaser's expense. A 30-cm [1-ft] length of pipe for each lot cut from an unmachined portion of the pipe shall have sufficient strength to resist the minimum crushing load prescribed in Table 3, when tested in accordance with Test Methods C500.

9.2 In case of failure under the crushing load, refer to 15.4.

10. Chemical Requirements

10.1 When uncombined calcium hydroxide tests are requested, one sample shall be taken from each lot of pipe and tested in accordance with Test Methods C500. The sample to be tested shall be taken from one of the specimens selected for the crushing test. The amount of uncombined calcium hydroxide shall not exceed 1.0 % for Type II pipe.

NOTE 3—There are no chemical requirements for Type I pipe.

10.2 In case a specimen fails to meet the 1 % limit, refer to 15.6.

11. Sampling

11.1 All pipe and couplings tested under this specification shall be in a normal air-dried condition in equilibrium with atmospheric moisture.

12. Sizes and Dimensions

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

TABLE 1 Applied Hydrostatic Proof Pressures

Class [nominal psi]	Applied Pressure MPa	[psi]
100	2.4	[350]
150	3.6	[525]
200	4.8	[700]

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