Designation: C 663 – 98 (Reapproved 2003)ε1

# Standard Specification for Asbestos-Cement Storm Drain Pipe[1]

This standard is issued under the fixed designation C 663; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

ε[1] NOTE—Warning notes were editorially moved into the standard text in July 2003.

## 1. Scope

1.1 This specification covers asbestos-cement pipe intended for use in storm-water drainage of highways, airports, farms, foundations, and other similar drainage systems.

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

1.3 *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 7.2 for a specific hazard statement.

## 2. Referenced Documents

2.1 *ASTM Standards:*

C 150 Specification for Portland Cement[2]

C 458 Test Method for Organic Fiber Content of Asbestos-Cement Products[3]

C 500 Test Methods for Asbestos-Cement Pipe[3]

C 595 Specification for Blended Hydraulic Cements[2]

D 2946 Terminology for Asbestos and Asbestos-Cement Products[3]

2.2 *Federal Standard:*

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

2.3 *Military Standard:*

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

2.4 *Other Standards:*

Uniform Freight Classification Rules[5]

National Motor Freight Classification Rules[6]

## 3. Terminology

3.1 *Definitions:*

3.1.1 *coupling, n—in asbestos-cement conduit, sewer, underdrain and storm drain pipe*—component made from a larger diameter pipe of the same type or class, or of Type II and 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. Alternatively, for storm drain couplings, plastic sleeves that, when properly installed develop sufficient tightness to prevent the surrounding soil from entering the drain, may be used as couplings.

3.1.2 *lot, n*—for pipe sizes 525 mm (21 in.) in diameter and smaller, each 300 lengths of pipe or less, of identical class and sized 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.

3.1.3 Additional terminology is given in Terminology D 2946.

## 4. Classification

4.1 The types of pipe shall be shown as Type I and Type II corresponding to the chemical requirements given in 10.1.

4.2 Asbestos-cement storm drain pipe furnished under this specification shall be designated as Class II, III, 2500D, IV, and V. The corresponding strength requirements are prescribed in Table 1. The $D_1$ load is the crushing test load expressed in

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

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[2] *Annual Book of ASTM Standards*, Vol 04.01.

[3] *Annual Book of ASTM Standards*, Vol 04.05.

[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.

**TABLE 1 Minimum Crushing Loads**

| Pipe Class | Minimum Crushing Load | |
|---|---|---|
| | $D_1$ Load kN/m | (D Load) (lbf/ft) |
| II | 22 | (1500) |
| III | 29 | (2000) |
| 2500 D | 37 | (2500) |
| IV | 44 | (3000) |
| V | 55 | (3750) |

newtons per linear metre per of diameter. (The D load is the crushing test load expressed in pounds-force per linear ft per ft of diameter.) The pipe shall be furnished in 10, 15, 20, 25, 30, 36, 38, 41, 46, 51, 53, 61, 69, 76, 84, 91, 99 and 107-cm sizes (4, 6, 8, 10, 12, 14, 15, 16, 18, 20, 21, 24, 27, 30, 33, 36, 39 and 42-in. sizes).

## 5. Materials and Manufacture

5.1 Asbestos-cement storm drain pipe shall be composed of an intimate mixture of portland cement or portland blast-furnace slag cement meeting Specification C 150 or portland slag or pozzolan cements conforming to Specification C 595. The mixture shall not contain more than 0.2 % of non-deleterious organic components as determined by Test Method C 458. 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. Dimensions, Mass, and Permissible Variations

6.1 The nominal length for asbestos-cement storm drain pipe shall be either 3 or 4 m (10 or 13 ft). A maximum of 15 % of the total footage of any one size and type for any order may be furnished, at the manufacturer's option, in pipe lengths shorter than specified nominal, but not shorter than 2 m (7 ft); these shall be termed random lengths.

6.2 A tolerance of 25 mm (±1 in.) shall apply to nominal standard lengths. Random lengths shall be classified to 150 mm (+ 150–25 mm) [6 in. (+ 4.9–1.0 in.)] increments, allowing a tolerance of 124 mm (+ 4⅞ in.) and −1 in.

6.3 The average inside diameter of the pipe may be less than the nominal size by not more than 6 mm (0.25 in.) or 1½ %, whichever is greater.

## 7. Sampling

7.1 All material tested under this specification shall be in air-dried condition in equilibrium with atmospheric moisture.

7.2 For crushing tests, select one full length of pipe from each lot of each size, class, and type of pipe. Cut one test specimen 30 cm (12 in.) long from the unmachined portion of the selected length of pipe. (**Warning**—In addition to other precautions, when cutting asbestos-cement products minimize the dust that results. Prolonged or frequent breathing of significant airborne concentrations of silica or asbestos dust is hazardous. When such dusts are generated, effective measures shall be taken to prevent inhalation. Refer to approved techniques.[7])

7.3 When uncombined calcium hydroxide tests are requested (10.1), take one sample from each lot of pipe and test in accordance with Test Methods C 500. The sample to be tested may be taken from any one of the specimens selected for the crushing test.

## 8. Couplings

8.1 Each standard, short, or random length of pipe shall be provided with a coupling for the purpose of maintaining alignment and to ensure close joints.

## 9. Fittings

9.1 Asbestos-cement storm drain pipe fittings shall be suitable in size, crushing strength, and design for the pipe with which they will be furnished.

## 10. Test Methods

10.1 *Chemical Requirements*—When tested in accordance with Test Methods C 500, the amount of uncombined calcium hydroxide shall not exceed 1.0 % for Type II pipe.

NOTE 1—There are no chemical requirements for Type I pipe.

10.2 *Crushing Strength*—Conduct crushing tests before shipment. Lengths of pipe 30 cm (1 ft) long cut from unmachined portions of the pipe shall have the minimum crushing strength prescribed in Table 1 when tested in accordance with the appropriate section of Test Methods C 500, Vee Shaped Three Edge Bearing Method.

## 11. Inspection

11.1 All material furnished under this specification shall conform to the requirements stated herein and shall be subjected to the factory inspection and tests prescribed in this specification. When requested by the purchaser in his order (see Appendix X1), the manufacturer shall notify the purchaser of the time that the inspection and testing will take place so that the purchaser may arrange for witnessing such tests and inspections at his own expense. Instead of such inspection, when requested, the manufacturer shall certify that his product conforms to the requirements of this specification.

11.2 Each pipe shall be inspected by the manufacturer before shipment for compliance with the standards for dimensions, tolerances, workmanship, and finish (see also Section 7).

## 12. Rejection

12.1 Failure of any specimen tested for crushing strength to withstand 75 % of the load specified in 10.2 shall be cause for rejection of the lot from which the test specimen was taken. When any specimen tested for crushing strength withstands over 75 % but under 100 % of the load specified in 10.2, one specimen shall be cut from each of two additional pipes of the same lot. Failure of either of these additional specimens to meet the strength requirements of 10.2 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 that the sample failed to meet the specification requirements, two additional specimens shall be selected and sampled for each test. The failure of one of these two additional samples

[7] Available from Asbestos Information Association, 1745 Jefferson Davis Highway, Crystal Square 4, Suite 509, Arlington, VA 22202.

to meet the specification requirements of 10.1 shall be cause for rejection of the lot.

## 13. Product Marking and Shipping

13.1 Each standard and random length of pipe shall be marked by the manufacturer with the trade name, nominal size, class, and the date of manufacture, in alkali resistant ink or indelible paint.

13.2 Couplings and fittings shall be marked with the size and class.

13.3 Pipe, couplings, and fittings shall be prepared for commercial shipment so as to ensure acceptance by common or other carriers.

## 14. Keywords

14.1 asbestos; asbestos-cement; asbestos-cement pipe; drain; drain pipe; storm drain pipe

## SUPPLEMENTARY REQUIREMENTS

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

## S1. Packaging

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 packaging 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 purchase 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 prescribed requirements.

## APPENDIX

**(Nonmandatory Information)**

## X1. ADDITIONAL ORDERING INFORMATION

X1.1 It is suggested to the purchaser, without being made a part of this specification, that the purchaser may request inclusion of the following information in his order or agreement for purchase of the pipe:

X1.1.1 Any tests, in addition to those prescribed by this specification, as the special circumstances may require,

X1.1.2 The place or places where any additional tests are to be made,

X1.1.3 Description of the additional testing facilities,

X1.1.4 Who shall bear the expense of such additional tests.

X1.1.5 Whether such additional tests may be made by any sound sampling process or other method approved by the parties.