



Designation: C 1450/C 1450M – 02

Standard Specification for Non-Asbestos Fiber-Cement Storm Drain Pipe¹

This standard is issued under the fixed designation C 1450/C 1450M; 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 non-asbestos fiber-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 either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

NOTE 1—Experience has shown that the successful performance of this product depends upon the proper selection of the pipe strength, the type of bedding and backfill, care that the installation conforms to the construction specifications, and provision for adequate inspection at the construction site. This specification does not include requirements for bedding, backfill, the relationship between field load conditions and the strength designation of the pipe, or durability. These requirements should be included in the project specification.

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.*

2. Referenced Documents

2.1 ASTM Standards:

C 150 Specification for Portland Cement²

C 497 Test Methods for Concrete Pipe, Manhole Sections, or Tile³

C 500 Test Methods for Asbestos-Cement Pipe³

C 595 Specification for Blended Hydraulic Cements²

C 1154 Terminology for Non-Asbestos Fiber-Reinforced Cement Products³

2.2 Federal Standard:

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

2.3 Military Standard:

MIL-STD-129 Marking for Shipment and Storage⁵

2.4 Other Standards:

Uniform Freight Classification Rules⁵

National Motor Freight Classification Rules⁶

3. Terminology

3.1 *Definitions*—Refer to Terminology C 1154.

3.1.1 *coupling, n*—in fiber-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 fiber-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 21 in. [525 mm] 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 21 in. [525 mm], 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.

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 Fiber-cement storm drain pipe furnished under this specification shall be designated as Class I, II, III, IV, and V. The corresponding strength requirements are prescribed in

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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 19111-5904 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.

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Table 1. The D load is the saturated crushing test load expressed in pounds-force per linear foot per foot of diameter. [The D1 load is the saturated crushing test load expressed in Newtons per linear metre per millimetre of diameter.] The pipe shall be furnished in 4, 6, 8, 10, 12, 15, 18, 21, 24, 27, 30, 33, 36, 42 and 48-in. [100, 150, 200, 250, 300, 375, 450, 525, 600, 675, 750, 825, 900, 1050 and 1200-mm] sizes.

4.3 When requested by the owner, the manufacturer shall provide the owner the relationship between the short-term crush load required to achieve long-term design loads with supporting estimates of service life using recognized calculation methods.

5. Composition and Manufacture

5.1 *Composition*—Fiber-cement drain pipes shall be composed of an intimate mixture of an inorganic hydraulic binder (see Specification C 150) or a calcium silicate binder (see Specification C 595) formed by the chemical reaction of a siliceous material and a calcareous material reinforced by organic fibers, inorganic non-asbestos fibers, or both. Process aids, fillers, and pigments which are compatible with fiber-reinforced cement are not prohibited from being added.

5.1.1 The manufacturer shall state the type of fiber used in the pipe, and, where requested, provide the owner with documented evidence that the fibers employed are compatible with other materials of that manufacturer.

5.2 *Manufacture*—The material shall be of laminar construction formed under pressure to be a homogeneous structure, and cured either under natural or accelerated conditions, to meet the physical requirements of this specification.

6. Dimensions, Mass, and Tolerances

6.1 The nominal length for fiber-cement storm drain pipe shall be either 10, 13 or 16 ft [3, 4 or 5 m]. Furnish a maximum of 15 % of the total footage of any one size and type for any order, at the manufacturer's option, in pipe lengths shorter than the specified nominal, but not shorter than 7 ft [2 m]; these shall be termed random lengths.

6.2 The underrun in length of a section of pipe shall not be more than 1/8 in./ft [10 mm/m] with a maximum of 1/2 in. [12.7 mm] in length in any pipe.

6.3 The average inside diameter shall not be less than the nominal size by more than 0.25 in. [6 mm] or 1 1/2 % of the nominal size, whichever is greater in value.

6.4 The manufacturer shall state the minimum wall dimensions of the product it produces that complies with the minimum crush loads presented in Table 1.

7. Sampling

7.1 All material tested under this specification shall be tested in the saturated condition after immersion in water at an

ambient temperature above 41°F [5°C] for a period of 21 to 28 days immediately prior to testing.

7.1.1 Employ sampling procedures providing an acceptable quality level (AQL) of 6.5 % at a 90 % confidence level, except where specific sampling is required by particular test procedures.

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 12 in. [300 mm] long from the unmachined portion of the selected pipe length. (**Warning**—In addition to other precautions, when cutting fiber-cement products minimize the dust that results. Prolonged breathing or frequent breathing of significant airborne concentrations of silica is hazardous. When such dust is generated, effective measures shall be taken to prevent inhalation.)

NOTE 2—When sampling from continuous production, these tests may be conducted on dry, equilibrium, or saturated specimens, provided a relationship can be established between this testing and the specified values.

7.3 When uncombined calcium hydroxide tests are required (10.1), take one sample from each lot 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 or joint for the purpose of maintaining alignment and to ensure close joints.

8.2 Joints shall be of a design, and the ends of the pipe sections so formed, that when the sections are laid together they will make a continuous line of pipe with a smooth interior free of appreciable irregularities in the flow line and all will be compatible with the tolerances given in Section 6.

9. Fittings

9.1 Fiber-cement storm drain pipe fittings shall be suitable in size, crush 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 the Type II pipe.

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

10.2 *Crushing Strength*—Conduct crushing tests before shipment. 12 in. [300 mm] lengths of pipe 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 497.

11. Inspection

11.1 All material furnished under this specification shall conform to the requirements stated herein and shall be subjected to factory inspection and tests prescribed in this specification. When specified in the purchase order (see Appendix X1), the manufacturer shall notify the purchaser of the time

TABLE 1 Minimum Crushing Load

Pipe Class	D Load lb/ft/ft	D1 Load N/m/mm
I	1200	60
II	1500	75
III	2000	100
IV	3000	150
V	3750	175