

American Water Works Association
ANSI/AWWA C400-93
(Revision of ANSI/AWWA C400-80[R86])



AWWA STANDARD
FOR
ASBESTOS-CEMENT PRESSURE PIPE,
4 IN. THROUGH 16 IN.
(100 mm THROUGH 400 mm),
FOR WATER DISTRIBUTION SYSTEMS



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AMERICAN WATER WORKS ASSOCIATION

6666 West Quincy Avenue, Denver, Colorado 80235

AWWA Standard

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Foreword

This foreword is for information only and is not a part of AWWA C400.

I. Introduction.

I.A. Background. Asbestos-cement pipe was originally introduced into the North American market in 1931. At that time, asbestos-cement (an intimate mixture of portland cement and asbestos fibers) was a relatively new pipe material. Experience with asbestos-cement pipe was limited to only a few years at installations in several European countries, particularly Italy. During the years following its North American introduction, a record of successful experience was established in the United States and other North American countries, as well as in Europe. In 1949 AWWA established a standards committee to develop a standard for asbestos-cement pressure pipe.

I.B. History of Standard. The original AWWA committee developed a standard designated AWWA C400-53T, Tentative Standard for Asbestos-Cement Water Pipe, which was approved by the AWWA Board of Directors on May 15, 1953. By 1958 the need for a revision of the tentative standard became apparent and the committee was reactivated as Committee 8340D on Asbestos-Cement Pipe. This committee produced a revised tentative standard adopted by AWWA as AWWA C400-64T, Tentative Standard Specification/Tentative Standard for Asbestos-Cement Pipe on Jan. 27, 1964. This edition was advanced to standard without revision under the designation AWWA C400-65, Standard for Asbestos-Cement Water Pipe on July 2, 1965.

In 1968 the committee was reactivated as the Standards Committee on Asbestos-Cement Pipe to review and revise all AWWA standards on asbestos-cement pipe. The committee produced a revised standard designated AWWA C400-72, Standard for Asbestos-Cement Pressure Pipe for Water and Other Liquids, which was approved on Jan. 31, 1972.

During 1972 and 1973 the committee was reorganized and enlarged to include representation of national organizations having an interest in the scope of the committee and wishing to participate in the work. The reorganized committee reaffirmed AWWA C400-72 without revision so that it could be presented to the American National Standards Institute for designation as an American National Standard. The reaffirmed standard was republished as AWWA C400-73 under the same title.

In 1975 the committee produced a revised standard designated AWWA C400-75, Standard for Asbestos-Cement Pressure Pipe, 4 In. Through 24 In., for Water and Other Liquids, which was approved on Jan. 26, 1975. During the same period, the committee produced a new standard designated AWWA C402-75, Asbestos-Cement Transmission Pipe, 18 In. Through 42 In., for Water and Other Liquids.

Because pipe sizes covered by AWWA C400-75 and AWWA C402-75 overlapped, a new edition designated AWWA C400-77, Standard for Asbestos-Cement Distribution Pipe, 4 In. Through 16 In., for Water and Other Liquids, was published in 1977.

The next edition, designated AWWA C400-80, Standard for Asbestos-Cement Distribution Pipe, 4 In. Through 16 In. (100 mm Through 400 mm) NPS, for Water and Other Liquids, was published in 1980. This edition added a reference to ASTM C500-77, "Testing Asbestos-Cement Pipe," and included an appendix on dimensional requirements for fittings. The 1980 edition was reaffirmed without revision in 1986.

I.C. Acceptance. In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF International (NSF) to develop voluntary third-party consensus standards and a certification program for all direct and indirect drinking water additives. Other members of the consortium included the American Water Works Association Research Foundation (AWWARF), the Conference of State Health and Environmental Managers (COSHEM), the American Water Works Association (AWWA), and the Association of State Drinking Water Administrators (ASDWA). The consortium is responsible for the cooperative effort of manufacturers, regulators, product users, and other interested parties that develop and maintain the NSF standards.

In the United States, authority to regulate products for use in, or in contact with, drinking water rests with individual states.* Local agencies may choose to impose requirements more stringent than those required by the state. To evaluate the health effects of products and drinking water additives from such products, state and local agencies may use various references, including

1. An advisory program formerly administered by USEPA, Office of Drinking Water, discontinued on Apr. 7, 1990.
2. Specific policies of the state or local agency.
3. Two standards developed under the direction of NSF, ANSI†/NSF‡ 60, Drinking Water Treatment Chemicals—Health Effects, and ANSI/NSF 61, Drinking Water System Components—Health Effects.
4. Other references, including AWWA standards, *Food Chemicals Codex*, *Water Chemicals Codex*,§ and other standards considered appropriate by the state or local agency.

Various certification organizations may be involved in certifying products in accordance with ANSI/NSF 61. Individual states or local agencies have authority to accept or accredit certification organizations within their jurisdiction. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

Appendix A, "Toxicology Review and Evaluation Procedures," to ANSI/NSF 61 does not stipulate a maximum allowable level (MAL) of a contaminant for substances not regulated by a USEPA final maximum contaminant level (MCL). The MALs of an unspecified list of "unregulated contaminants" are based on toxicity testing guidelines (noncarcinogens) and risk characterization methodology (carcinogens). Use of Appendix A procedures may not always be identical, depending on the certifier.

*Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction.

†American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

‡NSF International, 3475 Plymouth Rd., Ann Arbor, MI 48106.

§Both publications available from National Academy of Sciences, 2102 Constitution Ave. N.W., Washington, DC 20418.

AWWA C400-93 does not address additives requirements. Thus, users of this standard should consult the appropriate state or local agency having jurisdiction in order to

1. Determine additives requirements including applicable standards.
2. Determine the status of certifications by all parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues

II.A. General. When specifying pipe manufactured according to this standard, it is recommended that the purchaser or the purchaser's authorized agent refer to ANSI/AWWA C401, Standard Practice for the Selection of Asbestos-Cement Distribution Pipe, 4 In. Through 16 In. (100 mm Through 400 mm), for Water and Other Liquids, for guidance in the selection of asbestos-cement pressure pipe for water distribution systems to meet the project's site-specific installation and operating conditions. ANSI/AWWA C401 also provides information on criteria for determining the type of pipe to be used under various soil and internal and external water chemistry conditions. The purchaser is also referred to ANSI/AWWA C603, Standard for Installation of Asbestos-Cement Pressure Pipe, which covers recommended installation practices and laying of the pipe. Occupational Safety and Health Administration (OSHA) standards (29CFR 1926.58) should be reviewed by the purchaser for regulatory requirements related to the protection of workers engaged in the handling and installation of asbestos-cement pipe.

At the time of this writing, AWWA Manual M16 (1978), *Work Practices for Asbestos-Cement Pipe*, represented the latest edition of this manual. Manual M16 is out of date and should not be regarded as current. A committee is in the process of developing a new revision of this manual. In the interim, the Asbestos-Cement Pipe Producers Association has available a new booklet on the subject entitled "Recommended Work Practices for A/C Pipe."

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine whether or not the products described in that standard are suitable for use in the particular application being considered.

III.A. Purchaser's Options and Alternatives. When purchasing asbestos-cement pipe under this standard, the purchaser should specify special requirements and provide specific information in the purchaser's specifications regarding the following:

1. The standard used—that is, AWWA C400-93, Standard for Asbestos-Cement Pressure Pipe, 4 In. Through 16 In. (100 mm Through 400 mm), for Water Distribution Systems.
2. Affidavit of compliance if required (Sec. 1.3).
3. Type of pipe to be furnished (Sec. 2.3).
4. Class of pipe (Sec. 3.1).
5. Nominal inside diameter (Sec. 3.2).
6. Lineal feet to be furnished in standard and random lengths (Sec. 3.3).
7. Number, size, type, class, lengths, and extent of machining of special short lengths (Sec. 3.3.1).
8. If inspection by the purchaser (Sec. 5.1) and special markings (Sec. 6.1.4) are required.

III.B. Modification to Standard. Any modification of the provisions, definitions, or terminology in this standard must be provided in the purchaser's specifications.

IV. Major Revisions. Major changes to the 1980 edition of the standard (reaffirmed without revision in 1986) are as follows:

1. Revised the title of the standard.
2. Reorganized the format of the foreword.
3. Added Sec. I.C, Acceptance, to the foreword.
4. The information formerly provided in the foreword under Sec. II.A and Sec. II.C was deleted from this standard and moved to the foreword of ANSI/AWWA C401.
5. The information formerly provided in the foreword under Sec. II.B was deleted. Sec. 2.2.1, *Flexural strength*, was revised to incorporate the intent of former Sec. II.B.
6. Added Sec. III, Use of This Standard, to the foreword. Section III includes a statement regarding the standard user's responsibility for applications other than for water.
7. Added Sec. III.B, Modification to Standard, to the foreword.
8. Deleted old Sec. IV, Metrication.
9. Deleted the definition of "Inspector" from Sec. 1.2 and substituted the term "purchaser's authorized agent" throughout the text.
10. Revised the definitions for "manufacturer" and "purchaser" in Sec. 1.2.
11. Added appendix B, Bibliography.

V. Comments. If you have any comments or questions about this standard, please call the AWWA Standards Department, (303) 794-7711 ext. 2201, FAX (303) 794-7310, or write to the department at 6666 W. Quincy Ave., Denver, CO 80235.



ANSI/AWWA C400-93
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AWWA STANDARD FOR

ASBESTOS-CEMENT PRESSURE PIPE,

4 IN. THROUGH 16 IN.

(100 mm THROUGH 400 mm),

FOR WATER DISTRIBUTION SYSTEMS

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard covers type I and type II asbestos-cement pressure pipe in nominal pipe sizes from 4 in. (100 mm) through 16 in. (400 mm) in pressure classes 100, 150, and 200. The pipe is intended for the underground conveyance of water in water distribution systems. (See foreword, Sec. III, regarding suitability for any application.)

1.1.1 *Use.* Asbestos-cement pressure pipe is intended for use in water distribution systems having relatively unpredictable flows and many appurtenances that do not permit reasonable hydraulic analyses, including that for surge pressure.

Sec. 1.2 Definitions

The following definitions shall apply in this standard.

1.2.1 *Inspection:* Inspection of the pipe and the tests conducted by the purchaser or the purchaser's authorized agent.

1.2.2 *Lot:* A lot as used herein is defined as all pipe of any one class, type, and size manufactured on any one machine in 24 h but not to exceed 300 lengths.

1.2.3 *Manufacturer:* The party that manufactures, fabricates, or produces materials or products.

1.2.4 *Operating pressure:* The maximum hydrostatic pressure to which the pipe will be subjected, exclusive of allowance for water hammer.

1.2.5 *Purchaser*: The person, company, or organization that purchases any materials or work to be performed.

Sec. 1.3 Affidavit of Compliance

Whether factory inspection has been required or not, the purchaser's specifications may require an affidavit of compliance from the manufacturer that the material furnished under the purchaser's order complies with all applicable requirements of this standard.

Sec. 1.4 References

This standard references the following documents. In their latest editions, they form a part of this standard to the extent specified herein. In any case of conflict, the requirements of this standard shall prevail.

ASTM* C500—Standard Test Methods for Asbestos-Cement Pipe.

ASTM D1869—Standard Specification for Rubber Rings for Asbestos-Cement Pipe.

ANSI†/AWWA C401—Standard for the Selection of Asbestos-Cement Pressure Pipe, 4 In. Through 16 In. (100 mm Through 400 mm), for Water Distribution Systems.

SECTION 2: MATERIALS

Sec. 2.1 Composition

Asbestos-cement pipe shall be composed of an intimate mixture of either (1) portland cement or portland blast-furnace slag cement and asbestos fiber with or without silica, or (2) portland pozzolanic cement and asbestos fiber. Both (1) and (2) can be used with or without the addition of curing agents. The pipe shall be formed under pressure and cured. The finished pipe shall contain not more than 0.2 percent organic materials.

Sec. 2.2 Physical Requirements

2.2.1 *Flexural strength*. For quality-control purposes and not as a simulated service test, each length of pipe 10 ft (3 m) or longer for pipe sizes 4-in., 6-in., and 8-in. (100-mm, 150-mm, and 200-mm) shall have the minimum flexural strength prescribed in Table 1 when tested in accordance with the Flexural Test Proof Method as required in the latest edition of ASTM C500. (For pipe sizes 10-in. [250-mm] and larger, wall thicknesses increase to a point at which the flexural strength is not a controlling factor. Therefore, routine flexural strength testing is not required.)

2.2.2 *Bursting strength*. Each length of pipe and each coupling sleeve shall have sufficient strength to withstand the design internal pressure indicated for its class in Table 2 when subjected to the hydrostatic procedure specified in this standard.

*American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103.

†American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

Table 1 Flexural test loads

Nominal Diameter		Total Applied Load					
		Class 100		Class 150		Class 200	
		<i>lb</i>	(<i>N</i>)	<i>lb</i>	(<i>N</i>)	<i>lb</i>	(<i>N</i>)
4	(100)	1200	(5340)	1470	(6540)	1870	(8300)
6	(150)	2800	(12,500)	3700	(16,500)	4900	(21,800)
8	(200)	5330	(23,700)	7600	(33,800)	10,130	(45,100)

Table 2 Design internal pressure and design external load*

Nominal Pipe Size		Class 100		Class 150		Class 200	
		Internal Pressure	External Load	Internal Pressure	External Load	Internal Pressure	External Load
		<i>psi</i> (<i>kPa</i>)	<i>lb/lin ft</i> (<i>kN/m</i>)	<i>psi</i> (<i>kPa</i>)	<i>lb/lin ft</i> (<i>kN/m</i>)	<i>psi</i> (<i>kPa</i>)	<i>lb/lin ft</i> (<i>kN/m</i>)
4	(100)	417 (2900)	4100 (60)	616 (4200)	5400 (79)	809 (5600)	8700 (127)
6	(150)	441 (3000)	4000 (58)	632 (4400)	5400 (79)	815 (5600)	9000 (136)
8	(200)	472 (3300)	4000 (58)	653 (4500)	5500 (80)	824 (5700)	9300 (136)
10	(250)	490 (3400)	4400 (64)	650 (4500)	7000 (102)	826 (5700)	11,000 (161)
12	(300)	490 (3400)	5200 (76)	658 (4500)	7600 (111)	830 (5700)	11,800 (172)
14	(350)	500 (3400)	5200 (76)	650 (4500)	8600 (126)	826 (5700)	13,500 (197)
16	(400)	500 (3400)	5800 (85)	654 (4500)	9200 (134)	825 (5700)	15,400 (225)

*It is necessary to apply a load factor (see ANSI/AWWA C401) to the three-edge bearing loads obtained in the crushing tests specified in Sec. 5.2.4 of this standard in order to correlate them to the field loads.

2.2.3 Crushing strength. Each length of pipe shall have sufficient strength to support the design external load indicated for its class in Table 2 when subjected to the crushing test procedure specified in this standard.

Sec. 2.3 Chemical Requirements

The purchaser shall specify pipe as either type I or type II according to the allowable content of uncombined calcium hydroxide desired, as determined by the test procedures in this standard for uncombined calcium hydroxide. The requirements for each type of pipe are as follows:

Type I—no limit on uncombined calcium hydroxide,

Type II—1 percent or less uncombined calcium hydroxide.

SECTION 3: DESIGN

Sec. 3.1 Pipe Classes

Pipe supplied under this standard shall be made in one or more of the following classes: 100, 150, or 200.

Sec. 3.2 Pipe Diameters

Pipe shall be made with nominal inside diameters of 4, 6, 8, 10, 12, 14, and 16 in. (100, 150, 200, 250, 300, 350, and 400 mm). The average inside diameter of a standard or random pipe length shall not be less than the nominal diameter by more than 5 percent.

Sec. 3.3 Pipe Lengths

Pipe shall be produced in standard, random, and short lengths. At least 90 percent of the total footage (linear metres) of pipe of any class, type, and size, excluding short lengths, shall be furnished in standard lengths. The remaining 10 percent may be in random lengths.

3.3.1 *Standard lengths.* Pipe is customarily furnished in standard lengths of 10 ft (3 m) or 13 ft (4 m) in 4-, 6-, and 8-in. (100-, 150-, and 200-mm) sizes, unless otherwise specified by the purchaser. Sizes 10-in. (250-mm) and greater are customarily supplied in 13-ft (4-m) lengths, unless otherwise specified by the purchaser. A maximum of 10 percent of each pipe size may be furnished in random lengths of not less than 7 ft (2 m). Short lengths for making connections to valves, fittings, or structures and for making closures shall be furnished as specified by the purchaser.

Sec. 3.4 Couplings

A coupling shall consist of an asbestos-cement sleeve of the same type and class as the pipe and two rubber rings or a device that has equal or better jointing characteristics, strength, and serviceability as that of an asbestos-cement coupling. The manufacturer shall submit specifications and drawings of alternate couplings to the purchaser for approval prior to manufacturing.

3.4.1 *Amount furnished.* One coupling of the same size and class as the pipe shall be furnished with each standard and random length of pipe.

3.4.2 *Rubber gaskets.* Rubber gaskets for pipe and fittings shall conform to the requirements of the latest edition of ASTM D1869 and shall be purchased from the pipe manufacturer.

3.4.3 *Coupling areas.* Coupling areas for all lengths of pipe shall be properly machined at their ends or over their entire length to serve their intended purpose, as specified by the purchaser. The sealing surface of the coupling area shall be free of dents and gouges that will affect the tightness of the joint.

Sec. 3.5 Joints

Joints shall be capable of withstanding, without leakage, a hydrostatic pressure test as defined in Sec. 5.2.2.1.

Sec. 3.6 Wall Thickness

The wall thickness of the machined portion of any length of pipe shall not be less than the manufacturer's standard by the tolerance listed in Table 3.

Table 3 Wall thickness tolerance

Nominal Pipe Size		Wall Thickness Tolerance	
in.	(mm)	in.	(mm)
4-12	(100-300)	-0.06	(-1.5)
14-16	(350-400)	-0.12	(-3.0)

SECTION 4: WORKMANSHIP AND FINISH

Sec. 4.1 Imperfections

4.1.1 *Interior surfaces.* The inside surface of each length of pipe shall be free from bulges, dents, and tears that could result in a variation in diameter of more than 0.20 in. (5 mm) from the diameter of adjacent unaffected portions of the surface.

4.1.2 *Exterior surfaces.* Flaking on the exterior surface and edge of machined ends shall not extend back by more than 0.500 in. (13 mm) from the end, have a depth of more than 0.125 in. (3 mm), or extend around the perimeter for more than 0.500 in. (13 mm) at any one location.

4.1.3 *Straightness.* Each length of pipe shall not vary in straightness by more than 0.05 in./ft (4 mm/m) of length when the variation is measured as follows:

Measure the maximum ordinate from the exterior surface of the pipe by placing a straightedge or line that exceeds the pipe length against the exterior surface and measure the maximum distance from the exterior pipe to the straightedge or line.

SECTION 5: INSPECTION, TESTING, AND REJECTION

Sec. 5.1 Inspection

5.1.1 *General.* Inspection by the purchaser shall not relieve the manufacturer of the responsibility to furnish material conforming in all aspects to the requirements of this standard.

5.1.2 *Notification.* If inspection is specified by the purchaser under Sec. 5.1.4, then the manufacturer shall notify the purchaser in advance of the date, time, and place of testing of the pipe so that the purchaser may be represented at the test.

5.1.3 *Access.* The purchaser or the purchaser's authorized agent shall have free access to those parts of the manufacturer's plant that are involved in work performed under this standard. The manufacturer shall provide, without charge, all reasonable facilities for determining whether the pipe meets the requirements of this standard.

5.1.4 *Testing.* If inspection is specified by the purchaser, the purchaser or the purchaser's authorized agent shall have the option of witnessing any or all test phases. The pipe to be tested shall have passed the routine inspection and testing requirements of this standard. The number of tests to be conducted for flexural strength (4, 6, and 8 in. [100, 150, and 200 mm]), hydrostatic proof ($3\frac{1}{2}$ times class), and, when required, crushing strength shall be limited to 1 per each 300 standard lengths of each size, type, and class of pipe on the order. If uncombined calcium hydroxide tests are required, the number of tests will be one for each size, type, and class of pipe on the order. The purchaser or the purchaser's authorized agent may select the pipe to be tested. Retesting and rejection stipulations as shown in Sec. 5.3 shall apply.

Sec. 5.2 Physical Test Requirements

5.2.1 *Test specimens.* All pipe and couplings tested under this standard shall be in a normal air-dried condition when tested.

Table 4 Hydrostatic tests

Class	Proof Test*		Lot Test†	
	psi	(kPa)	psi	(kPa)
100	350	(2400)	400	(2800)
150	525	(3600)	600	(4100)
200	700	(4800)	800	(5500)

*Every length per Sec. 5.2.2.1.

†One per lot per Sec. 5.2.2.2.

5.2.2 Hydrostatic tests.

5.2.2.1 Each standard, random, or short length of pipe and each coupling sleeve shall be tested under an internal hydrostatic pressure as shown for the proof test in Table 4 in accordance with hydrostatic proof test requirements of the latest edition of ASTM C500. Any pipe length or coupling sleeve showing leakage, sweating, or other defects shall be rejected.

5.2.2.2 From each lot that has passed the hydrostatic proof test, one standard length shall be hydrostatically tested to the lot test in Table 4 for that class in the manner specified in Sec. 5.2.2.1. Each length of the pipe so tested shall be retested in the manner and at the pressure specified in Sec. 5.2.2.1.

5.2.3 *Flexure tests.* Each standard length of pipe and each random length of pipe, 10 ft (3 m) or longer, having a nominal diameter of 4, 6, or 8 in. (100, 150, and 200 mm), shall be tested in flexure in accordance with the latest edition of ASTM C500. Each pipe so tested shall support, without evidence of cracks or other defects, the applicable total load shown in Table 1.

5.2.4 *Crushing tests.* On lots containing more than 100 lengths of each size and class of pipe, one length from each 300 lengths or fraction thereof shall be tested for crushing strength. If inspection by the purchaser has been specified, the length of pipe to be tested may be selected by the purchaser or the purchaser's authorized agent. From each selected length, one unmachined section of pipe 1 ft (300 mm) long shall be cut. This section shall be tested for crushing strength in accordance with the three-edge bearing, V-block method of the latest edition of ASTM C500. The test section shall not fail until the total load applied meets or exceeds the applicable value shown in Table 2.

5.2.5 Machines for testing.

5.2.5.1 The machine used for the hydrostatic test shall have gaskets that seal the ends of the pipe, coupling, or pipe and coupling with factory-assembled joint, but exert no end pressure. Couplings may be hydrostatically tested with a rubber bladder inside the couplings, and if so tested, each coupling shall have sufficient strength to withstand a test pressure of four times the class of the coupling.

5.2.5.2 The machines used for the flexure and crushing tests shall be substantial and rigid throughout so that the distribution of the load shall not be appreciably affected by the deformation or yielding of any part of the machine.

Sec. 5.3 Retests (Physical) and Rejection

5.3.1 *Crushing strength.* The failure of any specimen tested for crushing strength to support 75 percent of the crushing load required in Table 2 shall be cause for rejection of that portion of the lot of that size, type, and class

manufactured during the same shift as the test specimen. If any specimen tested for crushing strength supports more than 75 percent but less than 100 percent of the crushing load, then two additional pipe sections of the same size, type, and class manufactured during the same shift shall be subjected to the same crushing test. The additional lengths may be selected by the purchaser or the purchaser's authorized agent if inspection by the purchaser has been specified. The failure of one of these additional specimens to meet the full crushing-strength requirement shall be cause for rejection of that portion of the lot of that size, type, and class manufactured during the same shift as the test specimen.

5.3.2 Hydrostatic tests. If any pipe subjected to the hydrostatic tests specified in Sec. 5.2.2.2 fails to withstand the specified pressure, then two additional lengths of the same size and class manufactured during the same shift shall be subjected to the same hydrostatic test. The failure of one of these additional lengths to withstand the specified pressure shall be cause for rejection of that portion of the lot of that size, type, and class manufactured during the same shift as the test lengths.

Sec. 5.4 Test for Uncombined Calcium Hydroxide

The manufacturer shall perform the test for uncombined calcium hydroxide as often as necessary to ensure compliance with the requirements for uncombined calcium hydroxide in type II pipe when tested in accordance with the latest edition of ASTM C500.

Sec. 5.5 Test Records

The results of all tests shall be recorded and retained for one year and shall be available to the purchaser at the place of manufacture.

SECTION 6: MARKING AND DELIVERY

Sec. 6.1 Marking

6.1.1 Standard and random lengths. Each standard or random length of pipe shall be clearly marked on the outside surface with the trade name, nominal inside diameter, class, type, hydrostatic test pressure, and date and shift of manufacture.

6.1.2 Short lengths. Each short length of pipe shall be clearly marked on the outside surface with the nominal inside diameter, class, type, and the letter "T" to indicate that it has been hydrostatically tested.

6.1.3 Couplings. All component parts of each coupling shall be clearly marked for use with the pipe for which they are intended. Each coupling sleeve shall also be marked with the letter "T" to indicate that it has been hydrostatically tested.

6.1.4 Special markings. If factory inspection is made by the purchaser or the purchaser's authorized agent, then each pipe and each coupling sleeve shall receive an additional special marking of no more than three letters, as specified by the purchaser.

Sec. 6.2 Preparation for Shipment

All pipe and couplings, unless otherwise specified, shall be prepared for standard commercial shipment.

APPENDIX A

Dimensional Table of Fittings Ends Designed for Use With Asbestos-Cement Pressure Pipe

This appendix is for information only and is not a part of AWWA C400.

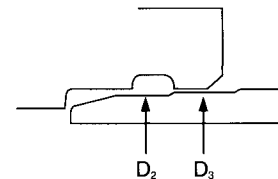
In the figures and tables that follow, the dimensions shown are for fittings to be used with asbestos-cement pipe having the end dimensions in Table A.1.

Fitting tolerances, where indicated, are required of the fittings manufacturer to establish proper control.

Fittings shall be made of such materials as will provide service compatible with asbestos-cement pipe.

Pipe Size <i>in. (mm)</i>	Class 100						Class 150/200						All Classes	
	<i>in. A (mm)</i>	<i>in. B (mm)</i>	<i>in. C (mm)</i>	<i>in. A (mm)</i>	<i>in. B (mm)</i>	<i>in. C (mm)</i>	<i>in. A (mm)</i>	<i>in. B (mm)</i>	<i>in. C (mm)</i>	<i>in. W (mm)</i>	<i>in. N (mm)</i>			
4 (100)	5.36 (136)	4.93 (125)	4.74 (120)	5.53 (140)	5.10 (130)	4.91 (125)	0.95 (24)	3.50 (89)						
6 (150)	7.63 (194)	7.20 (183)	7.01 (178)	7.63 (194)	7.20 (183)	7.01 (178)	0.95 (24)	3.50 (89)						
8 (200)	9.83 (250)	9.40 (239)	9.21 (234)	9.83 (250)	9.40 (239)	9.21 (234)	0.95 (24)	3.50 (89)						
10 (250)	11.96 (304)	11.53 (293)	11.34 (288)	12.38 (314)	11.95 (304)	11.76 (299)	0.95 (24)	3.50 (89)						
12 (300)	14.16 (360)	13.73 (349)	13.54 (344)	14.64 (372)	14.21 (361)	14.02 (356)	0.95 (24)	4.00 (102)						
14 (350)	15.93 (405)	15.37 (390)	15.17 (385)	17.08 (434)	16.52 (420)	16.32 (414)	1.00 (25)	4.50 (114)						
16 (400)	18.01 (457)	17.45 (443)	17.25 (438)	19.32 (491)	18.76 (476)	18.56 (471)	1.00 (25)	4.50 (114)						

Pipe Size <i>in. (mm)</i>	Class 100		Class 150/200	
	<i>in. D₂ (mm)</i>	<i>in. D₃ (mm)</i>	<i>in. D₂ (mm)</i>	<i>in. D₃ (mm)</i>
4 (100)	4.64 (118)	4.80 (122)	4.81 (122)	4.97 (126)
6 (150)	6.91 (176)	7.07 (180)	6.91 (176)	7.07 (180)
8 (200)	9.11 (231)	9.27 (236)	9.11 (231)	9.27 (235)
10 (250)	11.24 (286)	11.40 (290)	11.66 (296)	11.82 (300)
12 (300)	13.44 (341)	13.60 (345)	13.92 (354)	14.08 (358)
14 (350)	15.07 (383)	15.23 (387)	16.22 (412)	16.38 (416)
16 (400)	17.15 (436)	17.31 (440)	18.46 (469)	18.62 (473)



APPENDIX B

Bibliography

This appendix is for information only and is not a part of AWWA C400.

1. ANSI/AWWA C603-90, Standard for Installation of Asbestos-Cement Pressure Pipe.
2. *Recommended Work Practices*. 1988. Asbestos-Cement Pipe Producers Association, Arlington, Va.

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