ANSI/AWWA **C300-22**

(Revision of ANSI/AWWA C300-16)

AWWA Standard

Reinforced Concrete Pressure Pipe, Steel-Cylinder Type

Effective date: June 1, 2022.
Addendum incorporated July 2023.
First edition approved by Board of Directors Dec. 11, 1947.
This edition approved Jan. 13, 2022.
Approved by American National Standards Institute Jan. 7, 2022.

American Water Works Association

AWWA Standard

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ISBN-13, print: 978-1-64717-089-9

ISBN-13, electronic: 978-1-61300-623-8

DOI: http://dx.doi.org/10.12999/AWWA.C300.22

Committee Personnel

The AWWA Standards Subcommittee on ANSI/AWWA C300, which reviewed and developed this standard, had the following personnel at the time:

Henry H. Bardakjian, *Chair*

S.A. Arnaout, Stantec, Dallas, Tex.
K.R. Baas, Thompson Pipe Group—Pressure, Hattiesburg, Miss.
H.H. Bardakjian, Consulting Engineer, Glendale, Calif.
W.C. Duke, Bureau of Reclamation, Denver, Colo.
N.D. Faber, San Diego County Water Authority, San Diego, Calif.
B.D. Keil, Northwest Pipe Company, Salt Lake City, Utah
M.R. McReynolds, Brown and Caldwell, Oakton, Va.
A.E. Romer, AECOM, Orange, Calif.
R.F. Williams, AECOM, Miami, Fla.

The AWWA Standards Committee on Concrete Pressure Pipe, which reviewed and approved this standard, had the following personnel at the time of approval:

Wylie C. Duke, *Chair*
Kevin M. Brown, *Secretary*

User Members

W.C. Duke, Bureau of Reclamation, Denver, Colo.
N.D. Faber, San Diego County Water Authority, San Diego, Calif.
J.K. Johnson, Tarrant Regional Water District, Fort Worth, Tex.
T. Peng, Metropolitan Water District of Southern California, Los Angeles, Calif.
F. Sy Su, Los Angeles Dept. of Water & Power, Los Angeles, Calif.
A.F. Williams, Louisville Water Company, Louisville, Ky.

General Interest Members

S.A. Arnaout, Stantec, Dallas, Tex.
H.H. Bardakjian, Consulting Engineer, Glendale, Calif.
W.R. Brunzell, Brunzell Associates Ltd., Wilmette, Ill.
B.C. Coltharp, Freese and Nichols Inc., Fort Worth, Tex.

D. Faber (*liaison, nonvoting*), Standards Council Liaison, Faber & Associates, Terra Alta, W.Va.
W.C. Hagenburger, Crossland Heavy Contractors, Lowell, Ark.
F.S. Kurtz (*liaison, nonvoting*), Standards Engineer Liaison, AWWA, Denver, Colo.
A.S. Maughn (*alternate*), Freese and Nichols Inc., Dallas, Tex.
R. Ortega, Aurora Technical Services LLC, Houston, Tex.
A. Rodriguez, HDR Engineering, San Antonio, Tex.
J.J. Roller, CTLGroup, Skokie, Ill.
A.E. Romer (*alternate*), AECOM, Orange, Calif.
R.F. Williams, AECOM, Miami, Fla.
M.S. Zarghamee, Simpson Gumpertz & Heger Inc., Waltham, Mass.

Producer Members

K.R. Baas, Thompson Pipe Group—Pressure, Hattiesburg, Miss.
G. Bizien, Forterra Pressure Pipe, St. Eustache, Que.
K.M. Brown, American Concrete Pressure Pipe Association, Rockledge, Fla.
M. DeFranco (*alternate*), DECAST Ltd., Utopia, Ont.
B.D. Keil, Northwest Pipe Company, Salt Lake City, Utah
Y. Lan, DECAST Ltd., Utopia, Ont.
R.D. Mielke (*alternate*), Northwest Pipe Company, Raleigh, N.C.
B. Tanguay (*alternate*), Forterra Pressure Pipe, St. Eustache, Que.

Contents

All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C300.*

I. Introduction.

I.A. *Background.* Reinforced concrete pressure pipe of the cylinder type, first manufactured in 1919, consists of a welded steel cylinder with a steel joint ring welded at each end; a cage or cages of steel reinforcing bars or wire; an encasing wall of concrete; and a preformed gasket of rubber to provide the joint seal between adjacent pipes. The pipe is manufactured in sizes ranging from 30 in. (760 mm) to more than 144 in. (3,660 mm) in diameter and is generally made in 16-ft through 24-ft (4.8-m through 7.5-m) laying lengths.

Reinforced concrete pressure pipe, steel-cylinder type, is designed for the specific combination of internal pressure and external load required for the project in accordance with the procedures outlined in AWWA Manual M9, *Concrete Pressure Pipe*. This pipe is normally limited in working pressures to a maximum of 260 psi (1,790 kPa).

This type of pipe is used for transmission lines in irrigation, industrial, and domestic water supply systems, as well as for distribution feeder mains and other uses (see Sec. III of the foreword).

I.B. *History.* In April 1943, the AWWA Board of Directors authorized the preparation of "Tentative Emergency Specifications for Concrete Pressure Pipe." These tentative specifications, which described several types of pipe in a single document, served a useful purpose during World War II but are now obsolete and have been withdrawn.

The first standard prepared by AWWA Water Works Practice Committee 8320D—Reinforced Concrete Pipe, which was formed in 1946, described the manufacture of reinforced concrete pressure pipe, steel-cylinder type, not prestressed. The standard is now designated ANSI/AWWA C300. The first edition of this standard was approved as tentative on Dec. 11, 1947. It was revised and approved as a standard on Jan. 13, 1952. The second edition was approved as tentative on July 19, 1957 and made a standard on Jan. 27, 1964. Subsequent editions of ANSI/AWWA C300 were approved by the AWWA Board of Directors on Jan. 28, 1974; May 16, 1982; July 26, 1989; Feb. 2, 1997; June 13, 2004; Jan. 23, 2011; and June 19, 2016. This edition was approved on Jan. 13, 2022.

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.

Installation, design, and other data pertaining to this type of pipe are described by AWWA Manual M9, *Concrete Pressure Pipe.*

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 direct and indirect drinking water additives. Other members of the original consortium included the Water Research Foundation (formerly AwwaRF) and the Conference of State Health and Environmental Managers (COSHEM). AWWA and the Association of State Drinking Water Administrators (ASDWA) joined later.

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. Specific policies of the state or local agency.

2. Four standards developed under the direction of NSF: NSF[‡]/ANSI[§]/CAN[¶] 60, Drinking Water Treatment Chemicals—Health Effects; NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects; NSF/ANSI/CAN 372, Drinking Water System Components—Lead Content; and NSF/ANSI/CAN 600, Health Effects Evaluation and Criteria for Chemicals in Drinking Water.

3. 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 NSF/ANSI/CAN 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.

NSF/ANSI/CAN 600 (which formerly appeared in NSF/ANSI/CAN 60 and 61 as Annex A, "Toxicology Review and Evaluation Procedures") does not stipulate a maximum allowable level (MAL) of a contaminant for substances not regulated by a

[†] Persons outside the United States should contact the appropriate authority having jurisdiction.
[‡] NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.
[§] American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.
[¶] Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada.
[**] The National Academies Press, 500 Fifth Street NW, Keck 360, Washington, DC 20001.

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 NSF/ANSI/CAN 600 procedures may not always be identical, depending on the certifier.

ANSI/AWWA C300 does not address additives requirements. 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 parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues. Special issues are addressed in AWWA Manual M9, *Concrete Pressure Pipe.*

II.A. *Chlorine and Chloramine Degradation of Elastomers.* The selection of materials is critical for water service and distribution piping in locations where there is a possibility that elastomers will be in contact with chlorine or chloramines. Documented research has shown that elastomers such as gaskets, seals, valve seats, and encapsulations may be degraded when exposed to chlorine or chloramines. The impact of degradation is a function of the type of elastomeric material, chemical concentration, contact surface area, elastomer cross section, environmental conditions, and temperature. Careful selection of and specifications for elastomeric materials and the specifics of their application for each water system component should be considered to provide long-term usefulness and minimum degradation (swelling, loss of elasticity, or softening) of the elastomer specified.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. *Purchaser Options and Alternatives.* Purchasers are advised that, while this standard presents information on materials and procedures of manufacture of the pipe, it does not contain all the engineering information needed to prepare a complete specification for a particular pipeline installation. A specific installation may require more restrictive provisions than those in the standard and most certainly will require additional design and installation features.

Reference to AWWA Manual M9, *Concrete Pressure Pipe,* should be considered a supplement to the use of this standard, and information in the manual should not be regarded as superseding any portion of this standard. The purpose of AWWA Manual M9 is to provide information concerning some of the various

subjects to be considered in, and the minimum standard of practice for, the design and installation of concrete pressure pipelines.

The following information should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA C300, Reinforced Concrete Pressure Pipe, Steel-Cylinder Type, of latest revision.
2. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required.
3. Manner of storage and delivery, if required of the manufacturer.
4. Working pressure, surge pressure, field-test pressure, external loading conditions, and method of bedding and backfilling (Sec. 4.2.2).
5. If detailed drawings and schedules are to be submitted for review (Sec. 4.3.1).
6. If the manufacturer is not permitted to supply pipe from inventory (Sec. 4.3.1).
7. If a tabulated layout schedule will be required (Sec. 4.3.2).
8. Details of federal, state, and local requirements (Sec. 4.4).
9. Type of cement required, if there is a preference (Sec. 4.4.1.1).
10. If the manufacturer is not permitted to use pozzolanic materials as a cement replacement (Sec. 4.4.1.1).
11. If aggregate samples will be required (Sec. 4.4.4).
12. If submission of the type and amount of admixtures will be required (Sec. 4.4.6).
13. If submission of manufacturer's design calculations will be required (Sec. 4.5.2).
14. If elliptical reinforcement is acceptable (Sec. 4.5.2 and AWWA Manual M9).
15. If submission of welding procedure specifications will be required (Sec. 4.6.3).
16. Variance in curing, if permitted (Sec. 4.6.7.1).
17. If details of specials and fittings are to be provided by the manufacturer (Sec. 4.7.1).
18. If the purchaser desires to inspect the material, pipe, and fittings at the manufacturer's plant (Sec. 5.1.1).
19. If any material or manufacturing test reports will be required (Sec. 5.1.2).
20. If steel test specimens will be required (Sec. 5.2.5).
21. If testing of welds in reinforcing bars is required (Sec. 5.2.7).
22. If identification marks referenced to layout drawings and schedules are required (Sec. 6.1).
23. If an affidavit of compliance will be required (Sec. 6.3).

III.B. *Modification to Standard.* Any modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major changes made to the standard in this edition include the following:

1. Provisions for slag cement as a replacement for portland cement (up to 20 percent) have been added (Sec. 4.4.1).
2. Rubber gasket testing requirements have been added for ozone resistance (Sec. 4.4.11.8) and water immersion (Sec. 4.4.11.9).
3. Requirements for maximum pipe laying length have been modified (Sec. 4.5.1.2).
4. Provisions for concrete placement have been modified to include the horizontal centrifugal method in sizes 30–54 in. (760–1,370 mm) (Sec. 4.6.6.1).
5. The maximum allowable circumferential steel stress used in the design of fittings has changed to 18,000 psi (124.2 MPa).
6. Updates to material requirements meeting ASTM standards have been made as appropriate throughout the standard.

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711; FAX at 303.795.7603; write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098; or e-mail at standards@awwa.org.

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AWWA Standard

Reinforced Concrete Pressure Pipe, Steel-Cylinder Type

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the manufacture of reinforced concrete cylinder pipe in sizes 30 in. to 144 in. (760 mm to 3,660 mm), inclusive. Larger sizes have been manufactured based on the concepts of this standard. This type of pipe is designed for the internal pressure, external loads, and bedding conditions designated by the purchaser. This standard does not include requirements for design, handling, delivery, laying, field testing, or disinfection of pipe. Refer to AWWA Manual M9, *Concrete Pressure Pipe,* for information on these topics.

1.1.1 *Essential requirements.* The pipe shall have the following principal features: a welded steel cylinder with steel joint rings welded to its ends; reinforcing cages of steel bars, wire, or welded wire reinforcement; a wall of concrete encasing the steel cylinder and reinforcing cages inside and outside of the steel cylinder or reinforcing cages outside of the steel cylinder; and a joint with a preformed gasket of rubber, designed so that the joint will be watertight under all conditions of service.