



American Water Works
Association

The Authoritative Resource for Safe Drinking WaterSM

ANSI/AWWA C400-03
(Revision of ANSI/AWWA C400-93 [R98])

AWWA Standard

Asbestos–Cement Pressure Pipe, 4 In. Through 16 In. (100 mm Through 400 mm), for Water Distribution Systems



Effective date: July 1, 2003.

First edition approved by AWWA Board of Directors July 2, 1965.

This edition approved Jan. 19, 2003.

Approved by American National Standards Institute May 1, 2003.

6666 West Quincy Avenue
Denver, CO 80235-3098
T 1.800.926.7337
www.awwa.org

Advocacy
Communications
Conferences
Education and Training
► **Science and Technology**
Sections

AWWA Standard

This document is an American Water Works Association (AWWA) standard. It is not a specification. AWWA standards describe minimum requirements and do not contain all of the engineering and administrative information normally contained in specifications. The AWWA standards usually contain options that must be evaluated by the user of the standard. Until each optional feature is specified by the user, the product or service is not fully defined. AWWA publication of a standard does not constitute endorsement of any product or product type, nor does AWWA test, certify, or approve any product. The use of AWWA standards is entirely voluntary. AWWA standards are intended to represent a consensus of the water supply industry that the product described will provide satisfactory service. When AWWA revises or withdraws this standard, an official notice of action will be placed on the first page of the classified advertising section of *Journal AWWA*. The action becomes effective on the first day of the month following the month of *Journal AWWA* publication of the official notice.

American National Standard

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether that person has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review, and users are cautioned to obtain the latest editions. Producers of goods made in conformity with an American National Standard are encouraged to state on their own responsibility in advertising and promotional materials or on tags or labels that the goods are produced in conformity with particular American National Standards.

CAUTION NOTICE: The American National Standards Institute (ANSI) approval date on the front cover of this standard indicates completion of the ANSI approval process. This American National Standard may be revised or withdrawn at any time. ANSI procedures require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 25 W. 43rd St., Fourth Floor, New York, NY 10036; (212) 642-4900.

Science and Technology

AWWA unites the drinking water community by developing and distributing authoritative scientific and technological knowledge. Through its members, AWWA develops industry standards for products and processes that advance public health and safety. AWWA also provides quality improvement programs for water and wastewater utilities.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information or retrieval system, except in the form of brief excerpts or quotations for review purposes, without the written permission of the publisher.

Copyright © 2003 by American Water Works Association
Printed in USA

This page intentionally blank.

Committee Personnel

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

Leo A. Kinney, Jr., *Chair*

General Interest Members

Marcel Cossette, Sherbrooke, Que.	(AWWA)
S.C. Danos,* Littleton Water Department, Littleton, Mass.	(AWWA)
R.C. Graff, Poway, Calif.	(AWWA)
L.A. Kinney Jr., Lakewood, Colo.	(AWWA)
E.W. Misichko, Underwriters Laboratories Inc., Northbrook, Ill.	(UL)
P.J. Olson,* Standards Engineer Liaison, AWWA, Denver, Colo.	(AWWA)
W.R. Perrell, Birmingham, Ala.	(AWWA)
Ken Zastrow,† Underwriters Laboratories Inc., Northbrook, Ill.	(UL)

Producer Members

A.A. Guerra, Mexalit Industrial SA De CV, Col. Polanco, Mexico	(AWWA)
B.J. Pigg, AC Product Producers Association, Arlington, Va.	(ACPPA)

* Liaison, nonvoting

† Alternate

Contents

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

SEC.	PAGE	SEC.	PAGE
Foreword		5	Verification
I	Introduction..... vii	5.1	Inspection 6
I.A	Background..... vii	5.2	Physical Test Requirements 7
I.B	History..... vii	5.3	Retests (Physical) and Rejection..... 8
I.C	Acceptance..... viii	5.4	Test for Uncombined Calcium Hydroxide 8
II	Special Issues..... ix	5.5	Test Records 8
II.A	General..... ix	6	Delivery
III	Use of This Standard..... x	6.1	Marking 9
III.A	Purchaser's Options and Alternatives. x	6.2	Preparation for Shipment 10
III.B	Modification to Standard..... x	6.3	Affidavit of Compliance..... 10
IV	Major Revisions x		
V	Comments. x		
Standard		Appendix	
1	General	A	Dimensional Table of Fittings Ends Designed for Use With Asbestos-Cement Pressure Pipe..... 11
1.1	Scope 1		
1.2	Purpose 1		
1.3	Application 2		
2	References 2	Tables	
3	Definitions 2	1	Flexural Test Loads..... 4
4	Requirements	2	Design Internal Pressure and Design External Load..... 4
4.1	Permeation..... 3	3	Wall Thickness Tolerance..... 6
4.2	Materials 3	4	Hydrostatic Tests 7
4.3	Design..... 5	A.1	Dimensional Table of Fittings Ends Designed for Use With Asbestos-Cement Pressure Pipe 12
4.4	Fabrication 6		

This page intentionally blank.

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. Asbestos–cement pipe had been used for only a few years at installations in several European countries, particularly Italy. After its North American introduction, it was used successfully 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.* 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, a revision of the tentative standard was needed, 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 as 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 with 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. The standard was next revised in 1993 and designated AWWA C400-93, Standard for Asbestos-Cement Pressure Pipe, 4 in. Through 16 in. (100 mm through 400 mm), for Water Distribution Systems. The 1993 edition was reaffirmed without revision in 1998. This edition was approved on Jan. 19, 2003.

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 original consortium included the American Water Works Association Research Foundation (AWWARF) and the Conference of State Health and Environmental Managers (COSHEM). The American Water Works Association (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

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

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.

Annex 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 Annex A procedures may not always be identical, depending on the certifier.

AWWA C400 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 refer to ANSI/AWWA C401, Standard Practice for the Selection of Asbestos–Cement Distribution Pipe, 4 In. Through 16 In.

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

†NSF International, 789 N. Dixboro Rd., Ann Arbor, MI 48106.

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