



**American Water Works  
Association**

*Dedicated to the World's Most Important Resource™*

**ANSI/AWWA C503-14**  
(Revision of ANSI/AWWA C503-05)

**AWWA Standard**

# Wet-Barrel Fire Hydrants

Effective date: Aug. 1, 2014.

First edition approved by AWWA Board of Directors July 7, 1959.

This edition approved June 8, 2014.

Approved by American National Standards Institute April 4, 2014.



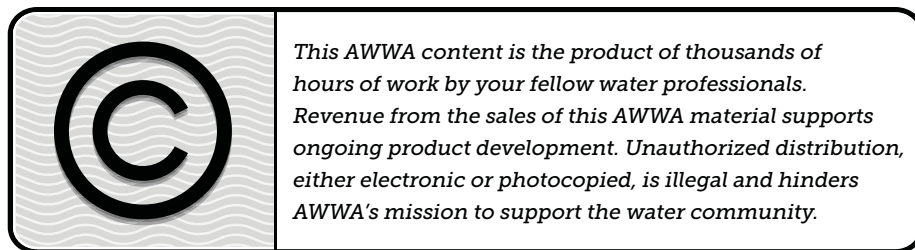
## AWWA Standard

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. This standard does not supersede or take precedence over or displace any applicable law, regulation, or codes of any governmental authority. 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 Official Notice section of *Journal - American Water Works Association*. The action becomes effective on the first day of the month following the month of *Journal - American Water Works Association* 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 ANSI approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036; (212) 642-4900, or emailing [info@ansi.org](mailto:info@ansi.org).



ISBN-13, print: 978-1-62576-025-8

eISBN-13, electronic: 978-1-61300-284-1

DOI: <http://dx.doi.org/10.12999/AWWA.C503.14>

---

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 © 2014 by American Water Works Association  
Printed in USA

## Committee Personnel

The AWWA Subcommittee for Revision of C503, Wet-Barrel Fire Hydrants which developed this revision, had the following personnel at the time:

Randy Looney, *Chair*

D.E. Burczynski, Kennedy Valve, Elmira, N.Y.	(AWWA)
G. Chambers, Sigelock Systems LLC, East Rockaway, N.Y.	(AWWA)
L. W. Fleury, Mueller Group, Chattanooga, Tenn.	(AWWA)
T.C. Harbour, Clow Valve Company, Oskaloosa, Iowa	(AWWA)
K. Huelsman, Clow Valve Company, Oskaloosa, Iowa	(AWWA)
K.S. Jeng-Bulloch, City of Houston, Houston, Texas	(AWWA)
R.L. Larkin, Gardendale, Ala.	(AWWA)
R. Looney, American AVK Company, Minden, Nev.	(AWWA)
D. Matthews, Kochek Co. Inc., Putnam, Conn.	(AWWA)
J. Maun, Insurance Services Office Inc., Jersey City, N.J.	(AWWA)
S.D. Osborne, OSD LLC, Lexington, Mass.	(AWWA)
J.H. Wilber, American AVK Company, Littleton, Colo.	(AWWA)
D. Woollums, Mueller Group, Chattanooga, Tenn.	(AWWA)
K. Wright, EJ USA Inc., East Jordan, Mich.	(AWWA)
S. Ziobro, FM Approvals, Chepachet, R.I.	(AWWA)

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

Sean D. Osborne, *Chair*

*General Interest Members*

E.E. Arasmith, ACR Publications Inc., Albany, Ore.	(AWWA)
D.M. Flancher,* Standards Engineer Liaison, AWWA, Denver, Colo.	(AWWA)
R. Horner,* Standards Council Liaison, Water Management Inc., Alexandria, Va.	(AWWA)
R.L. Larkin, Gardendale, Ala.	(AWWA)
G.E. Laverick, Underwriters Laboratories Inc., Northbrook, Ill.	(UL)
J. Maun, Insurance Services Office Inc., Jersey City, N.J.	(AWWA)

---

\* Liaison, nonvoting

S.D. Osborne, OSD LLC, Lexington, Mass.	(AWWA)
M.D. Tennebaum,* Underwriters Laboratories Inc., Los Angeles, Calif.	(AWWA)
M.P. Yoke, Anniston, Ala.	(AWWA)
S. Ziobro, FM Approvals, Chepachet, R.I.	(AWWA)

*Producer Members*

T.M. Alcott,* Waterous Company, South St. Paul, Minn.	(AWWA)
D.E. Burczynski,* Kennedy Valve, Elmira, N.Y.	(AWWA)
L.W. Fleury, Mueller Group, Chattanooga, Tenn.	(AWWA)
T.C. Harbour, Clow Valve Company, Oskaloosa, Iowa	(AWWA)
T.R. Ingalls,* EJ USA Inc., East Jordan, Mich.	(AWWA)
R. Looney, American AVK Company, Minden, Nev.	(AWWA)
T.J. Mettler, Waterous Company, South St. Paul, Minn.	(AWWA)
J.H. Wilber,* American AVK Company, Littleton, Colo.	(AWWA)
K.J. Wright, EJ USA Inc., East Jordan, Mich.	(AWWA)

*User Members*

E.L. Hernandez, Denver Water, Denver, Colo.	(AWWA)
K.S. Jeng-Bulloch, City of Houston, Houston, Texas	(AWWA)
B. Kellsey, EPCOR Water Services Inc., Edmonton, Alta., Canada	(AWWA)
J.W. Kingsbury, Fairfax Water, Fairfax, Va.	(AWWA)
D.W. Qualls, City of Dallas Water Utilities Department, Dallas, Texas	(AWWA)
B.A. Shelton, Montgomery Water Works and Sanitary Sewer Board, Montgomery, Ala.	(AWWA)
M.K. Stankovich, City of Haverhill, Haverhill, Mass.	(AWWA)
L.G. Thomas, East Bay Municipal Utility District, Oakland, Calif.	(AWWA)

---

\* 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
<b>Foreword</b>			
I	vii	4.2	5
I.A	vii	Data to Be Provided by the Purchaser .....	
I.B	vii	4.3	5
I.C	vii	Drawings or Data to Be Provided by the Manufacturer .....	
II	ix	4.4	6
II.A	ix	Materials .....	
II.B	ix	4.5	10
II.C	ix	General Design .....	
II.D	ix	4.6	10
II.E	ix	Detailed Design .....	
III	ix	4.7	16
III.A	x	Coating .....	
Purchaser Options and Alternatives .....		4.8	16
III.B	xii	Workmanship .....	
Modification to Standard .....		<b>5</b>	<b>Verification</b>
IV	xii	5.1	17
Major Revisions.....		Fire-Hydrant Component Tests.....	
V	xii	5.2	17
Comments .....		Production Tests.....	
		5.3	17
		Inspection and Nonconformance ....	
		<b>6</b>	<b>Delivery</b>
		6.1	18
		Marking.....	
		6.2	18
		Shipment.....	
		6.3	18
		Affidavit of Compliance .....	
<b>Standard</b>			
<b>1</b>	<b>General</b>	<b>Appendixes</b>	
1.1	1	A	19
1.2	1	Characteristics of National Standard Fire-Hose Coupling Screw Threads .....	
1.3	2	B	23
<b>2</b>	<b>References</b> .....	Uniform Color Scheme for Fire Hydrants .....	
<b>3</b>	<b>Definitions</b> .....	<b>Tables</b>	
<b>4</b>	<b>Requirements</b>	1	9
4.1	5	Copper Alloys .....	

2	Minimum Wall Thickness for Sections of Wet-Barrel Hydrants .....	11	A.1	Nominal Dimensions of NH (fire-hose) Threads .....	20
3	Maximum Permissible Loss of Head for Hydrants .....	12	A.2	Basic Dimensions of NH (fire-hose) Threads .....	21

---

# Foreword

*This foreword is for information only and is not a part of ANSI\*/AWWA C503.*

## **I. Introduction.**

I.A. *Background.* A fire hydrant is usually a unit of a water utility's property that is provided for public fire-protection service. However, during fire emergencies, a hydrant is operated by members of a fire department rather than by water utility personnel.

The use of a fire hydrant as a source of water for street cleaning, construction projects, or any purpose other than firefighting is beyond the primary purpose for which the unit is installed. The use of hydrants in this manner should be rigidly restricted and controlled in the interest of maintaining the equipment in satisfactory working condition for use at times of fire emergencies.

This standard pertains to wet-barrel fire hydrants that are intended for use in water-supply systems in areas where the climate is mild and freezing temperatures do not occur.

ANSI/AWWA C502, Dry-Barrel Fire Hydrants, pertains to dry-barrel fire hydrants that are intended for use in water-supply systems, including those where freezing temperatures do occur.

Unless expressly relieved by the fire department by written agreement, public ordinance, or other ownership, water utilities should schedule regular and frequent inspections of hydrants to ensure they are in satisfactory working condition. AWWA Manual M17, *Installation, Field Testing, and Maintenance of Fire Hydrants*, provides an excellent guide for owners of fire hydrants.

I.B. *History.* Previous editions of ANSI/AWWA C503 were approved by the AWWA Board of Directors in January 1958 (tentative), July 1959, January 1970, June 1975, February 1982, June 1988, June 1997, and June 2005. This edition of C503 was approved June 8, 2014.

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)

---

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

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

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, NSF<sup>†</sup>/ANSI<sup>‡</sup> 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI 61, Drinking Water System Components—Health Effects.
4. Other references, including AWWA standards, *Food Chemicals Codex*, *Water Chemicals Codex*,<sup>§</sup> 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 61. Individual states or local agencies have authority to accept or accredit certification organizations within their jurisdictions. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

Annex A, “Toxicology Review and Evaluation Procedures,” to NSF/ANSI 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.

ANSI/AWWA C503 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.

---

\* Persons outside the United States should contact the appropriate authority having jurisdiction.

† NSF International, 789 N. Dixboro Road, Ann Arbor, MI 48105.

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

§ Both publications available from National Academy of Sciences, 500 Fifth Street, N.W., Washington, DC 20001.



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.**

II.A. *Gate Valve.* Installing a gate valve on the branch connection of hydrants is considered good water utility practice. This practice is particularly important for wet-barrel hydrants. Dry-barrel hydrants manufactured according to ANSI/AWWA C502 are designed so that if the hydrant is damaged or broken above or near the grade level, the main valve will remain closed and reasonably tight against leakage. However, in the case of wet-barrel hydrants, a break will discharge water unless used in conjunction with a break-off style check valve. The gate valve on the branch connection enables the water to be shut off in the shortest possible time to prevent or reduce damage.

II.B. *Torque.* Hydrants produced according to this standard shall meet a torque requirement of 200 ft-lb (270 N·m) of torque applied at the operating nut in both opening and closing directions, as required in Sec. 4.6.13. This amount of torque is considered fully adequate to operate a hydrant that is in satisfactory working condition. The use of a wrench longer than 15 in. (380 mm), or an indefinite extender operated by two or more persons, is not considered good practice. If one person using a 15-in. (380-mm) wrench cannot open and close a fire hydrant, the hydrant is not in proper working condition, and it should be repaired promptly.

A fire-hydrant wrench shall be readily reversible.

II.C. *Single-Outlet Nozzle.* Hydrants with a single 2½-in. (65-mm) outlet nozzle are not considered suitable for normal fire-protection service.

II.D. *Head Loss.* Table 3 of ANSI/AWWA C503 does not show permissible loss of head above a flow of 1,500 gpm (5,678 L/min). If hydrants are to be required to deliver more than 1,500 gpm (5,678 L/min), the manufacturer should be consulted regarding head losses at higher flows to determine the suitability of the hydrant for its intended purpose.

II.E. *Physical and chemical properties.* The physical and chemical properties of hydrant component materials should be considered when preparing a specification for fire hydrants. Material melting points, compatibility with treatment chemicals, and other properties can affect performance of a fire hydrant, depending on criteria of an application.

**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.* The following items should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA C503, Wet-Barrel Fire Hydrants, of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required, in addition to the requirements of the Safe Drinking Water Act.
3. Quantity required. If a complete hydrant (a hydrant top section and bury section bolted together) is not desired, the purchaser should specify the quantity of each section.
4. Threaded boss on top of hydrant top section. The top of a wet-barrel hydrant may have a threaded boss of sufficient thickness to receive a supplementary hose-outlet angle valve. If required, the threaded boss must be specified by the purchaser.
5. Number of outlet nozzles for hose and pumper.
6. Nominal inside diameter of the outlet nozzles, in inches (or millimeters).
7. Type of outlet-nozzle connection. Outlet-nozzle connections should conform to those in service in the system in which the hydrant is to be installed. If the connections are to conform to NFPA\* 1963, Standard for Fire Hose Connections (reproduced in part in appendix A of this standard), this requirement should be specified.

If the threaded connections do not conform to NFPA 1963, the following thread detail dimensions for both nozzle and cap (coupling) should be specified, including appropriate tolerances:

- a. Major diameter.
- b. Minor diameter.
- c. Pitch diameter.
- d. Thread form.
- e. Number of threads per inch.
8. Special designs or features, if required (Sec. 4.2, 4.5, and 4.6).
9. Catalog and maintenance data, net weight, and drawings, if required. If the manufacturer is required to provide drawings, specify the number of drawings and whether the drawings are to be approved before the hydrants are manufactured (Sec. 4.3).
10. Details of other federal, state or provincial, and local requirements (Sec. 4.4).

---

\* National Fire Protection Association, P.O. Box 9101, 1 Batterymarch Park, Quincy, MA 02269.

11. Alternative materials, if the water that will be used in the hydrants promotes corrosion (Sec. 4.4.6.3) or if low-lead (less than 0.25 percent weighted average of the wetted surface area lead content) alloys are required.
12. Corrosion-resistant bolts and nuts, if required (Sec. 4.4.12.2).
13. Bury depth, measured in feet and inches to the nearest 6 inches from the bottom of the connecting pipe to the ground line (trench depth).
14. Size and type of inlet connection and joint accessories, such as gaskets, bolts, or nuts, if any (Sec. 4.6.7). The number of slotted bolt holes, if any, should also be specified (Sec. 4.6.7.3).
15. Harnessing lugs, if required (Sec. 4.6.8).
16. Outlet-nozzle cap chains and cap gasket, if not required (Sec. 4.6.9.3).
17. Whether the outlet-nozzle cap is not to have pressure-relief capability (Sec. 4.6.9.7).
18. Whether the outlet nozzle caps may be made of a suitable type of plastic (Sec. 4.6.9.8).
19. Whether bolting or traffic flange must be provided that is designated to fail at a lower force than is required to break the pressure-containing vessel (Sec. 4.6.10.2).
20. The hydrant top-section and bury-section flange drilling. If the desired flange detail dimensions do not conform to Sec. 4.6.11, the following details should be specified:
  - a. Bolt-circle diameter.
  - b. Number of bolt holes.
  - c. Size of bolt holes.
  - d. Orientation of bolt holes to centerline of a specified outlet nozzle or bury-section inlet.
21. Direction of rotation of the operating nut to open the hydrant; that is, left (counterclockwise) or right (clockwise). This direction should conform to the practice in the system where the hydrant is to be installed (Sec. 4.6.12.4).
22. Size, shape, and dimensions of stem-operating nut and outlet-nozzle cap nuts, if different from those in this standard and if an attachable stem-operating nut is required (Sec. 4.6.13).
23. The use of pressure-actuating seals other than O-rings (Sec. 4.6.14.3).
24. Color and type of paint to be applied on the outside of the hydrant top section (Sec. 4.7 and appendix B).
25. Special interior coatings (Sec. 4.4.15).
26. Whether the repair of structural defects is allowed (Sec. 4.8.2).

27. Records of standard tests, if required (Sec. 5.3).
28. Whether special markings are required (Sec. 6.1).
29. Location to which hydrants are to be shipped and any special shipping instructions or requirements (Sec. 6.2).
30. Affidavit of compliance, if required (Sec. 6.3).
31. Manufacturer's Certification of Compliance to NSF/ANSI 61, Drinking Water System Components—Health Effects

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 revision include the following:

1. Revised requirements for aluminum bronze alloys (Sec. 4.4.6.3).
2. Added requirements for threaded and nonthreaded outlet nozzle connections (Sec. 4.6.9).
3. Added casting date marking requirements. (Sec. 6.1.1).

**V. Comments.** If you have any comments or questions about this standard, please call the 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 email at [standards@awwa.org](mailto:standards@awwa.org).



**American Water Works  
Association**

*Dedicated to the World's Most Important Resource™*

**ANSI/AWWA C503-14**  
(Revision of ANSI/AWWA C503-05)

**AWWA Standard**

---

# Wet-Barrel Fire Hydrants

---

## SECTION 1: GENERAL

---

### **Sec. 1.1 Scope**

This standard pertains to the various types and classes of wet-barrel fire hydrants for use in fire-protection service in areas where the climate is mild and freezing temperatures do not occur. A wet-barrel hydrant has one or more valve openings above the ground line and, under normal operating conditions, the entire interior of the hydrant is subjected to water pressure at all times. Each outlet nozzle has an independent, compression-type valve (i.e., working with or against the pressure) that controls discharge from that particular outlet.

1.1.1 *Exceptions.* This standard does not pertain to dry-barrel fire hydrants. (For such hydrants, see ANSI/AWWA C502.) References to the setting of hydrants are not included in ANSI/AWWA C503. For installation information, see ANSI/AWWA C600 and AWWA Manual M17.

Hydrants of steel-pipe risers and angle-valve construction are not covered in this standard.

### **Sec. 1.2 Purpose**

The purpose of this standard is to provide purchasers, manufacturers, and suppliers with the minimum requirements for wet-barrel fire hydrants for fire-protection service, including materials, design, inspection, testing, marking, and shipping requirements. Fire hydrants designed and constructed to the requirements of