ANSI/AWWA **C503-21**

(Revision of ANSI/AWWA C503-18)

AWWA Standard

Wet-Barrel Fire Hydrants

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American Water Works Association

Approved American National Standard ANSI

STANDARD Since 1881

AWWA Standard

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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 C503.*

I. Introduction.

I.A. *Background*. 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.

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, June 2005, June 8, 2014, and Oct. 24, 2018. This edition of C503 was approved on Oct. 25, 2021.

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. 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, and NSF/ANSI 372, Drinking Water System Components—Lead Content.

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

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

‡ NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.

§ Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada.

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 jurisdictions. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

Annex A, "Toxicology Review and Evaluation Procedures," to NSF/ANSI/CAN 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.
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. *Ownership, Use, and Maintenance.* 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 fire hydrants for the conveyance of drinking water, such as for use as components of a temporary bypass piping system, or for dispensing drinking water for special events, are applications that require particular care. Surfaces that are in contact with the water must be properly disinfected, and evaluation must be performed to ensure that materials in the waterway are suitable for contact with drinking water. The requirements of NSF/ANSI/CAN 61 and NSF/ANSI 372 address the safety of additives from the surfaces of a fire hydrant that are in contact with drinking water when the main valve is closed. Surfaces that are downstream of the main valve, which are in contact with the water when the main valve is open, are not covered by these standards.

[¶] Both publications available from The National Academies Press, 500 Fifth Street NW, Keck 360, Washington, DC 20001.

The use of fire hydrants 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 strictly restricted and controlled in the interest of maintaining the equipment in satisfactory working condition for use at times of fire emergencies.

The water utility, unless expressly relieved by the fire department in accordance with a written agreement, public ordinance, or other ownership, should schedule regular and sufficiently frequent inspections of hydrants to ensure they are in good working condition. AWWA Manual M17, *Fire Hydrants*: *Installation, Field Testing, and Maintenance,* provides an excellent guide for owners of fire hydrants.

II.B. *Advisory Information on Product Application.* Hydrants produced according to ANSI/AWWA C503 are designed to be operated by one person using a 15-in. (380-mm) wrench. The use of a longer wrench or an indefinite extender operated by two or more persons is not considered to be good practice. If one person cannot open and close a fire hydrant with a 15-in. (380-mm) wrench, the hydrant is not in proper working order and should be promptly repaired. Wrenches for fire hydrants should be constructed so that the openings can be readily reversed.

Hydrants produced according to ANSI/AWWA C503 are required to meet a test of 200 lbf·ft (270 N·m) torque applied at the operating nut in both opening and closing directions. This torque is considered to be fully adequate to operate a hydrant that is in good working condition. Hydrants with barrels longer than 5 ft (1.5 m) of bury may require special design.

Hydrants with a single 2½-in. (64-mm) outlet nozzle are not considered to be suitable for normal fire protection service.

If Table 3 of this standard does not show permissible loss of head for a particular flow rate, the manufacturer should be consulted on head losses at the particular flow rate for the products.

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 the specific conditions of an application.

II.C. *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 (see Appendix C). 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.D. *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.* The following information 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/CAN 61, Drinking Water System Components—Health Effects and NSF/ANSI 372 Drinking Water System Components—Lead Content 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, Sec. 4.5, and Sec. 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 federal, state, and local requirements (Sec. 4.4).

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 in. 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).

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

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. 4.7.1.1 and Appendix B).

25. Special interior coatings (Sec. 4.7).

26. Whether the repair of structural defects is allowed (Sec. 4.8.4).

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. Permeation language was expanded to define the piping system and components (Sec. 4.1).

2. Section 4.9 was added on hydrant Accessories.

3. Appendix C was added for Break-check valves.

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 email at standards@awwa.org.

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American Water Works Association

Dedicated to the World's Most Important Resource®

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

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