



**American Water Works
Association**

The Authoritative Resource for Safe Water®

ANSI/AWWA C511-07
(Revision of ANSI/AWWA C511-97)

AWWA Standard

Reduced-Pressure Principle Backflow Prevention Assembly



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AWWA Standard

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C511.

I. Introduction.

I.A. *Background.* The production and preservation of safe potable water is the objective of greatest priority for public water utilities and other agencies having jurisdiction. When safe water has been produced and put into the public distribution system, precautions must be taken to be certain that it is not contaminated with water or liquids from other sources.

Most water-using premises may have actual or potential cross-connection hazards. The water distribution systems of some premises served by public water systems, such as hotels, hospitals, and industrial plants, can be quite complex. On these premises, contaminated backflow into the public system can be a result of either backpressure or backsiphonage from appliances and equipment or from cross-connection with other sources of supply. Cross-connection control programs usually will require that backflow prevention assemblies be installed at the water-service connections to premises where potentially hazardous conditions exist.

Water users (utility customers) have a clearly implied responsibility to protect the safety of the water in the public supply system. Water users must also protect the integrity of the water supply on their own premises. Protection of a building's piping system must be done in accordance with the requirements of the local authority having jurisdiction.

Cross-connection hazards vary widely in degree. Generally, the degree of protection against backflow resulting from a cross-connection should be commensurate with the degree of hazard. Two types of backflow prevention assemblies are commonly used: the double check valve assembly and the reduced-pressure principle assembly. If local regulations or ordinances do not specify the type to use or the conditions under which one or the other may be used, recommendations may be found in AWWA Manual M14, *Recommended Practice for Backflow Prevention and Cross-Connection Control*.

I.B. *History.* The Conference of State Sanitary Engineers (CSSE) and the American Water Works Association (AWWA) appointed the Joint Committee on Backflow Preventers and Cross-Connection Control in September 1959 to carry out the recommendations of an earlier joint committee. These recommendations were included in the joint committee's final report published in the December 1958

edition of *Journal AWWA*. The first chair, Ray L. Derby, then of the Los Angeles Department of Water and Power, served until April 1964. From April 1964 until March 1972, Gustave J. Angele Sr., plant sanitary engineer, Union Carbide Nuclear Division, served as chair. From March 1972 until April 1983, Ernest J. Havlina, Los Angeles Department of Water and Power, served as chair. From April 1983 until April 1993, Patrick J. Brady, Department of Public Utilities, County of Henrico, Richmond, Va., served as chair. Since then, the work has been under the direction of the present chair, James T. Cowgill, Hazen & Sawyer Engineers, Hollywood, Fla.

The first work of the committee resulted in AWWA Manual M14, which was published in the April 1966 edition of *Journal AWWA*.

After publication of AWWA Manual M14, the committee produced a standard that received final approval from the AWWA Board of Directors on Jan. 27, 1969, and was designated as AWWA C506-69, Standard for Backflow Prevention Devices—Reduced Pressure Principle and Double Check Valve Types. Revision of ANSI/AWWA C506 was approved in 1978. The 1978 edition was subsequently reaffirmed without revision in 1983.

In 1989, ANSI/AWWA C506-78 was separated into two standards: ANSI/AWWA C510 covers the double check valve backflow prevention assembly, and ANSI/AWWA C511 covers the reduced-pressure principle backflow prevention assembly. The second revision of ANSI/AWWA C511 was approved on June 15, 1997. This edition was approved June 24, 2007.

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 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

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

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*/ANSI[†] 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*,[‡] 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 jurisdiction. 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 C511 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 parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues. This standard has no applicable information for this section.

*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.

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 covered by the purchaser:

1. Standard used—that is, ANSI/AWWA C511, Reduced-Pressure Principle Backflow Prevention Assembly, of latest revision.
2. Whether compliance with NSF/ANSI 61 Drinking Water System Components—Health Effects, is to be required, in addition to the requirements of the Safe Drinking Water Act.
3. Whether for hot or cold water (Sec. 1.1).
4. Materials, if other than those specified in Sec. 4.1.
5. Details of other federal, state or provincial, and local requirements (Sec. 4.1.)
6. Size, flow, and pressure loss (Sec. 4.2.1), and number of assemblies required.
7. Type of end connection—flanged, threaded, or grooved and shouldered (Sec. 4.3.1.7).
8. Affidavit of compliance (Sec. 6.3), if required.
9. Certificate of approval (Sec. 6.3), if required.

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 revisions made to the standard in this revision include the following:

1. AWWA standard materials statement has been added (Sec. III.A.2 and Sec. 4.1).
2. Synthetic coating of ferrous bodies has been removed. (Sec. 4.1.2).
3. The material callouts have been updated (Sec. 4.1.3).
4. The identification of nominal size of the assembly has been revised (4.2.1.1).
5. The requirements for structural capability and operational capability have been revised (Sec. 4.2.2.1 and Sec. 4.2.2.2).
6. The sections on area of waterways, clearance of moving parts, facing rings for poppet-type valves, facing rings for swing-type valves, bushings, diaphragms, and air release have been removed (former Sec. 4.3.1.2 through 4.3.1.6, 4.3.1.10, and 4.3.1.11).
7. The requirements for control piping have been revised (Sec. 4.3.1.4).
8. The requirements for shutoff valves have been updated (Sec. 4.3.1.7).

9. Requirements for relief valve sensitivity have been added (Sec. 4.3.2.10).
10. Requirements for operational cycle testing have been added (Sec. 4.3.2.11).
11. Requirements for replacement parts have been added (Sec. 4.3.3).

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

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AWWA Standard

Reduced-Pressure Principle Backflow Prevention Assembly

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the reduced-pressure principle backflow prevention assembly. The assembly shall be capable of withstanding a working water pressure of at least 150 psi (1,034 kPa) without damage to working parts or impairment of function and for operation on hot or cold water lines.

This standard describes hot and cold water reduced-pressure principle backflow prevention assemblies. Assemblies shall be designed to operate, at a minimum, at a temperature range of 33°F to 140°F (1°C to 60°C). Hot water assemblies shall be designed to operate, at a minimum, in water at a temperature range of 33°F to 180°F (1°C to 82°C).

A complete assembly consists of a mechanical, independently operating, hydraulically dependent relief valve located between two independently operating, internally loaded check valves that are located between two tightly closing resilient-seated shutoff valves with four properly placed resilient-seated test cocks (see Sec. 4.3.1.3).