ANSI/AWWA C510-17
(Revision of ANSI/AWWA C510-07)

American Water Works Association

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AWWA Standard

Double Check-Valve Backflow Prevention Assembly

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AWWA Standard

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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 C510.*

I. Introduction.

I.A. *Background.* The production and preservation of safe potable water are the objectives 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 backpressure or back-siphonage from appliances and equipment or from cross-connection with other supply sources. Cross-connection control programs usually 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 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-connections vary widely in degree of hazard. 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, *Backflow Prevention and Cross-Connection Control: Recommended Practices*.

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

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

included in the joint committee's final report published in the December 1958 edition of *Journal AWWA*.

The first work of the committee resulted in the first edition of 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, 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 to ANSI/AWWA C510 was approved by the AWWA Board of Directors on June 15, 1997. The third edition was approved June 24, 2007. This edition was approved on Jan. 14, 2017.

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). 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. Specific policies of the state or local agency.
2. 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.

* 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.

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 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 C510 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.

In an alternative approach to inadvertent drinking water additives, some jurisdictions are calling for reduced lead limits for materials in contact with potable water. Various third-party certifiers have been assessing products against these lead content criteria, and a new ANSI-approved national standard, NSF/ANSI 372, Drinking Water System Components—Lead Content, was published in 2010. On Jan. 4, 2011, legislation was signed revising the definition for "lead free" with the Safe Drinking Water Act (SDWA) as it pertains to "pipe, pipe fittings, plumbing fittings, and fixtures." The changes went into effect Jan. 4, 2014. In brief, the new provisions to the SDWA require that these products meet a weighted average lead content of not more than 0.25 percent.

II. Special Issues.

II.A. *Original Equipment Manufacturer (OEM) Parts.* Parts installed during servicing and repair shall be provided by the original equipment manufacturer (OEM)

* Both publications available from National Academy of Sciences, 500 Fifth Street, NW, Washington, DC 20001.

and be identical to those provided in the assembly when originally approved. In particular, resilient parts such as check-valve discs or facing rings, O-rings, and seals fabricated from different materials or compounds may be identical in appearance but over time may function differently from the compound originally used and approved. Use of non-OEM replacement parts will render the assembly not in conformance with this standard.

II.B. *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 seat 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, and environmental conditions as well as 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.* This standard includes certain options and alternatives, summarized in the following list that the purchaser should designate when purchasing double check valve backflow prevention assemblies described in this standard. The purchaser should review each item and make appropriate provisions in procurement documents to stipulate additional requirements. The following information should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA C510, Double Check-Valve Backflow Prevention Assembly of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required.
3. Whether compliance with NSF/ANSI 372, Drinking Water System Components—Lead Content, is to be required.
4. Whether for hot or cold water (Sec. 1.1).
5. Materials if other than those specified in Sec. 4.1.
6. Details of other federal, state or provincial, and local requirements (Sec. 4.1).
7. Size, rated flow, and allowable pressure loss (Sec. 4.2.1).

8. Number of assemblies required.

9. Type of end connection—flanged, threaded, or grooved and shouldered (Sec. 4.3.1.2).

10. Affidavit of compliance (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. The committee addressed original equipment manufacturer (OEM) parts for backflow preventers in Special Issues II.A of the foreword and in Sec 4.3.4.

2. Chlorine and chloramine degradation of elastomers language was added to Special Issues II.B of the foreword.

3. Lead and copper guidance was added to the foreword of this standard and requirements added in Sec. 4.1.3.1.2.

4. Plastic parts language was addressed in Sec. 4.1.3.8.

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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AWWA Standard

Double Check-Valve Backflow Prevention Assembly

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the double check-valve backflow prevention assembly for potable water applications. 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 potable water lines.

This standard describes hot- and cold-water double check-valve 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 two internally loaded, independently operating check valves, located between two tightly closing resilient-seated shutoff valves, with four properly placed resilient-seated test cocks (see Sec. 4.3.1.3).

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for double check-valve backflow prevention assemblies for potable water applications,