ANSI/AWWA C518-18
(Revision of ANSI/AWWA C518-13)

American Water Works Association
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AWWA Standard

Double-Disc Swing-Check Valves for Waterworks Service, 2-in. Through 48-in. (50-mm Through 1,200-mm) NPS

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AWWA Standard

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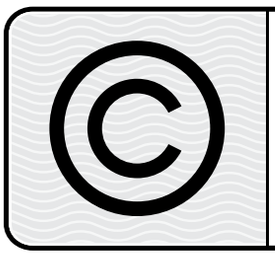

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Contents

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 C518.*

I. Introduction.

I.A. *Background.* Double-disc swing-check valves have been commonly used on pump discharge applications in the waterworks industry for more than half a century. These check valves are designed to prevent backflow by automatically closing rapidly on flow-reversal. They provide tight shutoff while requiring relatively little space for installation.

I.B. *History.* The need for standardization of double-disc swing-check valves was recognized by the American Water Works Association (AWWA) in 1992. The AWWA Gate and Check Valve Committee worked to publish the first edition of ANSI/AWWA C518 beginning in 2003. It was approved by the AWWA Board of Directors on Jan. 27, 2008. The last edition was approved on Jan. 20, 2013. This edition was approved on Oct. 24, 2018.

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 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.

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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 N. Dixboro Road, Ann Arbor, MI 48105.

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 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 C518 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.

Some jurisdictions (including California, Maryland, Vermont, and Louisiana) call 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 an 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" within the Safe Drinking Water Act (SDWA) as it pertains to "pipe, pipe fittings, plumbing fittings, and fixtures." The changes went into effect on 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. *General.* Conditions under which a valve is to be operated must be evaluated carefully by the purchaser. The evaluations must include the determination of the hydraulic characteristics of the system in which the valve will be installed and

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

the operation of the valve, including (1) the maximum transient and static differential pressure across the valve disc and (2) minimum and maximum flow through the valve under the most adverse operating conditions.

Hydraulic testing, flow capacities, and valve characteristics are based on the flow upstream of a valve being uniform and undisturbed, like the flow produced by a constant-diameter, straight pipe of at least six diameters. Piping configurations that produce a nonuniform or turbulent flow pattern upstream of the valve can create damaging vibrations, increase head loss, and increase stresses in valve components.

II.B. *Advisory Information on Product Application*. This standard does not describe all possible applications or manufacturing technologies. The purchaser should identify special requirements and required deviations from this standard and include appropriate language in purchase documents. Refer to Sec. III.A in this foreword. Other advisory information is provided as follows.

1. Check valves may be subject to excessive wear if there is insufficient flow to open the valve fully. Manufacturers can supply information during the valve sizing process to prevent this from occurring.

2. These valves are designed for use with clean water and installation in horizontal pipelines with the hinge pin oriented in the vertical plane, or in vertical pipelines with the flow-up. If installed in a flow-down application, the valve may not have sufficient spring torque to close.

3. These valves are sometimes used for air blower discharge service and therefore are subject to unusual temperature and flow conditions. Air service should be considered a special application for this valve and warrants a review of the operating parameters with the supplier or manufacturer.

4. When open, the valve discs extend a significant distance into the downstream piping and may strike or interfere with downstream valves or flow elements. A sufficient distance of open pipe downstream of the valve should be planned for every installation.

5. The ozone test requirement given in Sec. 4.2.2.6.5 is intended as an accelerated ozone resistance test for atmospheric ozone. If the valve is intended for ozone disinfection service, the system concentration should be specified and provided to the manufacturer to assist in the selection of an appropriate rubber seat material.

II.C. *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.

II.D. *Permeation*. The selection of materials is critical for potable water, reclaimed water service, and distribution piping in locations where there is likelihood the pipe will be exposed to significant concentrations of pollutants consisting of low-molecular-weight petroleum products or organic solvents or their vapors. Research has documented that pipe materials (such as polyethylene, polybutylene, polyvinyl chloride, and asbestos cement) and elastomers, such as those used in jointing gaskets and packing glands, are subject to permeation by lower-molecular-weight organic solvents or petroleum products. If a potable water, wastewater, or reclaimed water pipe must pass through such a contaminated area or an area subject to contamination, consult with the manufacturer regarding permeation of pipe walls, jointing material, and so on, *before* selecting materials for use in that area.

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 to be used—that is, ANSI/AWWA C518, Double-Disc Swing-Check Valves for Waterworks Service, 2-in. Through 48-in. (50-mm Through 1,200-mm) NPS, 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, or an alternative lead content criterion, is required.
4. Size of check valves.
5. Quantity required.
6. Maximum and minimum line pressure.
7. Required flow rate through valve.
    a. Under minimum conditions.
    b. Under maximum-flow conditions.

8. Description of connecting piping: material, outside diameter (OD) and inside diameter (ID), and end connection.

9. Valve orientation, either horizontal, vertical flow-up, or vertical flow-down (Sec II.B.2).

10. Maximum transient pressure and characteristics, if known.

11. Water temperature range.

12. A drawing or description of the piping arrangement sufficient to describe significant turbulent line flow conditions to which the valve disc may be subjected.

13. Considerations relating to anticipated problems with rubber components exposed to line content containing chlorine, chloramines, or other chemicals. If these problems are anticipated, the purchaser should identify the maximum expected concentrations of these chemicals and other factors, such as pH and temperature ranges, which may affect the corrosivity of these chemicals. The purchaser should consult with the manufacturers and, if appropriate, specify special requirements for these components.

14. Catalog data, net weight, and assembly drawings to be provided by the manufacturer (Sec. 4.1), if required.

15. Details of federal, state, and local requirements (Sec. 4.2.1).

16. Whether the valve will be subjected to water that promotes galvanic corrosion or that reacts chemically with materials used in these valves and requires the use of alternative disc materials as described in Sec. 4.3.4.1.

17. Protective coatings if other than specified in Sec. 4.4.2 of this standard.

18. If shop inspection of tests by the purchaser is required (Sec. 5.1).

19. The providing of test records that are specified according to Sec. 5.2.1 and Sec. 5.2.2 of this standard. The purchaser may require all records or may stipulate a breakdown of production test records.

20. If an affidavit of compliance is to be provided (Sec. 6.3).

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. The title of the standard was revised to Double-Disc Swing-Check Valves for Waterworks Service, 2-in. Through 48-in. (50-mm Through 1,200-mm) NPS.

2. An advisory statement was added in the Foreword (Sec. II.C) regarding chlorine and chloramine degradation of elastomers.

3. Permeation (previously Sec. 4.1) was moved to an advisory statement in the Foreword (Sec. II.D)

4. Revised the ASTM A536 material requirements.

5. Added aluminum bronze as an optional pin material.

6. Appendix B added to include a Specification and Data Sheet for 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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AWWA Standard

Double-Disc Swing-Check Valves for Waterworks Service, 2-in. Through 48-in. (50-mm Through 1,200-mm) NPS

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard establishes minimum requirements for double-disc swing-check valves, 2-in. (50-mm) through 48-in. (1,200-mm) NPS, with various body and end types for raw, potable, and reclaimed water having a pH range from 6 to 12 and a temperature range of 33–125°F (0.6–52°C).

1.1.1 *Body types.* Valves described in this standard are provided with wafer or threaded-lug ends for installation between ANSI Class 125 flanges or grooved ends for use with IPS pressure pipe.

1.1.2 *Gray-iron pressure ratings.* The minimum design working water pressure for gray-iron valves shall be 200 psig (1,380 kPa) for 2-in. through 12-in. (50-mm through 300-mm) NPS inclusive and 150 psig (1,030 kPa) for 14-in. through 48-in. (350-mm through 1,200-mm) NPS inclusive.

1.1.3 *Ductile-iron pressure ratings.* The minimum design working water pressure for ductile-iron valves shall be 250 psig (1,720 kPa) for 2-in. through 48-in. (50-mm through 1,200-mm) NPS inclusive.