ANSI/AWWA **C509-23**

*(Revision of ANSI/AWWA C509-15)*

AWWA Standard

# Resilient-Seated Gate Valves for Water Supply Service

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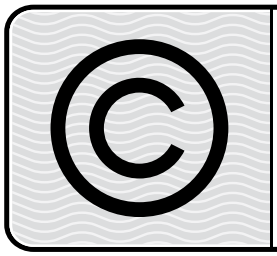
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# Foreword

*This foreword is for information only and is not a part of ANSI*/AWWA C509.*

## I. Introduction.

I.A. *Background*. This standard describes resilient-seated gate valves with nonrising stems (NRS) and outside screw-and-yoke (OS&Y) rising stems, including tapping gate valves for water supply service. The resilient-seated gate valve has been in service in various water utility applications since 1975.

I.B. *History.* The first edition of ANSI/AWWA C509, Resilient-Seated Gate Valves, was published in 1980. ANSI/AWWA C509 includes body and bonnet parts of either gray or ductile cast iron with shell-wall thicknesses equal to those of ANSI/AWWA C500, Metal-Seated Gate Valves, which was first issued in 1952 as ANSI/AWWA C500 but had its roots going back to the first AWWA standard for gate valves adopted on June 24, 1913.

The Manufacturers Standardization Society of the Valves and Fittings Industry (MSS) has played an important role in developing this standard. Founded in 1924, MSS has had official organizational representation on AWWA standards committees dealing with valve and hydrant products since 1930.

The first edition of ANSI/AWWA C509 was approved by the AWWA Board of Directors on Jan. 28, 1980, with subsequent editions approved in 1987, 1994, 2001, 2009, and on June 7, 2015. This edition was approved on Jan. 12, 2023.

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

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† NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.
‡ Water Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235.
§ Persons outside the United States should contact the appropriate authority having jurisdiction.



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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. Four 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; NSF/ANSI/CAN 372, Drinking Water System Components—Lead Content; and NSF/ANSI/CAN 600, Health Effects Evaluation and Criteria for Chemicals in Drinking Water.

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.

NSF/ANSI/CAN 600 (which formerly appeared in NSF/ANSI/CAN 60 and 61 as Annex A, "Toxicology Review and Evaluation Procedures") 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 NSF/ANSI/CAN 600 procedures may not always be identical, depending on the certifier.

ANSI/AWWA C509 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/CAN 372, Drinking Water System

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



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

1. Standard used—that is, ANSI/AWWA C509, Resilient-Seated Gate Valves for Water Supply Service, of latest revision.
2. Whether compliance with NSF/ANSI/CAN 372, Drinking Water System Components—Lead Content, or an alternative lead content criterion, is required.
3. Whether the purchaser requires that the cast ferrous valve components be made of ductile iron.
4. Quantity required.
5. Special packaging for shipment as may be required for protection of coatings.
6. Whether the pH level of the water is less than 6.5 or greater than 8.5.
7. Size and type of valve, NRS or OS&Y (Sec. 1.1).
8. Whether the valve will be used in a corrosive environment (Sec. 1.1.4) determined by methods described in AWWA Manual M27.
9. Catalog data, net weight, and assembly drawings to be provided by the manufacturer (Sec. 4.1), if required.



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10. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.2.1).

11. If test records of valve component materials are required (Sec. 4.2.4.2).

12. Whether the valve will be subjected to water that reacts chemically with materials used in these valves. Consultation with the manufacturer is advised to determine the suitability in cases of doubt (Sec. 4.2.4.5.5).

13. Other coating requirements (Sec. 4.2.4.11) and whether coating (Sec. 4.5.2) shall be NSF/ANSI/CAN 61 approved.

14. Cutter diameter must be specified for tapping valves (Sec. 4.3.3.3.2).

NOTE: Tapping machine shell-cutters are made in either full size (outside diameter [OD] is full nominal size) or undersize (OD is less than full nominal size, i.e., usually ½ in. (13 mm) less [MSS SP-113]). The purchaser should specify the size of the shell-cutter that the valve must accept.

15. Whether valves 54 in. (1,350 mm) and larger shall have a reduced or full-size waterway (Sec. 4.3.3.2).

16. Type of valve ends—flanged, including dimensions (Sec. 4.4.1.4.1, No. 2), spot facing (Sec. 4.4.1.4.1, No. 3), straddled bolt holes (Sec. 4.4.1.4.1, No. 5), mechanical joint (Sec. 4.4.1.4.2), push-on joint (Sec. 4.4.1.4.3), tapping valve flange (Sec. 4.4.1.4.4), and end flange requirements for tapping valves (Sec. 4.4.1.4.4).

17. Whether bolting material with physical and chemical properties other than ASTM A307 is required (Sec. 4.4.4). It is recommended that the purchaser verify with the supplier the appropriateness of any alternative bolting materials required. What alternative, if any, is desired in the type of rustproofing for bolts and nuts (Sec. 4.4.4.1).

18. Type of stem seal for NRS valves (Sec. 4.4.6.1) and for OS&Y valves (Sec. 4.4.6.2).

19. Packing material requirements (Sec. 4.4.6.2.1).

20. Whether the valve is handwheel or wrench-nut operated and the direction in which the handwheel or wrench nut shall turn to open (Sec. 4.4.7).

21. Detailed description of wrench nut, if not in accordance with Sec. 4.4.7.2.

22. Whether gearing is required (Sec. 4.4.8).

23. Gear material requirements (Sec. 4.4.8.1).

24. If gear casing is required (Sec. 4.4.8.2).

25. If position indicators are required (Sec. 4.4.8.3).

26. Whether records of tests specified in Sec. 5 are to be provided.

27. Special markings (Sec. 6.1.1.1.1), if required.

28. Affidavit of compliance (Sec. 6.3), if required.



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III.B. *Modification to Standard*. Any modification of 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. Updated Sec. I.C., Acceptance, in the foreword with the latest Standards Council language reflecting the addition of reference to NSF/ANSI/CAN 372 and 600.

2. The scope of the standard was revised to include gate valve sizes 42–72 in. (1,050–1,800 mm).

3. Definitions were added to Sec. 3 for potable water, reclaimed water, reduced waterway, and wastewater.

4. Updated Sec. 4.2.1, General, and Sec. 4.2.2, Permeation, with the latest Standards Council boilerplate language.

5. The allowable dezincification depth for copper alloys was increased from 25 microns to 100 microns in Sec. 4.2.4.5.5.

6. Liquid epoxy and fusion bonded epoxy coatings were added as allowable coatings to Sec. 4.2.4.11, Coatings.

7. Sec. 4.3.3, Size of Waterway, was revised to require valves sizes 48 in (1,200 mm) and smaller to have a full waterway and added in a new Sec. 4.3.3.2 providing requirements for reduced and full waterways for valves 54 in. (1,400 mm) and larger.

8. Table 2, Minimum full waterway sizes, was revised to include valves sizes 42–72 in. (1,050–1,800 mm) and added requirements for minimum reduced waterway diameters for sizes 54–72 in. (1,350–1,800 mm).

9. Tables 3, 4, 5, 8, and 11 were revised to include valves sizes 42–72 in. (1,050–1,800 mm).

10. Tables 8 and 9 were revised to include valves sizes 42–72 in. (1,050–1,800 mm) and requirements for reduced and full waterways for these sizes.

11. Sec. 4.4.1.4.4, Tapping Valve Ends (No. 1), was revised to include sizes up to 60 in. (1,500 mm).

12. A new Sec. 4.4.7.1, Legible Writing, was added to address marking on wrench nuts and handwheels.

13. A new Appendix B was added on valve bypasses.



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**V. Comments.** If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711; write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098; or email at standards@awwa.org.



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(Revision of ANSI/AWWA C509-15)

American Water Works Association

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AWWA Standard

# Resilient-Seated Gate Valves for Water Supply Service

## SECTION 1: GENERAL

### Sec. 1.1 Scope

This standard describes iron-body resilient-seated gate valves with nonrising stems (NRS) and outside screw-and-yoke (OS&Y) rising stems, including tapping gate valves, for water supply service having a temperature range of 33–125°F (0.6–52°C).

1.1.1 *Velocity.* These valves are intended for applications where fluid velocity does not exceed 16 ft/s (4.9 m/s) when the valve is in the full-open position.

1.1.2 *Sizes*. Gate valves described by this standard are 3–72 in. (75–1,800 mm) nominal pipe size (NPS).

1.1.3 *Valve pressure rating*. The minimum design working water pressure shall be 200 psig (1,380 kPa [gauge]) for 3–12 in. (75–300 mm) sizes and 150 psig (1,034 kPa [gauge]) for 14–72 in. (350–1,800 mm) sizes.

1.1.4 *Conditions and materials not covered.* This standard is not intended to describe special conditions of gate valve installation or operation, such as built-in power drive, installation in unusually corrosive soil, conveyance of unusually corrosive water, excessive water hammer, frequent operation (as in filter service), or operation in a throttled position. These conditions are beyond the intended scope of this standard and require special consideration in design and construction.



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