ANSI/AWWA **C561-21**

*(Revision of ANSI/AWWA C561-14)*

AWWA Standard

# Fabricated Stainless-Steel Slide Gates

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American Water Works Association

Approved American National Standard ANSI

STANDARD Since 1881

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# Foreword

*This foreword is for information only and is not a part of ANSI/AWWA C561.*

## I. Introduction.

I.A. *Background.* A fabricated stainless-steel slide gate is a vertically sliding gate with a fabricated, reinforced stainless-steel slide and a frame with ultra-high-molecular-weight polyethylene (UHMW-PE) seating faces and seals or UHMW-PE seating faces and resilient rubber seals. The slide gate consists of a self-contained frame or non–self-contained frame and a slide. Examples of where this type of gate is used include the control of water and wastewater through orifice openings in walls, at the ends of pipes, at the ends of open-top channels or within open-top channels and controlling flow at openings in tank walls. Downward-opening gates act as weir gates. Slide gates are raised and lowered by means of a stem or rod using a manually operated screw stem actuator, an electrically driven screw stem actuator, or by a hydraulic cylinder. Gates are mounted directly to concrete walls with anchor bolts, grouted into blockouts within concrete channel walls, or bolted to a pipe flange or wall thimble. Other terms used to describe slide gates include "penstocks" and "sluice gates".

The term "slide gate" has been adopted for use by this series of standards, which supersede ANSI/AWWA C501-92. The standards are:

ANSI/AWWA C560—Cast-Iron Slide Gates

ANSI/AWWA C561—Fabricated Stainless-Steel Slide Gates

ANSI/AWWA C562—Fabricated Aluminum Slide Gates

ANSI/AWWA C563—Fabricated Composite Slide Gates

The slide gates represented by ANSI/AWWA C560 through ANSI/AWWA C563 differ in material and means of sealing between the slide and the fixed frame as described below.

ANSI/AWWA C560 gates have a cast-iron or cast-ductile-iron slide and frame with machined metal seating faces and wedges to force the slide to seal between the seating faces on the slide and frame.

ANSI/AWWA C561 gates have a fabricated, reinforced stainless-steel slide and a frame with UHMW-PE seating faces and seals or UHMW-PE seating faces and resilient rubber seals.

ANSI/AWWA C562 gates have a fabricated, reinforced aluminum slide and a frame with UHMW-PE seating faces and seals or UHMW-PE seating faces and resilient rubber seals.



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ANSI/AWWA C563 gates have fiberglass-reinforced composite-plastic or rigid compressed plastic slides and frames of either fiberglass-reinforced composite-plastic, stainless steel, or coated carbon steel, with UHMW-PE seating faces and seals or UHMW-PE seating faces and resilient rubber seals.

I.B. *History*. The original AWWA standard for slide gates (then referred to as "sluice gates") was approved as tentative on June 26, 1941 and described cast-iron gates. The tentative standard was revised and approved on June 4, 1967, as AWWA C501. Subsequent editions were approved in January 1980, June 1987, and June 1992. Following the latest revision, the Standards Council authorized the development of additional standards for slide gates to recognize the widespread use of slide gates similar to ANSI/AWWA C501 gates in performance but manufactured by different methods and from different materials. For consistency among the new standards and recognizing the new designs employed, the Standards Council directed that each of the standards use the name "slide gate" in lieu of the term "sluice gate." The Standards Council also directed that ANSI/AWWA C501 be redesignated ANSI/AWWA C560, with subsequent slide gate standards numbered consecutively. The first edition of ANSI/AWWA C561, Fabricated Stainless-Steel Slide Gates, was approved on Jan. 18, 2004. Subsequent editions were approved on Jan. 22, 2013, and June 8, 2014. This edition was approved Jan. 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). 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.

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



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2. Two standards developed under the direction of NSF,[†] NSF/ANSI[‡]/CAN[§] 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects.

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 C561 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.**

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, environmental conditions as well as temperature. Careful selection of and specifications for elastomeric materials and the

[†] NSF International, P.O. Box 130140, 789 North Dixboro Road, Ann Arbor, MI 48105.

[‡] American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036.

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

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



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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 shall be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA C561, Fabricated Stainless-Steel Slide Gates, of latest revision.

2. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required.

3. Number of units required.

4. Type of closure—conventional or flush-bottom.

    a. Size—by width and height of clear opening.

5. Design head measured from the surface of water or wastewater to centerline of gate, in feet (meters), for the following:

    a. Seating head.

    b. Unseating head.

6. Operating head measured from surface of water or wastewater to centerline of gate, in feet (meters), in both seating and unseating conditions.

7. Type of lift actuator—manual, electric-motor–driven, or hydraulic-cylinder. If electric-motor–driven or hydraulic-cylinder, the purchaser should refer to ANSI/AWWA C542, Electric Motor Actuators for Valves and Slide Gates, or ANSI/AWWA C541, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates, respectively, of latest revision.

8. Conventional mounted frame or self-contained thrust reaction frame.

9. Upward- or downward-opening gate.

10. If hydraulic actuators are specified, provide cylinder operating media and pressure (refer to ANSI/AWWA C541, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates, of latest revision).

11. Definition of any special design and construction required for conditions beyond the scope of this standard, such as throttling service, environmental conditions, sediment or grit exposure, and intended operation frequency and duration.

12. Frequency of operation and special operating conditions, such as ice formation.



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13. An installation-requirement drawing showing clearances, wall and floor thicknesses, details of wall pipe and thimble installation, and location of actuator.

14. Any drawings and material requirements required of the supplier or of the manufacturer (Sec. 4.1 and Sec. 4.2).

15. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.3).

16. If test records must be viewed (Sec. 4.3.2).

17. Acceptable materials (Sec. 4.3.3).

18. If seals, separate from seats, are to be provided (Sec. 4.3.3.8).

19. Rising stem or nonrising stem (Sec. 4.4.7 and 4.4.11).

20. Type of gate mounting used; if a wall thimble is used, required length and shape (Sec. 4.4.10).

21. Omission of stem covers if not required (Sec. 4.4.13.6).

22. If a gate position indicator is to be provided with the actuator (Sec. 4.4.13.7).

23. If an actuator stand is needed (Sec. 4.4.14).

24. Weld inspections, if required (Sec. 4.5.1.3.2).

25. Inspection by purchaser, if required (Sec. 5.1).

26. Leakage tests in the shop (Sec. 5.2.1) and in the field (Sec. 5.2.2), if required.

27. Separate shipment of embedded items, if required (Sec. 6.2).

28. Affidavit of compliance, if required (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 revisions made to the standard in this edition include the following:

1. A section on chlorine and chloramine degradation of elastomers was added to the foreword (Sec. II.A.).

2. The definition of constructor has been removed from the standard.

3. Sec. 4: Requirements, was extensively updated to read consistently among the four slide gate standards, except for where materially different.

4. Tensile, compressive, and critical buckling loads were readdressed and clarified, along with the definitions for rated and extreme loads.

5. A basis for rejection section was added (Sec. 5.3)

**V. Comments.** If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711, FAX 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

# Fabricated Stainless-Steel Slide Gates

## SECTION 1: GENERAL

### Sec. 1.1 Scope

This standard describes vertically mounted, fabricated stainless-steel slide gates with full-aperture closure, designed for either seating head or unseating head or both, in ordinary water supply and wastewater service. The gates are primarily used to shut off or throttle water or wastewater flow through a rectangular or round orifice, end of channel, or in-channel opening. They may be of either conventional-closure or flush-bottom–closure type and may open upward or downward. This standard also describes manual gate actuator mechanisms together with standard accessories. Power-actuated mechanisms (including electric or hydraulic) are described in ANSI/AWWA C541 and ANSI/AWWA C542.

### Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for fabricated stainless-steel slide gates, including materials, general design, manufacture, testing, inspection, and shipment.

### Sec. 1.3 Application

This standard can be referenced in specifications for purchasing and receiving stainless-steel slide gates and can also be used as a guide for designing and manufacturing fabricated stainless-steel slide gates. The stipulations of this



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