



**American Water Works
Association**

ANSI/AWWA C520-10
(First Edition)

The Authoritative Resource on Safe Water®

AWWA Standard

Knife Gate Valves, Sizes 2 In. (50 mm) Through 96 In. (2,400 mm)



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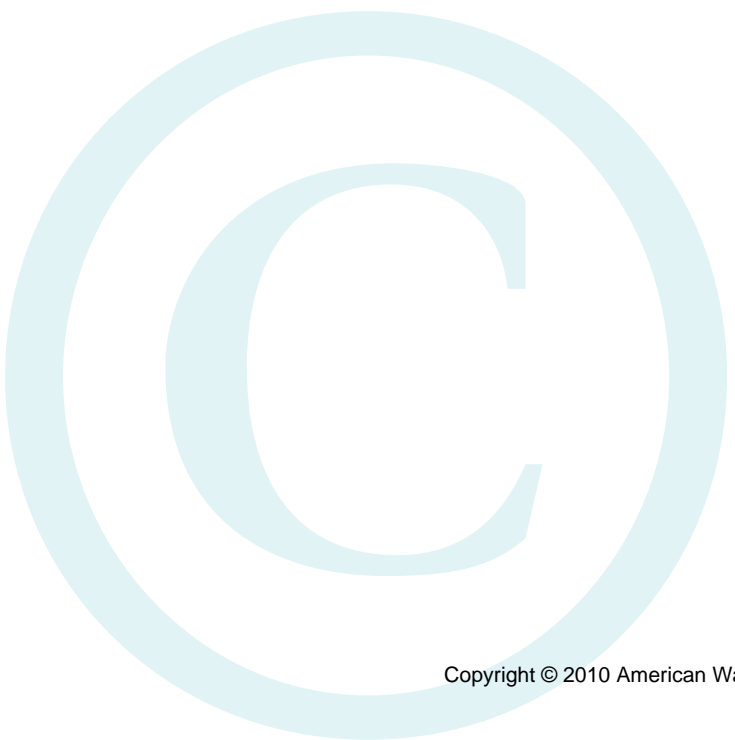
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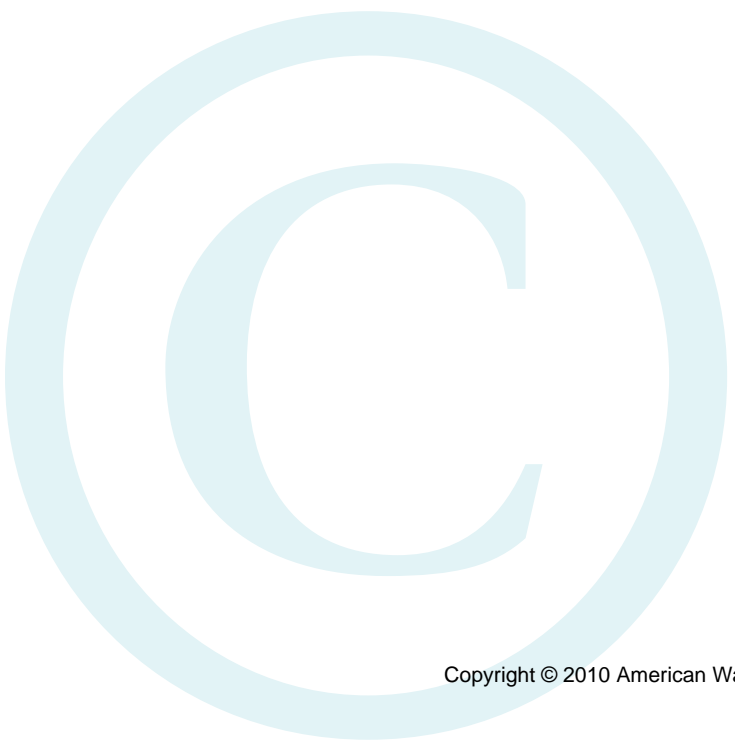


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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C520.*

I. Introduction.

I.A. *Background.* Knife gate valves are generally used for isolation of pipes in water and wastewater treatment plants. Knife gate valves can be metal or resilient seated, bidirectional or unidirectional. Knife gate valves provide tight shutoff and require relatively little space for installation.

I.B. *History.* The need for standardization of knife gate valves was recognized by the American Water Works Association (AWWA) in 2007, resulting in the formation of a standards committee. This first edition of C520 was approved by the AWWA Board of Directors on June 20, 2010.

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, now Water Research Foundation) 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. 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.

* 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.

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 C520 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. *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 the operation of the valve, including (1) the maximum transient and static differential pressure across the valve gate and (2) flow through the valve under the most adverse operating conditions. Torque and thrust requirements for valve operation vary considerably with differential pressure across the valve, fluid velocity, and fluid temperature. Knife gate valves are not intended for throttling service.

Shutoff direction is important in the installation and use of a knife gate valve. The valve's performance and sealing characteristics vary with direction of sealing. A manufacturer may have a recommended high-pressure sealing side for long-term reliability.

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

Installation: Knife gate valves may have protrusions in the bonnet area that may come in contact with oversize mating flanges. The top works of the valve may be significant and should be considered when designing the piping system.

Permeation: The selection of materials is critical for potable water, wastewater, and reclaimed water service and distribution piping in locations where there is a likelihood the pipe will be exposed to significant concentrations of pollutants composed 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 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 forth, *before* selecting materials for use in that area.

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 specifications. Refer to Sec. III.A in this foreword. Other advisory information is provided below.

1. The maximum anticipated fluid velocity through the valve, maximum non-shock operating pressure, water temperature range, and valve classification are used by manufacturers to calculate torque and thrust requirements, which then may determine valve operating-component design and actuator sizing. This information should be provided according to items in Sec. III.A in this foreword.

2. The direction of shutoff and whether it is uni- or bidirectional can affect valve design.

3. There is no standard for valve laying lengths for valves larger than 36 in. (900 mm). Laying lengths should be provided by the supplier on outline drawings for the contract.

4. Whether the valve is to be provided with or without a bonnet.

5. Some actuators may produce sufficient torque that may damage the valve if the valve is prevented from closing because of an obstruction in the pipeline. Preventive measures such as torque limiting devices or shear pins and keys are beyond the scope of this standard.

II.C. *Advisory information on scheduling requirements.* Valves made in accordance with this standard in large sizes are not “production run” products. They are custom designed and manufactured for the specific application. As a consequence

of this, the valve manufacturers may require more time than usual for “small” valves to develop bid prices, prepare valve designs, submit shop drawing data, manufacture the valve, and shop test the valve. For example, manufacturers may typically require several weeks to develop reasonable bid prices. Shop drawings or other submittal preparation may require an additional two to four weeks. Valve manufacture may take over six months to manufacture the valve. The purchaser should discuss schedule requirements with manufacturers in advance of placing orders or advertising for bids.

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 used—that is, ANSI/AWWA C520, Knife Gate Valves, Sizes 2 In. (50 mm) Through 96 In. (2,400 mm), of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required.
3. Size of valve and quantity required.
4. Minimum design pressure.
5. Maximum nonshock shutoff pressure and maximum nonshock line pressure.
6. Required flow rate through valve
 - a. under normal conditions.
 - b. under maximum-flow conditions.
7. Data to be provided by the manufacturer or supplier. Sec. 4.1 describes the minimum data to be provided by the supplier. Because these valves may be custom designed and manufactured, purchasers may require more detailed or comprehensive data. Such data may include
 - a. chemical analysis of materials for body, gate, and shaft.
 - b. tensile strength, yield strength, hardness, and impact test data for body, gate, and shaft materials.
 - c. weld procedures and documentation.
 - d. laying length, sizes greater than 36 in. (900 mm) NPS.
 - e. center of gravity.All such requirements shall be clearly defined in the purchase documents. The appropriate submittal requirements per ASTM and ASME material and design standards should be referenced.
8. Details of other federal, state or provincial, and local requirements (Sec. 4.2.1).

9. The providing of test records that are specified according to Sec. 4.2.2.4.1, 5.1.1, 5.1.2, and 5.1.3 of this standard. Test records required for ANSI/AWWA C541, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates, and ANSI/AWWA C542, Electric Motor Actuators for Valves and Slide Gates, may also be requested. The purchaser may require all records or may stipulate a breakdown of production test records or proof-of-design test records.

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

11. Type of shaft seal.

12. Whether shaft seal shall be contained in a bonnet.

13. Materials.

a. If the purchaser specifies a wetted component that was not tested and certified to NSF/ANSI 61 requirements, the certification may not be valid.

b. If one or more of the materials included in this standard are unacceptable, specify the acceptable materials that are included in this standard.

14. Type of installation: buried (specify depth and loadings) vault, submerged (specify depth and duration), indoors, or outdoors.

15. Actuator type and service conditions.

a. Type—manual, electric, cylinder, or other.

16. Manual actuator.

a. Type—handwheel, chainwheel, or wrench nut.

b. Direction to turn the handwheel, chainwheel, or wrench nut to open valves. (Unless otherwise specified, the valve will open by turning counterclockwise.)

c. Position indicator:

—If it is required.

—Configuration for vault, submerged, or in-plant service.

d. Special devices or features if required: gate guards, extension shaft, floor stand, handwheel diameter, limit switches, or position transmitter.

17. Electric actuator.

a. Type: multiturn actuator coupled to an intermediate mechanism

b. Characteristics: operating voltage, control scheme, opening and closing time.

c. Position indicator: configuration.

d. Special considerations: type of service environment should be stated and appurtenances required.

18. Cylinder actuator.

a. Operating medium: air, water, or oil.

b. Medium pressure: maximum and minimum.

- c. Characteristics: control scheme, opening and closing speed ranges.
 - d. Position indicator:
 - If it is required.
 - Configuration.
 - e. Special requirements:
 - Specify any limitations on acceptability or any special construction required.
19. Other actuators: actuators other than those described in this standard or ANSI/AWWA C541 and C542 shall be specified by the purchaser in detail.
20. Valve and actuator arrangement and position.
21. Protective coatings if other than specified in Sec. 4.6 of this standard.
22. Affidavit of compliance with applicable provisions of this standard notarized and signed by the valve and actuator manufacturer's person in responsible charge.
23. Copies of the "proof of design test" performed in accordance with Sec. 5.2.
24. Description of fluid and temperature range, including 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.
25. If purchaser requires shop inspection or test observations to be performed by the purchaser or purchaser's agent, the extent of such inspections and observations shall be defined.
26. Special markings to be applied to valve by manufacturer (Sec. 6.1).
27. Records of materials tests (Sec. 4.2.2.4.1).

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. This is the first edition of the standard.

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, write to the group at 6666 West Quincy Avenue, Denver, CO 80235-3098, or e-mail the group at standards@awwa.org.



**American Water Works
Association**

AWWA Standard

Knife Gate Valves, Sizes 2 In. (50 mm) Through 96 In. (2,400 mm)

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes bonneted, bonnetless and one- and two-piece fabricated stainless-steel and cast ductile-iron body knife gate valves with resilient or metal seats, including tapping knife gate valves, for use in water, wastewater, and reclaimed water systems with pH range from 6 to 12 and a temperature range from 33°F to 125°F (0.6°C to 52°C). The minimum design pressure shall be 150 psig (1,034 kPa) for nominal sizes 2 in. to 24 in. (50 mm–600 mm), and the minimum design pressure for nominal sizes 30 in. to 96 in. minimum (750 mm–2,400 mm) shall be 25 psig (172 kPa), 75 psig (517 kPa), and 150 psig (1,034 kPa).

Sec. 1.2 Purpose

The purpose of this standard is to provide minimum requirements for stainless-steel and ductile-iron body knife gate valves with resilient and metal seats, including tapping knife gate valves, for use in water, wastewater, and reclaimed water systems, including materials, design, testing, rejection, marking, and shipping.

Sec. 1.3 Application

This standard can be referenced in specifications for purchasing of stainless-steel and ductile-iron body knife gate valves with resilient and/or metal seats,