

American Water Works Association

ANSI/AWWA C507-99

(Revision of ANSI/AWWA C507-91)



AWWA STANDARD
FOR
BALL VALVES, 6 IN. THROUGH 48 IN.
(150 mm THROUGH 1,200 mm)



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AMERICAN WATER WORKS ASSOCIATION

6666 West Quincy Avenue, Denver, Colorado 80235

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Committee Personnel

The AWWA Standards Committee on Ball Valves, which revised and approved this standard, had the following personnel at the time of approval:

Bayard E. Bosserman, *Chair*

Consumer Members

Peter Fortin, City of Norfolk Department of Utilities, Norfolk, Va.	(AWWA)
V.Q. Le, Los Angeles Water and Power, Los Angeles, Calif.	(AWWA)
W.F. Reeves Jr., Cincinnati Water Works, Cincinnati, Ohio	(AWWA)
I.M. Schuraytz, Detroit Water and Sewage Department, Detroit, Mich.	(AWWA)
D.C. Stone, Denver Water, Denver, Colo.	(AWWA)

General Interest Members

B.E. Bosserman, Boyle Engineering Corporation, Mission Viejo, Calif.	(AWWA)
Tom Chadwick, Earth Tech, San Diego, Calif.	(AWWA)
W.D. Ensor, Gannett Fleming Inc., Newport News, Va.	(AWWA)
R.E. Herriott, Malcolm Pirnie, Columbus, Ohio	(AWWA)
J.R. Holstrom, Duke Engineering & Services, Naperville, Ill.	(AWWA)
M.B. Horsley, Black & Veatch LLP, Overland Park, Kan.	(AWWA)
W.A. Hunt, Consulting Engineer, Bozeman, Mont.	(AWWA)
L.C. Rodman,* Council Liaison, Black & Veatch LLP, Overland Park, Kan.	(AWWA)
Jeff Smith, CH2M Hill, Las Vegas, Nev.	(AWWA)
H.E. Spindler, Nodaway Valley Engineering, Barnard, Mo.	(AWWA)
J.S. Wailes,* Standards Engineer Liaison, AWWA, Denver, Colo.	(AWWA)

Producer Members

J.V. Ballun, Val-Matic Valve & Manufacturing Corporation, Elmhurst, Ill.	(AWWA)
Mac Dixon, Henry Pratt Company, Aurora, Ill.	(AWWA)
Keith Hall, APCO Willamette/Valve & Primer, San Clemente, Calif.	(AWWA)
T.A. Hartman, Hartman Valve Corporation, St. Louis, Mo.	(AWWA)
A.J. Hejl, Nibco Inc., Nacogdoches, Texas	(AWWA)
J.E. Pearman, Rodney Hunt Company, Orange, Mass.	(AWWA)
F.W. Peirce, G.A. Industries Inc., Cranberry Township, Pa.	(AWWA)
W.B. Scobie,† Mueller Company, Cranston, R.I.	(AWWA)

*Liaison, nonvoting

†Alternate

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Foreword

This foreword is for information only and is not a part of AWWA C507.

I. Introduction.

I.A. *Background.* Ball valves have been used in pipelines carrying water for at least 40 years. Manufacturers of ball valves have developed tight-seating ball valves using metal-to-metal seats and also metal-to-resilient seats.

I.B. *History.* The first edition of AWWA C507, Standard for Ball Valves, Shaft- or Trunnion-Mounted—6 In. Through 48 In.—for Water Pressures up to 300 psi, was approved on Sept. 14, 1973. The second edition of AWWA C507, Standard for Ball Valves, 6 In. Through 48 In., was approved by the AWWA Board of Directors on June 23, 1985. The third edition was approved by the AWWA Board on June 23, 1991. This fourth edition was approved by the AWWA Board on Jan. 24, 1999.

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 all direct and indirect drinking water additives. Other members of the original consortium included the American Water Works Association Research Foundation (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. 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, ANSI[†]/NSF 60[‡], Drinking Water Treatment Chemicals—Health Effects, and ANSI/NSF 61, Drinking Water System Components—Health Effects.
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 ANSI/NSF 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.

*Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction.

[†]American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

[‡]NSF International, 3475 Plymouth Rd., Ann Arbor, MI 48106.

[§]Both publications available from National Academy of Sciences, 2102 Constitution Ave. N.W., Washington, DC 20418.

Appendix A, “Toxicology Review and Evaluation Procedures,” to ANSI/NSF 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 Appendix A procedures may not always be identical, depending on the certifier.

AWWA C507-99 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 all 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. This standard covers only ball valves of the shaft- or trunnion-supported type. Generally, the valves are of cast construction in 150-psi (1,050-kPa), 250-psi (1,750-kPa), and 300-psi (2,100-kPa) pressure classes, with bodies having flanged ends. The actuating forces required to operate a ball valve of a given size vary considerably and depend on the size of the valve, the differential operating pressure, the quantity of water flow, the configuration of waterway passages, and the seal design used. This standard covers the design of these valves and their actuators operating at a maximum differential pressure equal to or less than the design pressure and a maximum port velocity of 35 ft/s (10.7 m/s). Ball valves capable of operating under pressure-velocity conditions exceeding these ratings are available but are outside the scope of this standard.

This standard uses the terms “differential pressure” and “rated pressure.” These terms are defined in Sec. 3, Definitions. As an example, a valve could be in a service in which the “rated pressure” is 100 psi (690 kPa), but the “differential pressure” is only 50 psi (345 kPa). That is, the pipeline pressure could be 100 psi (690 kPa), but with the valve closed, the differential pressure between the two sides of the closed ball is 50 psi (345 kPa).

II.B. Considerations for Throttling Service. If a valve is to be installed for throttling service, the purchaser must carefully evaluate the full range of differential pressures across the valve versus the downstream pressures in order to avoid damage by cavitation. Differential pressures across the valve versus downstream pressures for all angles of the ball, together with the hydraulic characteristics of the valve, must be determined and evaluated to ensure a successful installation.

Although port velocities greater than 35 ft/s (10.7 m/s) have a higher probability of causing cavitation in piping systems, especially if valves are used to throttle flows, the 35-ft/s (10.7-m/s) port velocity is not an upper limit to the flow that can be satisfactorily handled by ball valves. Piping systems capable of producing higher velocities should be studied by the purchaser and manufacturer to ensure the most appropriate valve selection.

II.C. Valve Supports Not Intended as Anchors. According to Sec. 4.3.2.1.4 in this standard, valve bodies are required to have support legs or pads. These body support legs or pads should also rest on foundations, piers, or plate bearings without being anchored to the supports. The purpose of the body support legs or pads is to support the weight of the valve and actuator assembly when the valve is installed in a horizontal pipeline. These support legs or pads are not intended to be anchored to foundations that would require the valve to withstand loads caused by thermal

expansion of piping or to support piping loads with the valve body. It is recommended that the purchaser take the responsibility of providing adequate supports for the piping. Ball valves installed in vertical pipelines may be supported by the flanged connections between the body and the pipeline.

II.D. *Effects of Pressure on Seat Performance.* Some ball valve seat designs are pressure sensitive, and the ability of these designs to meet the shop seat-leakage test requirements as outlined in Sec. 5.2.1 depends on the specified differential pressure. The ball valves described in this standard do not have a leakage requirement other than the design differential pressure. Operation of a valve at differential pressures less than the specified differential pressure may result in increased seat-leakage rates. If operation at differential pressures lower than the specified differential pressure is critical, then the user should consult with the manufacturers and specify allowable leakage rates at the lower pressures. Operation of a valve at differential pressures greater than the specified differential pressure may result in accelerated seat wear or the inability of the valve to seat or unseat properly, or both. The purchaser should provide the manufacturer with the actual operating differential pressure or range of differential pressures to ensure optimum seat performance.

III. Use of This Standard. AWWA has no responsibility for the suitability or compatibility of the provisions of this standard to any intended application by any user. Accordingly, each user of this standard is responsible for determining that the standard's provisions are suitable for and compatible with that user's intended application.

III.A. *Purchaser Options and Alternatives.* The following items should be considered in the purchaser's specifications:

1. Standard used—that is, AWWA C507-99, Standard for Ball Valves, 6 In. Through 48 In. (150 mm Through 1,200 mm).
2. An optional requirement that the manufacturers' drawings and material specifications be provided in sufficient detail to show that the proposed equipment meets the purchaser's specifications.
3. An optional requirement that the manufacturers provide end-to-end dimensions and the total, approximate, net assembled weight for each valve.
4. An optional requirement that the manufacturers submit drawings showing the principal dimensions, general construction, and materials for all parts of each valve, and that all work be done and all valves be provided in accordance with such drawings.
5. An optional requirement that the manufacturer include instructions, parts manuals, recommended spare parts lists, and maintenance procedures.
6. Size of the valve, pressure class, and quantity required (Sec. 1).
7. Type of installation—buried, submerged, in-plant, in-vault, or outdoor.
8. Valve and actuator arrangement and position.
9. Body materials if there is a preference (Sec. 4.3.2.1.1).
10. Type of valve support if different from the standard (Sec. 4.3.2.1.4).
11. Ball material if there is a preference (Sec. 4.3.2.2.1).
12. Whether a double- or single-seated valve is desired and preference of seat materials if any (Sec. 4.3.2.3).
13. Resilient seat location (body or ball) if there is a preference (Sec. 4.3.2.3).
14. Bearing material if there is a preference (Sec. 4.3.2.4.6).
15. Shaft material if there is a preference (Sec. 4.3.2.5.2).
16. Type of shaft seals if there is a preference (Sec. 4.3.2.6.2).