ANSI/AWWA C530-22

(Revision of ANSI/AWWA C530-17)

AWWA Standard

Pilot-Operated Control Valves

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American Water Works Association

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STANDARD Since 1881

AWWA Standard

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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 C530.*

I. Introduction.

I.A. *Background.* Pilot-operated control valves have been in use since the early 1900s in pipelines that carry liquids. Manufacturers of pilot-operated control valves have developed tight-closing rubber-seated and metal-seated products for pipeline use in water distribution and power generation. This standard describes two types of pilot-operated control valves: the piston and diaphragm types. Both pilot-operated control valve types are sold in globe, wye, and angle body configurations.

Since the late 1940s, pilot-operated control valves have gained increased acceptance for use in water treatment plants, in water supply and distribution, and in building heating, ventilation, and air-conditioning (HVAC) applications because they (1) provide tight shutoff, (2) provide for large pressure drops across the valves, (3) are suitable for many functions depending on the pilot system, and (4) are relatively easy to operate and maintain.

I.B. *History.* The need for a standard addressing pilot-operated control valves was recognized by the American Water Works Association (AWWA) in November 2001. A committee was appointed for the task of standardization; at the first inaugural meeting in June 2003, a subcommittee was appointed by the chair to develop a standard. The first edition was approved by the AWWA Board of Directors on June 24, 2007. The second edition was approved on June 10, 2012. The third edition was approved on June 11, 2017. This edition was approved by the AWWA Board of Directors on June 10, 2022.

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.

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.

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 the 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" of 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 C530 does not address additive requirements. Users of this standard should consult the appropriate state or local agency having jurisdiction in order to

1. Determine additive requirements, including applicable standards.

2. Determine the status of certification by parties offering to certify products for contact with, or treatment of, drinking water.

3. Determine current information on product certification.

[†] Persons outside the United States should contact the appropriate authority having jurisdiction.

[‡] NSF International, 789 North Dixboro Road, Ann Arbor, MI 48113.

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

II. Special Issues. Conditions under which the pilot-operated control valve is to be operated must be evaluated carefully by the purchaser. This evaluation must include determination of the hydraulic characteristics of the system in which the valve will be installed and the pilot devices required for operation of the valve, including (1) maximum and static differential pressures across the valve and (2) the range of flow rates through the valve under the most adverse operating conditions. Velocities exceeding 15 ft/sec (4.6 m/sec) should be discussed with the manufacturer. When selecting a type of valve, it must be noted that there are various types of control valves with different combinations of pilots and actuation mechanisms.

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 information should be provided by the purchaser.

1. Standard used, that is, ANSI/AWWA C530, Pilot-Operated Control Valves, of latest revision.
2. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required.
3. Size of valve.
4. Quantity required.
5. Maximum nonshock inlet pressure.
6. Minimum and maximum pressure drop across the seat.
7. Maximum head loss, if required.
8. Maximum transient pressure and characteristics, if known.
9. Requirements for anti-cavitation trim material.

10. State special devices or features, if required, including number and location of isolation valves for pilot lines, type of pilot filter element, open–close time speed control requirements, position indication, remote control devices, remote and externally mounted three-position control switches (open–close–auto), pressure gauges, and/or pressure transmitters on inlet and outlet flange taps.

11. Consideration 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, that may affect the corrosivity of these chemicals. The purchaser should consult with the manufacturer and, if appropriate, specify special requirements for these components.

12. Required rate of flow for normal flow conditions and for minimum and maximum flow conditions (Sec. 1.1).

13. Body style (globe, wye, or angle) (Sec. 1.1.1).

14. Flow port area (nominal diameter or reduced port) (Sec. 7.1.8).

15. Certified drawings to be provided by the manufacturer (Sec. 4.1.1).

16. Laying length dimension (Sec.# III.B).

17. Maximum height from valve centerline to position indicators, including on-site dismantling height requirements (Sec. 4.1.1.1).

18. Maximum space width, including control piping (Sec. 4.1.1.1).

19. Application and pilot type (Sec. 4.1.1.2).

20. Type of pilot-operated control valve, whether diaphragm or piston (Sec. 4.1.1.2).

21. Additional information for remote operation, such as position transmitters, variable pressure control pilots, limit switches, and/or other configurations (Sec. 4.1.1.2).

22. Installation, operation, and maintenance manual requirements (Sec. 4.1.3).

23. Details of other federal, state or provincial, and local requirements (Sec. 4.2.1).

24. Seat and body material (Sec. 4.3.7.1).

25. Type of material for pilot lines (stainless steel, copper, or other preferred material) (Sec. 4.2.2).

26. Type of end connection, flanged, groove-joint, or National Pipe Thread (NPT) (Sec. 4.3.4).

27. Body flange class (cast-iron Class 125 and/or Class 250 in accordance with ASME B16.1; and ductile-iron Class 150 or Class 250 in accordance with

ASME B16.42; or steel Class 150 or Class 300 in accordance with ASME B16.5) (Sec. 4.3.4.1).

28. Specify flange bolt hole drilling pattern class if different from a recognized ANSI pressure class (Sec. 4.3.4.1).

29. Plant inspection by the purchaser, if required (Sec. 5.1.1).

30. Requirement for an affidavit of compliance (Sec. 6.3).

III.B. *Laying Length*. Pilot-operated control valves do not have uniform laying lengths. Interchangeability between various manufacturers may not be possible without modification to the existing piping system. The purchaser is cautioned to obtain this information from the manufacturers for verification prior to purchase.

III.C. *Performance Test*. This standard does not require the manufacturer to conduct the performance test on a fully assembled valve. Sec. 5.2 allows the manufacturer to conduct the tests separately on the main valve and the related pilots. If the purchaser desires the performance test to be conducted on the fully assembled valve, this requirement should be specified in the purchase documents.

III.D. *Valve Test Media*. The purchaser should review Sec. 5.2.1 of this standard and inform the supplier of the preferred valve test media. The standard allows factory testing of valves with air or water.

III.E. *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. Addition of recommendation of control pilot system filtration in Sec. 7.1.4.
2. Clarification of installation position requirements in Sec. 7.1.5.
3. Clarification of pressure relief design requirements in Sec. 7.4.1.

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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American Water Works Association

Dedicated to the World's Most Important Resource®

AWWA Standard

Pilot-Operated Control Valves

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard establishes minimum requirements for pilot-operated control valves of globe, angle, and wye body styles with various end connections in sizes from 1½ through 60 in. (37.5 through 1,500 mm) in diameter, with water having a pH range from 6 to 9 and a temperature range from 40 to 125°F (4.4 to 52°C). The standard covers piston- and diaphragm-type valves suitable for a maximum steady-state fluid working pressure of 300 psig (2,070 kPa), a maximum steady-state differential pressure of 300 psig (2,070 kPa), and a maximum line velocity of 15 ft/sec (4.6 m/sec).

1.1.1 *Body type and class.* The valves described in this standard are provided in three body types (globe, angle, and wye) with various pilot-operating methods in pressure classes described as follows:

1.1.1.1 Angle body type. Classes 125, 150, 250, and 300; ASME flanges, National Pipe Thread (NPT) and grooved joint ends in sizes 1½ to 60 in. (37.5 to 1,500 mm).

1.1.1.2 Globe body type. Classes 125, 150, 250, and 300; ASME flanges, NPT and grooved joint ends in sizes 1½ to 60 in. (37.5 to 1,500 mm).

1.1.1.3 Wye body type. Classes 125, 150, 250, and 300; ASME flanges, NPT and grooved joint ends in sizes 1½ to 60 in. (37.5 to 1,500 mm).