



**American Water Works  
Association**

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**ANSI/AWWA C900-16**  
(Revision of ANSI/AWWA C900-07 and C905-10)

**AWWA Standard**

**Polyvinyl Chloride  
(PVC) Pressure Pipe and  
Fabricated Fittings,  
4 In. Through 60 In.  
(100 mm Through  
1,500 mm)**

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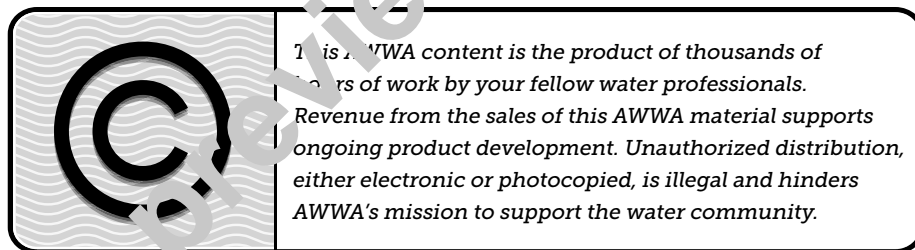
## AWWA Standard

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# Foreword

*This foreword is for information only and is not a part of ANSI/AWWA C900.*

## **I. Introduction.**

I.A. *Background.* This standard pertains to 4-in. through 60-in. (100-mm through 1,500-mm) polyvinyl chloride (PVC) pressure pipe and fabricated fittings with outside diameter (OD) dimensions that conform with either those of ductile and cast iron pipe (CIOD) or steel pipe (IPS). Outside-diameter to wall-thickness (OD) to dimension ratios (DRs) of 14, 17, 18, 21, 25, 26, 27.5, 32.5, 41, and 51 are included and correspond with pressure classes (PCs) of 305, 250, 235, 200, 165, 160, 150, 125, 100, and 80 psi. Design considerations are provided in AWWA Manual M23, *PVC Pipe—Design and Installation*. The manual includes chapters on general properties of PVC pipe; manufacturing, testing, and inspection; pressure capacity; design factors for external forces; hydraulics; receiving, storage, and handling; testing and maintenance; and service connections (tapping). Recommended installation guidance is provided in ANSI/AWWA C605, *Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVC-O) Pressure Pipe and Fittings*.

I.B. *History.* In 1966, the American Water Works Association (AWWA) appointed Committee 8350-D to study and report on the adaptability of plastic pipe for use within the water industry. The committee presented its report on June 6, 1967, at AWWA's annual conference. The report included a recommendation that a task group be appointed to prepare standards for the use of plastic materials. The AWWA Standards Committee of Thermoplastic Pressure Pipe Standards Committee was established in 1968.

In June 1980, the Thermoplastic Pressure Pipe Committee was divided into two separate committees: the Polyvinyl Chloride Pressure Pipe and Fittings Standards Committee and the Polyolefin Pressure Pipe and Fittings Standards Committee.

ANSI/AWWA C900 was the first thermoplastic pipe standard approved by the AWWA Board of Directors in June of 1975. This is the sixth edition of ANSI/AWWA C900. Previous revisions to ANSI/AWWA C900 were prepared by the AWWA Standards Committee and approved in Jan. 1981, Jan. 1989, June 1997, and June 2007. This edition of ANSI/AWWA C900 was approved on Jan. 16, 2016.

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

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. 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.
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 jurisdictions. 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

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

† NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.

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

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

(noncarcinogens) and risk characterization methodology (carcinogens). Use of Annex A procedures may not always be identical, depending on the certifier.

ANSI/AWWA C900 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.** The pressure-class designation requirements and pressure design recommendations presented in this standard are different from those in AWWA Manual M23, PVC Pipe—Design and Installation, second edition (2002). The requirements of this standard take precedence over the design recommendations in AWWA Manual M23, second edition. Inconsistencies with AWWA M23 and this standard should be discussed with the manufacturer. The committee intends to revise the third edition of M23 to align with this standard.

**II.A. Selection of Pressure Class.** The minimum pressure class of the pipe selected should be equal to or greater than the system working pressure. The sum of the system working pressure and occasional surge pressure should not exceed 1.60 times the pressure class of the pipe. The system working pressure and recurring surge pressure should be analyzed using the method in Sec. 4.3. If surge pressures govern the selection of the pressure class, consideration should be given to removal of the cause of surge pressures or to the incorporation of surge suppressors in the system.

**II.B. Concern Regarding UV Light Effects.** The effect of ultraviolet (UV) light on PVC pipe should be insignificant. User concerns such as outdoor storage should be discussed with the manufacturer.

**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 to be used—that is, ANSI/AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm), of latest revision.

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

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

4. Pipe and fabricated fittings.\*

- a. Nominal size [for example, 14 in. (350 mm)].
- b. Working, occasional, and recurring surge pressures (Section 3).
- c. Pressure class or dimension ratio (DR) (see Tables 1A and 1B).
- d. Linear feet of each pressure class or DR for each nominal pipe size to be furnished.

e. Number, nominal size, pressure class, or DR and configuration for fittings and couplings (for example, 17, nominal 24-in. DR 25, 45° bends, IPS).\*

5. When desired, requirements such as the following should be specified in the purchase contract:

- a. Standard lengths (Sec. 4.3.2.4).
- b. Shipping (Sec. 6.2).
- c. Affidavit of compliance (Sec. 6.3).

6. Plant inspection. If plant inspections are desired, provisions must be specified in the purchase contract (Sec. 5.3).

a. Production notice. The manufacturer should be required to give adequate advance notice of when and where production of ordered materials will start.

b. Inspection aids. The manufacturer should be required to make available, without charge, to the purchaser's inspector, such tools and assistance as are necessary for inspection and handling of materials.

c. Inspection limitation. To exclude inspection of proprietary manufacturing processes, the manufacturer should be required to give adequate advance notice to the purchaser.

III.B. *Modification to Standard.* Any modifications to the provisions, definitions, or terminology in the standard must be provided by the purchaser.

**IV. Major Revisions.** Major changes made to the standard in this edition include the following:

1. Pipe size range expanded to include nominal 54 and 60 in. (1,350 and 1,500 mm) along with all of the sizes covered in ANSI/AWWA C905. This expansion eliminates the need for a separate standard (i.e., ANSI/AWWA C905) for nominal sizes above 12 in. (300 mm).

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\* Purchase documents may allow or require the use of fittings other than those described in ANSI/AWWA C900. Some examples of compatible fittings include those covered in ANSI/AWWA standards C208, C153, and C110.

2. Expansion of the scope to include nonpotable water applications.
3. The addition of a ring-tensile (apparent tensile strength at yield) test.
4. The addition of integrity verification test requirements for nonstandard pipe lengths.
5. The addition of qualification test requirements for fusion joints.
6. The addition of pressure classes 150, 200, and 250 psi for pipe with cast iron outside diameters (CIODs).
7. Contract language has been removed from Sec. 5.4.

**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](mailto:standards@awwa.org).

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# Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm)

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## SECTION 1: GENERAL

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### **Sec. 1.1 Scope**

This standard covers polyvinyl chloride (PVC) pipe and fabricated fittings manufactured for conveying potable water, reclaimed water, irrigation water, wastewater, or any fluid compatible with nonplasticized PVC. The standard includes eight dimension ratios (DRs) and nominal sizes ranging from 4 in. through 60 in. (100 mm through 1,500 mm). Standard pipe outside diameters (ODs) conform to the ductile iron and cast iron sizing system, referred to as *cast iron* or *CIOD*, and steel pipe, referred to as *IPS* (iron pipe size). Pressure classes range from 80 psi (550 kPa) to 305 psi (2,100 kPa).

This standard does not include injection-molded PVC fittings. Injection-molded PVC fittings are covered in ANSI/AWWA C907.

### **Sec. 1.2 Purpose**

The purpose of this standard is to provide minimum manufacturing, verification, and marking requirements for PVC pressure pipe and fabricated fittings, 4 in. (100 mm) through 60 in. (1,500 mm).