



**American Water Works
Association**

Erratum to
ANSI/AWWA C905-10
Standard
for

**Polyvinyl Chloride (PVC) Pressure Pipe and
Fabricated Fittings, 14 In. Through 48 In.
(350 mm Through 1,200 mm), for Water
Transmission and Distribution**

(October 2012)

1. Correct Table 1-B, Nominal Size 18, for Pressure Class at 73.4°F (23°C) = 305 psi (2,100 kPa), Wall Thickness, to read 1.393 (35.38).

Table 1-B Dimensions, pressure classes, and dimension ratios for PVC pipe with CI outside diameter (continued)

Nominal Size <i>in.</i>	Pressure Class at 73.4°F (23°C)		Dimension Ratio (DR)	Outside Diameter <i>in. (mm)</i>		Wall Thickness <i>in. (mm)</i>	
	<i>psi</i>	<i>(kPa)</i>		Average	Tolerance	Minimum	Tolerance
14	100	(690)	41.0	15.300 (388.6)	±0.015 (0.38)	0.373 (9.47)	+0.052 (1.32)
	125	(860)	32.5	15.300 (388.6)	±0.015 (0.38)	0.471 (11.96)	+0.056 (1.42)
	165	(1,140)	25.0	15.300 (388.6)	±0.015 (0.38)	0.612 (15.54)	+0.073 (1.85)
	200	(1,380)	21.0	15.300 (388.6)	±0.015 (0.38)	0.729 (18.51)	+0.088 (2.22)
	235	(1,620)	18.0	15.300 (388.6)	±0.015 (0.38)	0.850 (21.59)	+0.102 (2.59)
	305	(2,100)	14.0	15.300 (388.6)	±0.015 (0.38)	1.093 (27.76)	+0.131 (3.33)
16	100	(690)	41.0	17.400 (442.0)	±0.020 (0.51)	0.424 (10.77)	+0.059 (1.50)
	125	(860)	32.5	17.400 (442.0)	±0.020 (0.51)	0.535 (13.59)	+0.064 (1.63)
	165	(1,140)	25.0	17.400 (442.0)	±0.020 (0.51)	0.696 (17.68)	+0.084 (2.13)
	200	(1,380)	21.0	17.400 (442.0)	±0.020 (0.51)	0.829 (21.05)	+0.100 (2.54)
	235	(1,620)	18.0	17.400 (442.0)	±0.020 (0.51)	0.967 (24.56)	+0.116 (2.95)
	305	(2,100)	14.0	17.400 (442.0)	±0.020 (0.51)	1.243 (31.57)	+0.149 (3.78)
18	80	(550)	51.0	19.500 (495.3)	±0.020 (0.51)	0.382 (9.70)	+0.053 (1.35)
	100	(690)	41.0	19.500 (495.3)	±0.020 (0.51)	0.476 (12.09)	+0.067 (1.70)
	125	(860)	32.5	19.500 (495.3)	±0.020 (0.51)	0.600 (15.24)	+0.072 (1.83)
	165	(1,140)	25.0	19.500 (495.3)	±0.020 (0.51)	0.780 (19.81)	+0.094 (2.39)
	200	(1,380)	21.0	19.500 (495.3)	±0.020 (0.51)	0.929 (23.60)	+0.111 (2.82)
	235	(1,620)	18.0	19.500 (495.3)	±0.020 (0.51)	1.083 (27.51)	+0.130 (3.30)
20	305	(2,100)	14.0	19.500 (495.3)	±0.025 (0.64)	1.393 (35.38)	+0.167 (4.24)
	80	(550)	51.0	21.600 (548.6)	±0.025 (0.64)	0.424 (10.77)	+0.059 (1.50)
	100	(690)	41.0	21.600 (548.6)	±0.025 (0.64)	0.527 (13.39)	+0.074 (1.88)
	125	(860)	32.5	21.600 (548.6)	±0.025 (0.64)	0.665 (16.89)	+0.080 (2.03)
	165	(1,140)	25.0	21.600 (548.6)	±0.025 (0.64)	0.864 (21.95)	+0.104 (2.64)
	200	(1,380)	21.0	21.600 (548.6)	±0.025 (0.64)	1.029 (26.14)	+0.123 (3.12)
24	235	(1,620)	18.0	21.600 (548.6)	±0.025 (0.64)	1.200 (30.48)	+0.144 (3.66)
	80	(550)	51.0	25.800 (655.3)	±0.030 (0.76)	0.506 (12.85)	+0.071 (1.80)
	100	(690)	41.0	25.800 (655.3)	±0.030 (0.76)	0.629 (15.98)	+0.088 (2.24)
	125	(860)	32.5	25.800 (655.3)	±0.030 (0.76)	0.794 (20.17)	+0.095 (2.41)
	165	(1,140)	25.0	25.800 (655.3)	±0.030 (0.76)	1.032 (26.21)	+0.124 (3.15)
	200	(1,380)	21.0	25.800 (655.3)	±0.030 (0.76)	1.229 (31.22)	+0.147 (3.73)
30	235	(1,620)	18.0	25.800 (655.3)	±0.030 (0.76)	1.433 (36.40)	+0.172 (4.37)
	80	(550)	51.0	32.000 (812.8)	±0.040 (1.02)	0.627 (15.93)	+0.088 (2.24)
	100	(690)	41.0	32.000 (812.8)	±0.040 (1.02)	0.780 (19.81)	+0.109 (2.77)



**American Water Works
Association**

ANSI/AWWA C905-10
(Revision of AWWA C905-97)

The Authoritative Resource on Safe Water®

AWWA Standard

Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 mm)



Effective date: April 1, 2010.

First edition approved by AWWA Board of Directors June 19, 1988.

This edition approved Jan. 17, 2010.

Approved by American National Standards Institute Feb. 5, 2010.

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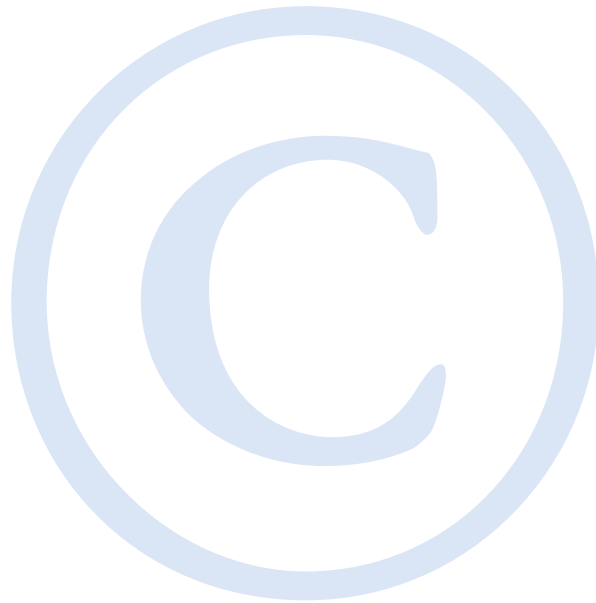
* Alternate

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Foreword

This foreword is for information only and is not part of ANSI/AWWA C905-10.

I. Introduction.

I.A. *Background.* This standard pertains to 14-in. through 48-in. (350-mm through 1,200-mm) polyvinyl chloride (PVC) pressure pipe and fabricated fittings with cast-iron-pipe equivalent (CI) outside diameter (OD) dimensions, steel-pipe-equivalent (IPS) outside diameter (OD) dimensions, and wall-thickness dimension ratios (DRs) of 14, 18, 21, 25, 26, 32.5, 41, and 51. Design considerations are provided in AWWA M23, *PVC Pipe—Design and Installation*, which provides detailed information on PVC pipe covered by ANSI/AWWA C905. 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, Standard for Underground Installation of PVC Pressure Pipe and Fittings for Water.

For PVC pipe and fittings with diameters below 14 in. (350 mm), refer to ANSI/AWWA C900, Standard for PVC Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.

I.B. *History.* This is the third edition of ANSI/AWWA C905. 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 on Thermoplastic Pressure Pipe Standards Committee was established in 1968. The first and second editions of this standard were approved by the AWWA Board of Directors in June 1988 and June 1997, respectively.

In June 1988, 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. This edition of ANSI/AWWA C905 was approved on Jan. 17, 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 (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 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.

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

† NSF International, 789 N. 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.

ANSI/AWWA C905 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 material presented in this standard will be addressed in a revision to AWWA Manual M23 that is currently in progress. The material is published here to ensure that the users of this standard will have continuous access to the most up-to-date design information. AWWA M23 and this standard will not be compatible until AWWA M23 is revised. Where the design manual does not match, the intent of the standard takes precedence and design matters in AWWA M23 that are inconsistent with this standard should be discussed with the manufacturer.

II.A. Pipe Selection.

II.A.1 Selection of pressure class. The minimum pressure class of the pipe or tubing 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 II.A.2. 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.A.2 Recurring surge pressures. Recurring surge pressures, while present in water distribution systems, are of such low amplitude that they typically do not govern the pipe selection. When analysis is deemed necessary, the method is found in appendix B.

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 C905, Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 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.).

b. Working, occasional, and recurring surge pressures (Section 4).

c. Pressure class or DR (see Table 1).

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. 4.3.2.3).

b. Shipping and delivery (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 limitations. 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 this standard must be provided by the purchaser.

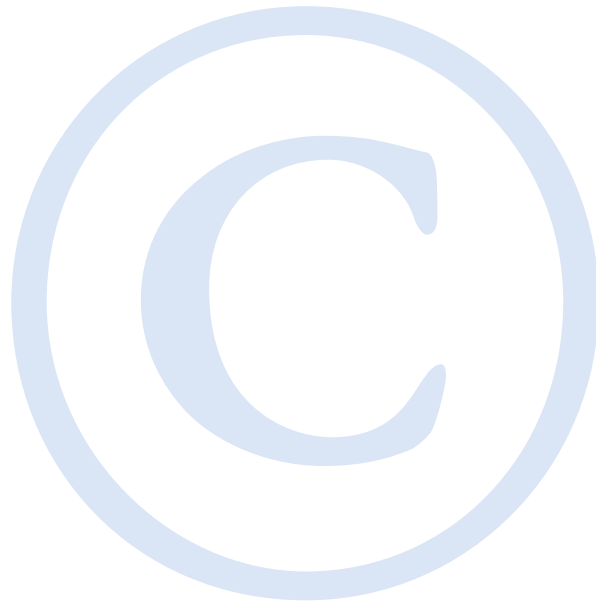
IV. Major Revisions. Major changes made to the standard in this edition include the following:

1. Treatment of surge pressures was expanded to include occasional (emergency) surge and recurring (cyclic) surge.

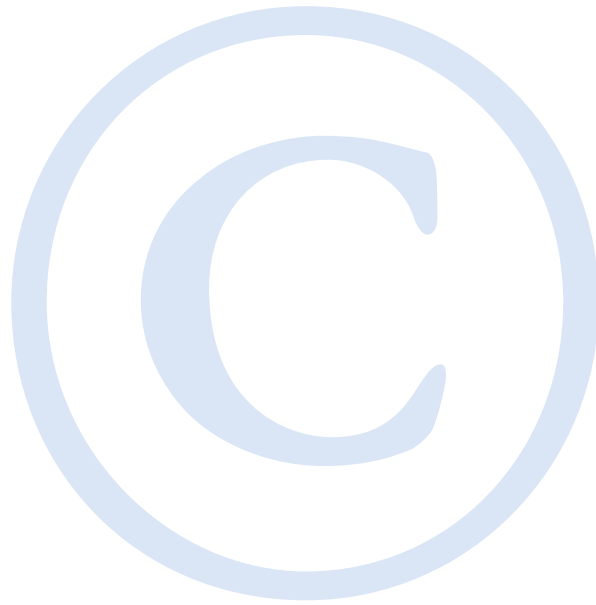
* NOTE: Purchase documents may allow or require the use of fittings other than those described in ANSI/AWWA C905. Some examples of compatible fittings include those covered in ANSI/AWWA Standards C208, C153, and C110.

2. Appendix B, Recurring Surge Tables and Design Example, was added.
3. Pressure classes remain unchanged from 14-in. to 48-in. pipe.

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.



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**American Water Works
Association**

AWWA Standard

**Polyvinyl Chloride (PVC) Pressure
Pipe and Fabricated Fittings, 14 In.
Through 48 In. (350 mm Through
1,200 mm)**

SECTION 1: GENERAL

Sec. 1.1 Scope

Pipe manufactured to this standard is generally well suited for conveying potable water, reclaimed water, irrigation water, wastewater, or any fluid compatible with nonplasticized PVC. The standard includes eight dimension ratio (DRs) and nominal pipe sizes ranging from 14 in. through 48 in. (350 mm through 1,200 mm). Pipe outside diameters (ODs) conform to those established for cast-iron-equivalent ODs (CIOD) and steel-pipe-equivalent ODs (IPS). Pressure classes range from 80 psi (550 kPa) to 305 psi (2,100 kPa).

Sec. 1.2 Purpose

The purpose of this standard is to provide purchasers, manufacturers, and suppliers with the minimum manufacturing, verification, and delivery requirements for PVC pressure pipe and fabricated fittings, 14 in. (350 mm) through 48 in. (1,200 mm).