



American Water Works
Association

C905a-00
Addendum to C905-97

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

January, 2000

1. P. vii, Sec. I.A., Background: revise the first sentence to read:

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 18, 21, 25, 26, 32.5, 41, and 51.

2. P. 1, Sec. 1.1, Scope: revise to read:

Sec. 1.1 Scope

This standard covers 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) and steel-pipe-equivalent (IPS) outside diameter (OD) dimensions, and with wall thickness dimension ratios (DRs) of 18, 21, 25, 26, 32.5, 41, and 51.

3. P. 7 and 8, Table 2: References to DR 14 have been removed. Replace the table on pages 7 and 8 with the attached table.

Table 2 Dimensions for PVC pipe with CI outside diameter

Nominal Size <i>in.</i>	Dimension Ratio (DR)	Outside Diameter— <i>in. (mm)</i>		Wall Thickness— <i>in. (mm)</i>	
		Average	Tolerance	Minimum	Tolerance
14	41	15.300 (388.6)	±0.015 (0.38)	0.373 (9.47)	+0.052 (1.32)
	32.5	15.300 (388.6)	±0.015 (0.38)	0.471 (11.96)	+0.056 (1.42)
	25	15.300 (388.6)	±0.015 (0.38)	0.612 (15.54)	+0.073 (1.85)
	21	15.300 (388.6)	±0.015 (0.38)	0.729 (18.51)	+0.088 (2.22)
	18	15.300 (388.6)	±0.015 (0.38)	0.850 (21.59)	+0.102 (2.59)
16	41	17.400 (442.0)	±0.020 (0.51)	0.424 (10.77)	+0.059 (1.50)
	32.5	17.400 (442.0)	±0.020 (0.51)	0.535 (13.59)	+0.064 (1.63)
	25	17.400 (442.0)	±0.020 (0.51)	0.696 (17.68)	+0.084 (2.13)
	21	17.400 (442.0)	±0.020 (0.51)	0.829 (21.05)	+0.100 (2.54)
	18	17.400 (442.0)	±0.020 (0.51)	0.967 (24.56)	+0.116 (2.95)
18	51	19.500 (495.3)	±0.020 (0.51)	0.382 (9.70)	+0.053 (1.35)
	41	19.500 (495.3)	±0.020 (0.51)	0.476 (12.09)	+0.067 (1.70)
	32.5	19.500 (495.3)	±0.020 (0.51)	0.600 (15.24)	+0.072 (1.83)
	25	19.500 (495.3)	±0.020 (0.51)	0.780 (19.81)	+0.094 (2.39)
	21	19.500 (495.3)	±0.020 (0.51)	0.929 (23.60)	+0.111 (2.82)
	18	19.500 (495.3)	±0.020 (0.51)	1.083 (27.51)	+0.130 (3.30)
20	51	21.600 (548.6)	±0.025 (0.64)	0.424 (10.77)	+0.059 (1.50)
	41	21.600 (548.6)	±0.025 (0.64)	0.527 (13.39)	+0.074 (1.88)
	32.5	21.600 (548.6)	±0.025 (0.64)	0.665 (16.89)	+0.080 (2.03)
	25	21.600 (548.6)	±0.025 (0.64)	0.864 (21.95)	+0.104 (2.64)
	21	21.600 (548.6)	±0.025 (0.64)	1.029 (26.14)	+0.123 (3.12)
	18	21.600 (548.6)	±0.025 (0.64)	1.200 (30.48)	+0.144 (3.66)
24	51	25.800 (655.3)	±0.030 (0.76)	0.506 (12.85)	+0.071 (1.80)
	41	25.800 (655.3)	±0.030 (0.76)	0.629 (15.98)	+0.088 (2.24)
	32.5	25.800 (655.3)	±0.030 (0.76)	0.794 (20.17)	+0.095 (2.41)
	25	25.800 (655.3)	±0.030 (0.76)	1.032 (26.21)	+0.124 (3.15)
	21	25.800 (655.3)	±0.030 (0.76)	1.229 (31.22)	+0.147 (3.73)
	18	25.800 (655.3)	±0.030 (0.76)	1.433 (36.40)	+0.172 (4.37)

Table continued next page.

Table 2 Dimensions for PVC pipe with CI outside diameter (continued)

Nominal Size <i>in.</i>	Dimension Ratio (DR)	Outside Diameter— <i>in. (mm)</i>			Wall Thickness— <i>in. (mm)</i>	
		Average		Tolerance	Minimum	Tolerance
30	51	32.000	(812.8)	±0.040 (1.02)	0.627 (15.93)	+0.088 (2.24)
	41	32.000	(812.8)	±0.040 (1.02)	0.780 (19.81)	+0.109 (2.77)
	32.5	32.000	(812.8)	±0.040 (1.02)	0.985 (25.02)	+0.118 (3.00)
	25	32.000	(812.8)	±0.040 (1.02)	1.280 (32.51)	+0.154 (3.91)
	21	32.000	(812.8)	±0.040 (1.02)	1.524 (38.71)	+0.183 (4.65)
	18	32.000	(812.8)	±0.040 (1.02)	1.778 (45.16)	+0.213 (5.41)
36	51	38.300	(972.8)	±0.050 (1.27)	0.751 (19.08)	+0.105 (2.67)
	41	38.300	(972.8)	±0.050 (1.27)	0.934 (23.72)	+0.131 (3.33)
	32.5	38.300	(972.8)	±0.050 (1.27)	1.178 (29.92)	+0.141 (3.58)
	25	38.300	(972.8)	±0.050 (1.27)	1.532 (38.91)	+0.184 (4.67)
	21	38.300	(972.8)	±0.050 (1.27)	1.824 (46.33)	+0.219 (5.56)
42	51	44.500	(1,130.3)	±0.060 (1.52)	0.872 (22.15)	+0.122 (3.10)
	41	44.500	(1,130.3)	±0.060 (1.52)	1.085 (27.56)	+0.152 (3.86)
	32.5	44.500	(1,130.3)	±0.060 (1.52)	1.369 (34.77)	+0.164 (4.17)
	25	44.500	(1,130.3)	±0.060 (1.52)	1.780 (45.21)	+0.214 (5.44)
48	51	50.800	(1,290.3)	±0.075 (1.90)	0.996 (25.30)	+0.139 (3.53)
	41	50.800	(1,290.3)	±0.075 (1.90)	1.239 (31.47)	+0.173 (4.39)
	32.5	50.800	(1,290.3)	±0.075 (1.90)	1.563 (39.70)	+0.188 (4.78)
	25	50.800	(1,290.3)	±0.075 (1.90)	2.032 (51.61)	+0.244 (6.20)

4. P. 8, Table 3: Reference to DR 14 have been removed. Replace the table on page 8 with the attached table.

Table 3 Transmission and distribution-pipe pressure rating*

Dimension Ratio (DR) [†]	Pressure Rating (PR)	
	<i>psi</i>	<i>(kPa)</i>
51	80	(550)
41	100	(690)
32.5	125	(860)
26	160	(1,100)
25	165	(1,140)
21	200	(1,380)
18	235	(1,620)

*The pipe pressure rating corresponds to a maximum safe operating pressure when a safety factor of 2.0 is applied and the surge pressure is zero. These ratings are determined at 73.4°F (23°C) using compound class 12454-A or 12454-B with a hydrostatic design basis of 4,000 psi (27.58 MPa). For sustained operating conditions above 73.4°F (23°C), refer to Table 4.

[†]Certain dimension ratios are available in only IPS or only CI outside diameters (see Tables 1 and 2).

5. P. 10, Sec. 4.6.2: Revise the “Note” to read:

NOTE: When the factor of safety (F) is set at 2.5 and the surge pressure allowance (P_s) is calculated for an abrupt 2 ft/s (0.61 m/s) change in velocity, WPR is the equivalent of the pressure class rating (PC) of ANSI/AWWA C900. This is useful when C905 pipe sizes are used in distribution systems where surge pressures cannot be accurately determined. When applied in this manner, the surge pressure allowance (P_s) for an abrupt velocity change of 2 ft/s (0.61 m/s) is 35, 32, 30, 26, 23, and 21 psi (240, 220, 200, 180, 160, and 140 kPa) for DRs 18, 21, 25, 32.5, 41, and 51 respectively. For distribution systems designed for a maximum working pressure of 100 psi (690 kPa), the maximum DR shall be 25.

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List of Standards

American Water Works Association

ANSI/AWWA C905-97

(Revision of ANSI/AWWA C905-88)



AWWA 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**



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AMERICAN WATER WORKS ASSOCIATION

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AWWA Standard

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Foreword

This foreword is for information only and is not a part of AWWA C905.

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 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 Distribution.

I.B. *History.* This is the second edition of 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, and recommended that a task group be appointed to prepare standards for the use of plastic materials. The AWWA Standards Committee on Thermoplastic Pressure Pipe was established in 1968. The first edition of this standard was approved by the AWWA Board of Directors in June 1988.

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.

At the annual conference in 1991, the PVC Pressure Pipe and Fittings Standards Committee appointed a subcommittee to review and, if necessary, revise the first edition of AWWA C905. PVC fabricated fittings were added to the standard by authority of the Standards Council at their Spring 1992 meeting. The second edition of ANSI/AWWA C905 was approved by the AWWA Board of Directors on June 15, 1997.

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.

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 C905-97 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. This standard has no applicable information for this section.

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 covered in the purchaser’s specifications:

*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.