ANSI/AWWA C901-08
(Revision of ANSI/AWWA C901-02)

American Water Works Association

The Authoritative Resource on Safe Water®

AWWA Standard

Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service

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AWWA Standard

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Committee Personnel

The AWWA Standards Committee on Polyolefin Pressure Pipe and Fittings, which reviewed and approved this standard, had the following personnel at the time of approval:

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Camille G. Rubeiz, *Secretary*

General Interest Members

S. Burn, CSIRO Manufacturing & Infrastructure Technology, Australia	(AWWA)
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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.

Foreword

This foreword is for information only and is not a part of ANSI/AWWA C901.

I. Introduction.

I.A. *Background.* This standard describes polyethylene (PE) pressure pipe and tubing for use primarily as service lines in the construction of underground water distribution systems.

This standard describes standard dimension ratios (SDR) and standard inside dimension ratios (SIDR) for pipe and tubing made from PE materials with standard PE code designations PE 2606, PE 2706, PE 2708, PE 3608, PE 3708, PE 3710, and PE 4710 in pressure classes of 80 psi, 100 psi, 125 psi, 160 psi, 200 psi, and 250 psi (560 kPa, 700 kPa, 870 kPa, 1,100 kPa, 1,400 kPa, and 1,700 kPa). Pipe ranging in nominal size from ½ in. (13 mm) through 3 in. (76 mm) conforms to the outside diameter dimensions of iron pipe sizes (OD based, IPS pipe) or to the inside-diameter dimensions of iron pipe sizes (ID based, IPS pipe). Tubing ranging in size from ½ in. (13 mm) through 2 in. (51 mm) conforms to the outside diameter dimensions of copper tubing.

I.B. *History.* On Jan. 28, 1978, the first edition of ANSI/AWWA C901 was approved by the AWWA Board of Directors. On Aug. 9, 1982, a subcommittee of the AWWA Standards Committee on Thermoplastic Pipe was formed to review and revise the standard based on experience and advances in the state of the art since the adoption of the standard. To this end, AWWA conducted two surveys of its members to ascertain their experience with ANSI/AWWA C901 products. This information was incorporated into the second edition of ANSI/AWWA C901, approved on Jan. 24, 1988.

In June 1988, the Thermoplastic Pressure Pipe Committee was divided into two committees to accommodate both polyolefin and polyvinyl chloride (PVC) pipe. Thus were formed the Polyvinyl Chloride Pressure Pipe and Fittings Committee and the Polyolefin Pressure Pipe and Fittings Committee. This action was approved on June 16, 2002. This edition of C901 was approved June 8, 2008.

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) 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.

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

† NSF International, 789 North Dixboro Rd., 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, N.W., Washington, DC 20418.

ANSI/AWWA C901 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. A new AWWA Manual of Water Supply Practices, M55: *PE Pipe—Design and Installation,* has been published. Details previously contained in this section are now in AWWA manual M55. Contact AWWA at 1.800.926.7337 or at www.awwa.org for more information.

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 covered by the purchaser:

1. Standard used—that is, ANSI/AWWA C901, Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service, 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
    a. Standard code designation of the PE material.
    b. Nominal size, pressure class, dimension ratio, and diameter basis (SDR or SIDR), form (straight or coiled), length of individual pieces, and total linear feet (linear meters) for each different item to be provided.
5. Tubing
    a. Standard code designation of the PE material.
    b. Nominal size, pressure class, dimension ratio, form (straight or coiled), length of individual pieces, and total linear feet (linear meters) for each different item to be provided.
6. The following requirements should be specified:
    a. Special quality-control tests (Section 5).
    b. Plant inspection (Sec. 5.6).

c. Special marking (Sec. 6.1.3).

d. Special preparation for shipment (Sec. 6.2).

e. Affidavit of compliance (Sec. 6.3).

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

IV. Major Revisions. This edition of ANSI/AWWA C901 is a comprehensive update and includes significant revisions and changes to all sections of the standard. Major changes made to the standard in this revision include the following:

1. Sec. 1.1 Scope. Removed material designations made obsolete by changes to ASTM D3350 and replaced with current and new material designations.

2. Section 2 References. Added seven ASTM standard references, reference to AWWA manual M55, and reference to NSF/ANSI 61. Deleted references to ISO 161 and NSF/ANSI 14.

3. Section 3 Definitions. Deleted definitions for bloom, design factor, and working pressure; revised definitions for dimension ratio, hydrostatic design basis, hydrostatic design stress, pressure class, and surge pressure allowance.

4. Section 4 Requirements.

a. Sec. 4.1 clarified permeation statement;

b. Sec. 4.2 revised material requirements to be consistent with new material designations; revised Table 1; revised potable water certification to NSF/ANSI 61;

c. Sec. 4.3 added toe-in; added special sizes; revised elevated temperature sustained pressure test; replaced Table 8 with new Table 2; replaced Tables 2, 3, 4, 5, 6, 7, and 9 with new Tables 3, 4, 5, 6, and 7; added length tolerance; added elongation at break test;

d. deleted Sec. 4.4.

5. Section 5 Verification.

a. Sec. 5.1 revised;

b. 5.2 revised; deleted Sec. 5.2.2 (replaced with Sec. 4.3.9);

c. Sec. 5.3 added 5.3.1, 5.3.2, 5.3.4, 5.3.6, and 5.3.7; revised Sec. 5.3.3 and 5.3.5;

d. Sec. 5.4 revised;

e. Sec. 5.5 revised;

f. Sec. 5.6; revised Sec. 5.6.2, 5.6.3, 5.6.4, and 5.6.5.

6. Section 6 Markings and Delivery.

a. Sec. 6.1 revised 6.1.2, 6.1.3, and 6.1.4; added 6.1.5;

b. Sec. 6.2 revised 6.2.1; deleted Sec. 6.2.2;

c. Sec. 6.3 revised.

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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AWWA Standard

Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm), for Water Service

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes polyethylene (PE) pressure pipe and tubing made from material having standard PE code designations PE 2606, PE 2706, PE 2708, PE 3608, PE 3708, PE 3710, PE 4608, PE 4708, and PE 4710* and intended for use in potable water, reclaimed water, and wastewater service. Polyethylene pipe ranges in nominal size from ½ in. (13 mm)† through 3 in. (76 mm) and conforms

* Earlier editions of ANSI/AWWA C901 included PE material designations PE 2406, PE 3406, and PE 3408. Changes to ASTM D3350 led to changes in thermoplastic material designation codes, resulting in material designation PE 2406 being superseded by material designations PE 2606, PE 2706, and PE 2708; material designation PE 3406 being discontinued; and material designation PE 3408 being superseded by material designations PE 3608, PE 3708, PE 3710, PE 4608, PE 4708, and PE 4710, with the most common designations being PE 2708, PE 3608, and PE 4710. Accordingly, material designations and descriptions for the superseded PE 2406, PE 3406, and PE 3408 designations have been removed from ANSI/AWWA C901. For removed designations, refer to previous editions of ANSI/AWWA C901, ASTM D3350, PPI TR-3, and PPI TR-4. The removal of superseded material designations does not affect pipelines that are in service. Recognizing that a transitional period is necessary for the dissemination of information, product markings that include both older and newer material designations, for example PE 3408/PE 3608, may occur.

† Metric conversions given in this standard are direct conversions of US customary units and are not those specified in International Organization for Standardization (ISO) standards.