ANSI/AWWA C605-13
(Revision of ANSI/AWWA C605-05)

American Water Works Association
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AWWA Standard

Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings

Effective date: Feb. 1, 2014.
First edition approved by AWWA Board of Directors Jan. 30, 1994.
This edition approved June 9, 2013.
Approved by American National Standards Institute April 2, 2013.

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AWWA Standard

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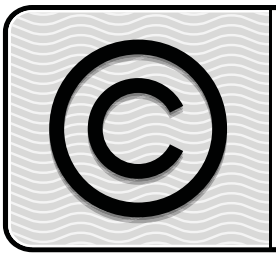

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ISBN-13, print: 978-1-58321-926-3 eISBN-13, electronic: 978-1-61300-221-6

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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 C605.*

I. Introduction.

I.A. *Background.* ANSI/AWWA C605, Standard for Underground Installation of PVC and PVCO Pressure Pipe and Fittings is offered as a reference to be used when constructing new PVC or PVCO pressurized pipelines or when making repairs or extensions to existing PVC and PVCO pressure pipelines. This standard provides information on pipe handling, trench excavation, pipe installation, appurtenance placement, and preparation of pipelines for use. It is not intended that this AWWA standard be used as a contract document; however, it may be used as a reference in contract documents. This standard represents the consensus of the standards committee on the recommended practice for the proper installation of PVC and PVCO pressure pipe. The standard is not intended to preclude the manufacture, marketing, purchase, or use of any product, process, or procedure.

I.B. *History.* This is the third edition of ANSI/AWWA C605. In 1978, the AWWA Standards Council authorized the AWWA Standards Committee on Thermoplastic Pressure Pipe to prepare a design and installation manual that would be followed by an installation standard for PVC pressure pipe. AWWA Manual M23, *PVC Pipe—Design and Installation*, was published in 1980.

In 1988, the AWWA Standards Committee on Thermoplastic Pressure Pipe was dissolved to allow for the formation of the AWWA Standards Committee on Polyvinyl Chloride (PVC) Pressure Pipe and Fittings. A new subcommittee was convened to resume work on the installation standard in 1989. On completion of the manual, development of this standard began. The first edition was effective July 1, 1995. The second edition of ANSI/AWWA C605 was approved by the AWWA Board of Directors on June 12, 2005. This third edition of ANSI/AWWA C605 was approved on June 9, 2013.

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

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.
† NSF International, 789 N. Dixboro Road, Ann Arbor, MI 48105.

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, provincial, and local agencies may use various references, including

1. An advisory program formerly administered by USEPA, Office of Drinking Water, discontinued on April 7, 1990.
2. Specific policies of the state, provincial, or local agency.
3. Two standards developed under the direction of NSF International, 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, provincial, 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.

ANSI/AWWA C605 does not address additives requirements. Users of this standard should consult the appropriate state, provincial, or local agency having jurisdiction in order to

1. Determine additives requirements, including applicable standards.

* Water Research Foundation, 6666 W. Quincy Ave., Denver, CO 80235.

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

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

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. Attention should be called to the need for users of this standard to provide proper design consideration for permeation. The selection of materials is critical for water service and distribution piping in locations where there is likelihood the pipe will be exposed to significant concentrations of pollutants comprising low-molecular-weight petroleum products or organic solvents or their vapors. Research has documented that pipe materials, such as polyethylene, polybutylene, PVC, and asbestos cement, and elastomers, such as used in jointing gaskets and packing glands, are subject to permeation by lower-molecular-weight organic solvents or petroleum products. If a water pipe must pass through such a contaminated area or an area subject to contamination, consult with the manufacturer regarding permeation of pipe walls, jointing materials, etc., before selecting materials for use in that area.

Guidance regarding the permeation resistance of pipe and pipe gasket materials is available in

Ong, S.K., J.A. Gaunt, F. Mao, C.-L. Cheng, L. Esteve-Agelet, and C.R. Hurburgh. 2007. *Impact of Hydrocarbons on PE/PVC Pipes and Pipe Gaskets*. Report No. 91204. Denver, CO: AWWA Research Foundation.

Holsen, T. M., J.K. Park, D. Jenkins, and R.E. Selleck. 1991. Contamination of Potable Water by Permeation of Plastic Pipe. *Journal AWWA*, 83(8): 53–56.

Glaza, E.C., and J.K. Park. 1992. Permeation of Organic Contaminants Through Gasketed Pipe Joints. *Journal AWWA*, 84 (7): 92–100.

Olson, A.J., D. Goodman, and J.P. Pfau. 1987. Evaluation of Permeation of Organic Solvents Through PVC, Asbestos/Cement, and Ductile Iron Pipes. *Journal of Vinyl Technology* 9(3): 114–118.

Vonk, M.W. 1985. Permeation of Organic Compounds Through Pipe Materials. Publication No. 85, Neuwegein, NL: Netherlands Waterworks' Testing and Research Institute (KIWA).

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 used—that is, ANSI/AWWA C605, Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings, of latest revision.

2. Reference to applicable plans, drawings, specifications, and other contract documents (all sections).

3. Whether compliance with NSF/ANSI 61, Drinking Water Treatment Chemicals—Health Effects, is required.

4. Details of other federal, state or provincial, and local requirements (Sec. 4.1).

5. Materials inspection and acceptance requirements (Sec. 5.1).

6. Affidavit of compliance for materials used (Sec. 5.1.1).

7. Special provisions for conflicting utilities and responsibility for facilities and responsibility for the location, relocation, and repair of the conflicting facility or relocation of the pipeline if necessary (Sec. 6.1.3 and Sec. 6.2).

8. Notification requirements (Sec. 6.3).

9. Open trench, trench water, and trench stability requirements (Sec. 7.1).

10. Requirements for the protection of workers and the safety of the general public (Sec. 7.1.1).

11. Special provisions for excavation and trenching requirements (Sec. 7.2).

12. Trench width, depth, bottom preparation, rock conditions, previous excavation, blasting, unstable subgrade, dewatering, and excavated material requirements (Sec. 7.2).

13. Special trench foundations (Sec. 7.2.7).

14. Special embedment materials (Sec. 8.3).

15. Thrust restraint requirements (Sec. 8.7).

16. Backfill requirements. (Sec. 8.8).

17. Type, number, and installation requirements for valves and fittings (Sec. 9.2).

18. Hydrant requirements (Sec. 9.3).

19. Special provisions for testing, including the assignment of responsibility for providing and conveying water for flushing, testing, disinfection, and provisions for disposal of disinfection water. Assignment of responsibility for providing equipment for testing witnessing and required recording of test results (Sec. 10.3.1).

20. Special requirements for the method of disinfection, sampling, and analysis (Sec. 10.4). See ANSI/AWWA C651, Standard for Disinfecting Water Mains, of latest revision.

21. System design pressure, required test pressure, and test duration (Sec. 10.3.5 and Sec. 10.3.4).

22. If delivery of an affidavit of compliance from the constructor is not required (Sec. 10.6).

III.B. *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. Permeation requirements were moved to the Special Issues section of the foreword.
2. Molecularly Oriented Polyvinyl Chloride (PVCO) pipe has been included (Sec. 1.1).
3. Soil classification requirements were added to Figure 1.
4. Trenchless construction requirements were added (Sec. 7.3).
5. Fused Joints are addressed (Sec. 8.5.6).
6. Tapping sleeves and valve requirements were added (Sec. 9.4.3).
7. Notice was added to bring the user's attention to the possibility that compliance with this standard may require use of an invention covered by patent rights (Sec 8.5.6).
8. Butt Fusion Inspection Requirements are addressed (Sec. 8.5.6.1).
9. Hydrostatic pressure testing requirements were changed to include the following: "not less than 1.5 times the stated sustained working pressure at the lowest elevation of the test section" shall be required (Sec. 10.3.5).
10. Notice of Nonconformance requirements was added (Sec. 10.5).
11. Delivery of an affidavit of compliance from the constructor is required (Sec. 10.6).

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711, FAX 303.795.7603, or write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098, or email standards@awwa.org.

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AWWA Standard

Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes underground installation and hydrostatic testing procedures for polyvinyl chloride (PVC) or molecularly oriented polyvinyl chloride (PVCO) pressure pipe and fittings that comply with either ANSI*/AWWA C900, ANSI/AWWA C905, ANSI/AWWA C907, or ANSI/AWWA C909. These plastic components are installed in piping systems that may contain components made from other materials. It may be necessary to supplement this standard with provisions for special requirements not included in this standard (see foreword, Sec. III). Such special requirements should be specified by the purchaser with input from the purchaser's engineering consultant(s), product manufacturer(s), and/or supplier(s).

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for underground installation and hydrostatic testing procedures for PVC or PVCO

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