

American Water Works Association

ANSI/AWWA C909-02

(Revision of ANSI/AWWA C909-98)



AWWA STANDARD
FOR
**MOLECULARLY ORIENTED POLYVINYL
CHLORIDE (PVCO) PRESSURE PIPE, 4 IN.
THROUGH 24 IN. (100 mm THROUGH
600 mm), FOR WATER DISTRIBUTION**



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AMERICAN WATER WORKS ASSOCIATION

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Foreword

This foreword is for information only and is not a part of AWWA C909.

I. Introduction.

I.A. *Background.* Molecularly oriented polyvinyl chloride (PVCO) pressure pipe has been installed in Europe since the early 1970s, and in North America since 1991. The longitudinal molecular structure of polyvinyl chloride (PVC) is reoriented to a circumferential direction using heat and pressure. The manufacturing process begins by conventionally extruding a starting stock pipe. This starting stock piece is roughly half the diameter and twice the wall thickness of the finished PVCO pipe (e.g., starting stock with a nominal 3-in. [75 mm]* diameter and a 0.40 in. [10.2-mm] wall thickness becomes a finished PVCO pipe with a nominal 6-in. [150-mm] diameter and a 0.20-in. [5.1-mm] wall thickness). The starting stock piece is heated and then circumferentially expanded to its final dimensions. By circumferentially expanding the starting stock piece, a new molecular orientation is achieved. This new orientation increases physical and mechanical properties of the pipe. Tensile strength, and hence the hydrostatic design basis (HDB), is substantially increased from 4,000 psi to 7,100 psi (27.6 MPa to 49.0 MPa).

This standard pertains to 4-in. through 24-in. (100-mm through 600-mm) PVCO pressure pipe made from class 12454-B material. The PVCO pressure pipe is designed to provide an HDB of 7,100 psi with cast-iron-pipe-equivalent (CI) outside diameter (OD) dimensions. The wall thicknesses are sufficient to provide pressure classes 100 psi, 150 psi, and 200 psi while maintaining a long-term safety factor of 2.5.

I.B. *History.* This is the second edition of AWWA C909. In 1994, the PVC Pipe and Fittings Committee appointed a subcommittee to develop a standard for PVCO pressure pipe. The first edition was the result of that effort. This edition was approved on Jan. 20, 2002.

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

*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.

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.

Annex 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 Annex A procedures may not always be identical, depending on the certifier.

*Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction.

[†]American National Standards Institute, 25 W. 43rd St., Fourth Floor, New York, NY 10036.

[‡]NSF International, 789 N. Dixboro Rd., Ann Arbor, MI 48105.

[§]Both publications available from National Academy of Sciences, 2102 Constitution Ave. N.W., Washington, DC 20418.

AWWA C909-02 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. Although this standard generally presents adequate information to order pipe to meet working pressure requirements, it does not include information to guide the designer in determining wall thicknesses, pipe flexibility requirements, and installation conditions to meet external loading conditions. Pipe designers should refer to AWWA Manual M23, PVC Pipe—Design and Installation. In addition, consultation with pipe manufacturers is recommended.

III.A. Purchaser Options and Alternatives. The following items should be covered in the purchaser's specifications:

1. Standard used—that is, ANSI/AWWA C909, Standard for Molecularly Oriented Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 24 In. (100 mm Through 600 mm), for Water Distribution.
2. Pipe.
 - a. Nominal size (for example, 4 in. [100 mm]).
 - b. Pressure class (see Table 1).
 - c. Linear feet of each pressure class for each nominal pipe size to be provided.
 - d. Whether drawings and calculations shall be provided by the manufacturer.
3. Specifications. When desired, requirements, such as the following, should be specified in the purchase contract.
 - a. Standard lengths (Sec. 4.3.3.3).
 - b. Shipping and delivery (Sec. 6.2).
 - c. Affidavit of compliance (Sec. 6.3).