

IAPMO IGC 287-2012^{e1}

Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing, and Fittings for Hot and Cold Water Distribution Systems



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IAPMO Standard

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Chlorinated Polyvinylchloride (CPVC)

Pipe, Tubing, and Fittings

for Hot and Cold Water Distribution Systems

1 Scope and Purpose

- 1.1** This Standard covers SDR 11 (standard dimension ratio 11) chlorinated polyvinylchloride (CPVC) pipe, tubing, and fittings for use in hot and cold water distribution systems that operate at a maximum working pressure of 690 kPa (100 psi) and a maximum temperature of 82.2 °C (180°F).
- 1.2** Fittings covered in this Standard comprise socket fittings, street fittings, and plastic-to-metal transition fittings. Components covered in this Standard include solvent cements and adhesives.
- 1.3** This Standard specifies requirements for materials, physical characteristics (e.g., dimensions and tolerances), hydrostatic pressure strength, solvent cement, joint strength, and markings.
- 1.4** The purpose of this Standard is to enhance health and safety by:
- (a) specifying acceptable criteria for CPVC pipe, tubing, and fittings for hot and cold water distribution systems; and
 - (b) serving as a guide for producers, distributors, architects, engineers, contractors, installers, inspectors, and users.
- 1.5** The requirements of this Standard are not intended to prevent the use of alternate materials or methods of construction provided such alternates meet the intent of this Standard.
- 1.6** Amendments to this Standard will be made after processing according to the standards writing procedures of IAPMO.

2 Reference Publications

This Standard refers to the following publications, and where such reference is made, it shall be to the current edition of those publications, including all amendments published thereto.

ASTM D1784	Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D2846	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems
ASTM F493	Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings

CSA B137 Series	Thermoplastic pressure piping compendium
CSA B137.0	Definitions, general requirements, and methods of testing for thermoplastic pressure piping
CSA B137.6	Chlorinated polyvinylchloride (CPVC) pipe, tubing, and fittings for hot- and cold-water distribution systems
NSF/ANSI 61	Drinking Water System Components - Health Effects

3 Abbreviations

The following abbreviations shall apply in this Standard:

CPVC	— chlorinated polyvinylchloride
NPS	— nominal pipe size
PVC	— polyvinylchloride
SDR	— standard dimension ratio
UV	— ultraviolet

4 General Requirements

4.1 Materials

4.1.1 CPVC Compounds†

CPVC compounds used in the manufacture of pipe, tubing, and fittings shall comply with the properties of CPVC cell classification 23447, or higher, as specified in ASTM D1784. A compound used in a single production run shall be procured from one manufacturer.

4.1.2 Hydrostatic Design Strength of CPVC Compounds†

CPVC compounds used in the manufacture of pipe and tubing shall have a hydrostatic design stress of 13.80 MPa (2,000 psi) for water at 23 °C (73°F) and 3.45 MPa (500 psi) for water at 82 °C (180°F).

4.1.3 Blends for Manufacturing†

Pipe, tube, tubing, fittings, and plastic accessories shall be made from:

- (a) virgin compound; or
- (b) a blend of virgin compound and reworked material.

4.1.4 Virgin Compounds†

The virgin compound used in any individual length of pipe or any individual fitting shall be a single compound procured from a single manufacturer.

4.1.5 Reworked Materials†

Reworked materials shall be

- (a) clean;

- (b) blended with the same kind and type of virgin compound; and
- (c) generated from the manufacturer's own production and not used by any other manufacturer.

4.1.6 Stabilizers, Lubricants, and Pigments†

CPVC compounds may contain stabilizers, lubricants, and pigments proven not to be detrimental to the pipe, tube, tubing, fittings, or plastic accessories.

4.2 Environmental Requirements

4.2.1 Toxicity†

Compounds, pipes, fittings, and solvent cements intended for potable water applications shall comply with the applicable requirements of NSF/ANSI 61.

4.2.2 Ultraviolet (UV) Radiation Protection†

Plastics used in the manufacture of pipe and fittings that are sensitive to ultraviolet (UV) exposure or have no natural resistance to UV exposure shall be compounded to provide UV stabilization. The degree of stabilization shall depend on end-use requirements and the sensitivity of the compound to UV exposure.

4.3 Hydrostatic Sustained Pressure Strength

4.3.1 Hydrostatic Sustained Pressure Strength†

The long-term hydrostatic pressure strength of CPVC compounds used for manufacturing pressure piping shall be determined in accordance with Clause 6.6.4 of CSA B137.0. When pipe or tubing specimens are tested in accordance with Clause 6.1 of CSA B137.6, the regression curve through the test points shall have a projected nominal value of at least 6.90 MPa (1,000 psi) at 82 °C (180°F).

4.3.2 Long-Term Hydrostatic Strength

The long-term hydrostatic strength of CPVC compounds used in the manufacture of pressure fittings shall be determined based on the hydrostatic strength of fitting assemblies as specified in Clause 6.2 of CSA B137.6.

4.4 Dimensions and Tolerances

4.4.1 Diameter, Out-of-Roundness, and Wall Thickness

When measured in accordance with Clause 6.8 of CSA B137.0, the outside diameter, out-of-roundness, and wall thickness of

- (a) tubing shall be as specified Table 1 of this Standard or Table 1 of ASTM D2846; and
- (b) pipe shall be as specified in Table 2 of this standard.

4.4.2 Coil Diameters

The inside diameter of CPVC tubing coils shall be at least:

- (a) 710 mm (28 in) for NPS-1/2 or smaller tubing;
- (b) 915 mm (36 in) for NPS-3/4 tubing; and
- (c) 1,220 mm (48 in) for NPS-1 tubing.

4.5 Fittings

4.5.1 Socket-Type Fittings†

Socket-type fittings shall

- (a) comply with Tables 3 to 5 of this Standard when measured in accordance with Clause 6.9 of CSA B137.0; and
- (b) not leak when tested in accordance with Clause 6.2 of CSA B137.6.

4.5.2 CPVC-to-Metal Transition Fittings

CPVC parts of CPVC-to-metal transition fittings shall comply with Clause 5.3.2 of CSA B137.6 except that

- (a) Tables 1 to 4 of this Standard shall apply, as applicable; and
- (b) the inside diameter (waterway) dimensions and wall thickness tolerances in Tables 1 to 4 of this Standard shall not apply.

4.5.3 Mechanical Fittings†

Mechanical fittings shall

- (a) have dimensions compatible with the pipe sizes with which they are intended to be used; and
- (b) not leak when tested in accordance with Clause 6.2 of CSA B137.6.

4.6 Solvent Cements and Adhesive Joints

4.6.1 General†

Solvent cements and adhesive joints shall comply with ASTM F493 except for Sections 5.6, 6.4, and 9 of that standard.

4.6.2 Pull Test

Solvent-cemented CPVC joints shall not leak or pull apart when tested in accordance with Clause 6.2 of CSA B137.6.

4.7 Quality Evaluation

Pipe, tubing, and fittings shall comply with Clause 5.5 of CSA B137.6.

5 Test Methods

5.1 Hydrostatic Pressure Test for Pipe and Tubing

The hydrostatic pressure test for CPVC pipe and tubing shall be conducted in accordance with Clause 6.1 of CSA B137.6.

5.2 Sustained Hydrostatic Pressure Test

The sustained hydrostatic pressure test for CPVC fittings shall be conducted in accordance with Clause 6.2 of CSA B137.6.

5.3 Short-Term Hydrostatic Pressure Test

The short-term hydrostatic pressure test for CPVC pipe, tubing, and fittings shall be conducted in

accordance with Clause 6.3 of CSA B137.6.

6 Markings

6.1 Pipe and Tubing

Markings on pipe and tubing shall include at least the following, spaced at intervals of not more than 1.5 m (5 ft):

- (a) the manufacturer's name or registered trademark;
- (b) the IAPMO standard designation (i.e., "IAPMO IGC 287");
- (c) the material designation (i.e., "CPVC");
- (d) the intended service, where applicable (e.g., "potable", "P", or "PW");
- (e) the pressure rating at 82 °C (180°F);
- (f) the nominal size;
- (g) the standard dimension ratio (i.e., "SDR 11"); and
- (h) the date of manufacture.

6.2 Fittings†

Fittings shall be marked with at least the following:

- (a) the manufacturer's name or registered trademark;
- (b) the material designation (i.e., "CPVC");
- (c) the intended service, where applicable (e.g., "potable", "P", or "PW"); and
- (d) the nominal size.

6.3 Solvent Cements†

Printed labels or direct printing on solvent cement containers shall have at least the following:

- (a) the name of the manufacturer or the distributor;
- (b) the trade name or logo of the solvent cement, when applicable;
- (c) the code name of the solvent cement, when applicable;
- (d) the description of the type of solvent cement (e.g., "solvent cement for CPVC pressure systems");
- (e) the container size;
- (f) the production date or date code; and
- (g) instructions for proper application of the solvent cement, including
 - (i) recommended dissolving agent(s) for cleaning tools;
 - (ii) recommended procedure for use; and
 - (iii) safety procedures applicable for solutions containing solvents of that particular type.

6.4 Potable Water

In addition to the markings specified in Sections 6.1 to 6.3, piping, tubing, and components intended for potable water applications shall be marked in accordance with the requirements of the laboratory making the evaluation for potable water.