IAPMO IGC 342-2018

ABS and PVC Snap-Lock DWV Fittings
IAPMO Notes

(1) The use of the singular does not exclude the plural (and vice versa) when the sense allows.

(2) The use of IAPMO Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

(3) This standard was developed using an open process and in accordance with IAPMO Standards Policy S-001, Standards Development Process, which is available on the IAPMO Standards website (www.IAPMOstandards.org).

(4) During its development, this Standard was made available for public review, thus providing an opportunity for additional input from stakeholders from industry, academia, regulatory agencies, and the public at large. Upon closing of public review, all comments received were duly considered and resolved by the IAPMO Standards Review Committee.

(5) This Standard was developed in accordance with the principles of consensus, which is defined as substantial agreement; consensus implies much more than a simple majority, but not necessarily unanimity. It is consistent with this definition that a member of the IAPMO Standards Review Committee might not be in full agreement with all sections of this Standard.

(6) Although the intended primary application of this Standard is stated in its scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

(7) IAPMO Standards are subject to periodic review and suggestions for their improvement will be referred to the IAPMO Standards Review Committee. To submit a proposal for change to this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at standards@IAPMOstandards.org or, alternatively, at 5001 East Philadelphia Street, Ontario, California, 91761, and include “Proposal for change” in the subject line:
   (a) standard designation (number);
   (b) relevant section, table, or figure number, as applicable;
   (c) wording of the proposed change, tracking the changes between the original and the proposed wording; and
   (d) rationale for the change.

(8) Requests for interpretation should be clear and unambiguous. To submit a request for interpretation of this Standard, you may send the following information to the International Association of Plumbing and Mechanical Officials, Attention Standards Department, at standards@IAPMOstandards.org or, alternatively, at 5001 East Philadelphia Street, Ontario, California, 91761, and include “Request for interpretation” in the subject line:
   (a) the edition of the standard for which the interpretation is being requested;
   (b) the definition of the problem, making reference to the specific section and, when appropriate, an illustrative sketch explaining the question;
   (c) an explanation of circumstances surrounding the actual field conditions; and
   (d) the request for interpretation phrased in such a way that a “yes” or “no” answer will address the issue.

(9) Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. IAPMO is not to be held responsible for identifying any or all such patent rights. Users of this Standard are expressly advised that determination of the validity of any such patent rights is entirely their responsibility.

(10) IAPMO does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this Standard, and does not undertake to insure anyone utilizing this Standard against liability for infringement of any applicable patents, nor assumes any such liability. Users of this Standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their responsibility.

(11) Participation by federal or state agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this Standard.
1 Scope

1.1 General

1.1.1 This Standard covers snap-lock fittings made of ABS or PVC intended for DWV applications and specifies requirements for materials, dimensions and other physical characteristics, and markings.

1.1.2 An example of one configuration of a snap-lock type of DWV fitting covered by this standard is shown in Figure 1.

1.2 Alternative Materials
The requirements of this Standard are not intended to prevent the use of alternative materials or methods of construction provided such alternatives meet the intent and requirements of this Standard.

1.3 Terminology
In this Standard,
(a) “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the Standard;
(b) “should” is used to express a recommendation, but not a requirement;
(c) “may” is used to express an option or something permissible within the scope of the Standard; and
(d) “can” is used to express a possibility or a capability.

Notes accompanying sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.4 Units of Measurement
SI units are the primary units of record in global commerce. In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application, but each unit system is to be used independently. All references to gallons are to U.S. gallons.

1.5 Amendments
Proposals for amendments to this Standard will be processed in accordance with the standards writing procedures of IAPMO.
1.6 Patents
The user’s attention is called to the possibility that compliance with this Standard might require use of an invention covered by patent rights. By publication of this Standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details can be obtained from 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 D3965 Standard Classification System and Basis for Specifications for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings
ASTM F409 Standard Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings
CSA B1800 Thermoplastic nonpressure piping compendium
    CSA B181.1 Acrylonitrile-butadiene-styrene (ABS) drain, waste, and vent pipe and pipe fittings
    CSA B181.2 Polyvinylchloride (PVC) and chlorinated polyvinylchloride (CPVC) drain, waste, and vent pipe and pipe fittings

3 Abbreviations
The following abbreviations apply in this Standard:

ABS — acrylonitrile-butadiene-styrene
DWV — drain, waste, and vent
ID — inside diameter
OD — outside diameter
PVC — polyvinylchloride
4 General Requirements

4.1 Materials

4.1.1 ABS compounds shall comply with or exceed the properties of cell classification 32222 specified in ASTM D3965.

4.1.2 PVC compounds shall comply with or exceed the properties of cell classification 12454 or 14333 specified in ASTM D1784.

4.1.3 Reworked materials:
   (a) may be used provided the fittings containing reworked material comply with all of the requirements of this Standard; and
   (b) shall be
      (i) clean;
      (ii) generated from the manufacturer’s own production of fittings and not supplied by any other manufacturer; and
      (iii) blended back into the same type of compound or product.

4.1.4 Other materials may be used provided they comply with all of the applicable requirements of this Standard.

4.2 Connections
Snap-lock DWV fittings shall be capable of connecting with pipe and fittings compliant with ASTM D2661, ASTM D2665, CSA B181.1, or CSA B181.2, as applicable (i.e., shall be sized to fit the connecting piping system).

4.3 Manufacturing

4.3.1 Snap-lock DWV fittings shall not
   (a) restrict the flow capacity of the drainage line;
   (b) offer abnormal obstruction to the flow;
   (c) produce excessive turbulence; or
   (d) have excessive body ledges or shoulders.

4.3.2 Inside and outside surfaces of Snap-lock DWV fittings shall be free of cracks, holes, blisters, voids, foreign inclusions, or other defects that are visible to the naked eye and that might affect their functionality.

4.4 Dimensions
Patterns, geometry, and dimensions of snap-lock DWV fittings shall comply with the applicable dimensional requirements specified in
   (a) ASTM D2661 or CSA B181.1 for ABS fittings; and
   (b) ASTM D2665, CSA B181.2, or ASTM F409 for PVC fittings.
5 Testing Requirements

5.1 Tests for snap-lock DWV Fittings

5.1.1 General
Snap-lock DWV fittings made of
(a) ABS shall comply with the applicable performance requirements specified in ASTM D2661 or CSA B181.1.
(b) PVC shall comply with the applicable performance requirements specified in ASTM D2665, ASTM F409 or CSA B181.2.

5.1.2 Test Set-up
The tests specified in Sections 5.2 and 5.3 shall be conducted using
(a) ABS pipe listed to ASTM D2661 or CSA B181.1 when testing ABS fittings and
(b) PVC pipe listed to ASTM D2665, ASTM F409 or CSA B181.2 when testing PVC fittings.

5.1.3 Test Assembly Pipe Length
The restrained pipe length shall be 305 to 914 mm (12 to 36 in), and the unrestrained pipe length shall be 1676 to 1829 mm (66 to 72 in) in length per Figure 2, Figure 3, and Figure 4.

5.1.4 Test Conditions
Unless specified otherwise the following tests shall be conducted under ambient laboratory conditions.

5.2 Unrestrained Hydrostatic Pressure Test

5.2.1 Test Procedure
The unrestrained hydrostatic pressure test shall be conducted as follows:
(a) Install a snap-lock DWV fitting according to the manufacturer’s instructions and assemble between the restrained and unrestrained pipe lengths in 5.1.3 and as shown in Figure 2:
(b) A restrained support shall be secured within 51 mm (2 in) from the nearest side of the coupling to be tested such that the support will allow any movement that the coupling may make during the test:
(c) Under ambient test conditions subject the pipe assembly to a hydrostatic pressure uniformly increased from 0 to 103.4± 7 kPa (0 to 15 ± 1 psi) over a 10 min period; and,
(d) Hold the 103.4± 7 kPa (15 ± 1 psi) pressure for 5 min.

5.2.2 Performance Requirements
There shall be no leakage, cracking, or permanent deformation.


5.3 Shear Test

5.3.1 Test Procedure

The shear test shall be conducted as follows:

(a) Install a snap-lock DWV fitting according to the manufacturer’s instructions with the seams oriented in three and nine o’clock positions and assemble between the restrained and unrestrained pipe lengths in 5.1.2 and as shown in Figure 3;

(b) A restrained support shall be secured within 51 mm (2 in) from the nearest side of the coupling to be tested such that the support will allow any movement that the coupling may make during the test;

(c) Subject the pipe assembly to a hydrostatic pressure of 5 psi (34.5 kPa) and hold pressure until completion of test;

(d) Apply a load equivalent to 3.5 N/mm (20 lbf/in), based on nominal diameter of pipe, on a 305 ± 25 mm (12 ± 1 in) long distribution load pad placed right next to the coupling. Hold the applied load and 5 psi (34.5 kPa) hydrostatic pressure for 5 min; and,

(e) Reorient the test specimen with the seams in the six and 12 o’clock positions and conduct the test procedure steps 5.3.1(b) through (d).

5.3.2 Performance Requirement

There shall be no leakage, cracking, or permanent deformation.

5.4 Deflection Test

5.4.1 Test Procedure

The deflection test shall be conducted as follows:

(a) Install a snap-lock DWV fitting according to the manufacturer’s instructions with the seams oriented in three and nine o’clock positions and assemble between the restrained and unrestrained pipe lengths in 5.1.3 and as shown in Figure 4;

(b) A restrained support shall be secured within 51 mm (2 in) from the nearest side of the coupling to be tested such that the support will allow any movement that the coupling may make during the test;

(c) Place a lift spacer 1524 ± 25 mm (60 ± 1 in) from the end of the coupling push fit drain, waste, and vent fitting, and subject the pipe assembly with hydrostatic pressure of 34.5 ± 3.5 kPa (5 ± 0.5 psi) and hold pressure until completion of test;

(d) Slowly lift the pipe so it is elevated 63.5 ± 0.6mm (2.5 ± 0.25 in) from the horizontal at the lift spacer.

(e) Apply and hold 34.5 ± 3.5 kPa (5 ± 0.5 psi) hydrostatic pressure for 5 min.,

(f) Reorient the test specimen with the seams in the six and 12 o’clock positions and conduct the steps 5.4.1(b) through (e).

5.4.2 Performance Requirement

There shall be no leakage, cracking, or permanent deformation.
5.5 Flattening Load Test

5.5.1 Test Procedure
The deflection load test shall be conducted as follows:
(a) Assemble two test specimens by connect two complete sets of snap-lock DWV fittings in
accordance with the manufacturer’s instructions but without assembly to any pipe;
(b) Allow the manufacturer’s suggested time to cure.
(c) Using platens, placed on either side along the length of the test specimens, subject the
complete fitting to a minimum load of 11 ± 2 N/mm (62.5 ± 0.5 lbf/in) of centerline length.
Shim the fittings when necessary to give full centerline contact with the platens;
   (i) Apply a load to the first test specimen with the platens contacting the sides of the fitting
       perpendicular to the seams, (e.g. approximately 90 degrees offset from the seams
       measured around the circumference of the fitting);
   (ii) Apply a load to the second test specimen, with the platens oriented at or along the
        seams (e.g. approximately 0 degrees offset from the seams).

5.5.2 Performance Requirement
Failure in any test sample shall be any cracking or other visible evidence of failure. Observe the
specimen while under load for evidence of failure.

5.6 Thermocycling Test

5.6.1 Test Procedure
The thermocycling test shall be conducted as follows:
(e) Assemble a snap-lock DWV fitting with two pipes in accordance with the manufacturer’s
instructions.
   Note: At least one end of the pipe and fitting assembly should be long enough to permit connection of
   an air source capable of maintaining a nominal internal pressure of 69 ± 6.9 kPa (10 ± 1 psi) and allow
   for full immersion of the fitting into the hot and cold-water baths.
(f) Pressurize the test specimen with nitrogen or air at 69 ± 6.9 kPa (10 ± 1 psi).
(g) Thermocycle the test specimen in hot and cold-water baths and in ambient air using the
following test cycle:
   (i) Water immersion at 180°F (82°C) 2 min (min)
   (ii) Air immersion at ambient 2 min (max)
   (iii) Water immersion at 60°F (16°C) 2 min (min)
   (iv) Air immersion at ambient 2 min (max)
   (h) Upon the completion of 1000 thermal cycles, immerse the specimen assembly again in 16 ±
       2°C (60 ± 4°F) water and check for signs of leakage.

5.6.2 Performance Requirement
There shall be no evidence of leakage at the fitting or separation of the fitting from the pipe.
6 Markings and Accompanying Literature

6.1 Snap-lock DWV fittings complying with this Standard shall be marked with the:
(a) manufacturer's name or trademark;
(b) nominal size(s); and
(c) material designation (e.g., ABS or PVC).

6.2 Markings shall be permanent, legible, and visible after installation.
Figure 1
Unrestrained Hydrostatic Pressure Test
(See Section 1.1.2)

Figure 2
Unrestrained Hydrostatic Pressure Test
(See Sections 5.1.3 and 5.2.1)
Figure 3
Shear Test
(See Sections 5.1.3 and 5.3.1)

Figure 4
Deflection Test
(See Sections 5.1.3 and 5.4.1)