IAPMO IGC 348-20192020

PUBLIC REVIEW DRAFT

Industry Standard for
Plastic Push Fit Tubular Fittings
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IAPMO Standards Review Committee

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Preface

This is the second edition of IAPMO IGC 348, Plastic Push Fit Tubular Fittings. This Standard supersedes IAPMO IGC 348-2017, Polypropylene Push Fit Tubular Fittings. The previous edition of this standard is: November 2017, August 2019.

This Standard was developed by the IAPMO Standards Review Committee (SRC) in accordance with the policies and procedures regulating IAPMO industry standards development, Policy S-001, Standards Development Process. This Standard was approved as an IAPMO Industry Standard on August 12, 2019.

Notes:
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(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.
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(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 4755 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 4755 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.
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(12) Proposals for amendments to this Standard will be processed in accordance with the standards-writing procedures of IAPMO industry standards development, Policy S-001, Standards Development Process.
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IAPMO IGC 348–20192020
Plastic Push Fit Tubular Fittings

1 Scope

1.1 Scope
This Standard covers reversible 1-1/4 and 1-1/2 NTS plastic push fit tubular fittings intended for quick assembly of ABS, PVC and PP waste tubing and tubular fittings applications, and specifies requirements for materials, physical characteristics, performance testing, and markings.

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.
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 International
ASTM A240/A240M
Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

ASTM D1784
Standard Classification System and Basis For Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D3965
Standard Classification System and Basis for Specifications for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings

ASTM D4101
Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials

ASTM F477
Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F409
Standard Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings

ASTM F913
Standard Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe

3 Definitions and Abbreviations

3.1 Definitions

The following definitions shall apply in this Standard:

**Push Fit Fitting** — A fitting with a push-on joint type with an elastomeric gasket providing a compressive force against the spigot and socket after assembly to provide a seal.

**Tubular Fittings** — Connect or change direction of plastic tubing used for plumbing fixture or appliance waste.
3.2 Abbreviations

The following abbreviations apply in this Standard:

- **ABS** — Acrylonitrile butadiene styrene
- **PVC** — Polyvinyl Chloride
- **NTS** — Nominal Tube Size
- **PP** — Polypropylene

4 General Requirements

4.1 Workmanship

Push fit tubular fittings shall

(a) be free of defects that can adversely affect their functionality or cause leaks;
(b) not restrict the flow capacity of a waste system;
(c) not obstruct flow;
(d) be sound, and free of imperfections;
(e) have uniform wall thickness;
(f) be true to pattern; and
(g) have a smooth interior waterway.

4.2 Materials

4.2.1 General

Push fit tubular fittings shall be made from

(a) virgin polypropylene compounds procured from a single manufacturer;
(b) a blend of virgin compound and clean reworked material generated from the manufacturer’s own production of push fit tubular fittings made from the same virgin resin;
(c) virgin ABS compounds procured from a single manufacturer; or
(d) virgin PVC compounds procured from a single manufacturer.

4.2.2 Reworked Material

Push fit tubular fittings containing reworked material shall comply with the requirements specified in the applicable nationally recognized standards.

4.2.3 PP

PP compounds used for manufacturing push fit tubular fittings shall comply with minimum cell classification PP0110B55140 and PP0105G20A33350 for waste fittings, as specified in ASTM D4101.

4.2.4 ABS

Virgin ABS compounds used for manufacturing push fit drain, waste and vent fittings shall comply with or exceed the properties of cell classification 20211 as specified in ASTM D3965.

4.2.5 PVC

Virgin PVC compounds used for manufacturing push fit drain, waste and vent fittings shall comply with or exceed the properties of cell classification 12454 as specified in ASTM D1784.
4.3 Dimensions

PP Push fit tubular fittings shall comply with dimensional requirements, the geometries and laying lengths specified in ASTM F409.

4.4 Elastomers

4.4.1 General

Push fit tubular fittings shall include an elastomeric gasket that shall provide a seal onto the mating connection joint. Joints shall be suitable for transitions between PVC, ABS and PP materials.

4.4.2 Materials

Elastomeric materials used within push fit tubular fittings shall be free from pitting, cracks, air marks, porosity, and other imperfections that could affect their performance in service and shall comply with the test performance requirements specified in ASTM F477, or ASTM F913.

4.5 Stainless Steel

Stainless steel components shall be 300 Series or better complying with the requirements of ASTM A240/A240M.

5 Testing Requirements

5.1 Tests for Push Fit Tubular Fittings

Tests specified in Sections 5.2 to 5.6 shall be conducted using tube listed to ASTM F409, or made from materials compliant with ASTM D4101, with the restrained tube length being 305 to 914 mm (12 to 36 in), and the unrestrained tube being 1676 to 1829 mm (66 to 72 in) in length per Figure 1, Figure 2, and Figure 3.

5.2 Unrestrained Hydrostatic Test

5.2.1 Test Procedure

The unrestrained hydrostatic test shall be conducted as follows:

(a) Install one coupling push fit tubular fitting according to the manufacturer’s instructions and assemble between the restrained and unrestrained tube lengths in 5.1 and as shown in Figure 1;

(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; and

(c) Subject the tube assembly with hydrostatic pressure uniformly increased to 103.4 kPa (15 psi) over a 10 min period, and hold the 103.4 kPa (15 psi) pressure for 5 min.

5.2.2 Performance Requirement

There shall be no leakage from the coupling push fit tubular fitting.
5.3  **Shear Test**

5.3.1  **Test Procedure**

The shear test procedure shall be conducted as follows:

(a) Install one coupling push fit tubular fitting according to the manufacturer’s instructions and assemble between the restrained and unrestrained tube lengths in 5.1 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) Subject the tube assembly with hydrostatic pressure to 34.5 kPa (5 psi) and hold pressure until completion of test; and

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

5.3.2  **Performance Requirement**

There shall be no leakage from the coupling push fit tubular fitting.

5.4  **Deflection Test**

5.4.1  **Test Procedure**

The deflection test shall be conducted as follows:

(a) Install one coupling push fit tubular fitting according to the manufacturer’s instructions and assemble between the restrained and unrestrained tube lengths in 5.1 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) Place a lift spacer 1524 mm (60 in) from the end of the coupling push fit tubular fitting, and subject the tube assembly with hydrostatic pressure of 5 psi (34.5 kPa) and hold pressure until completion of test; and

(d) Slowly lift the tube so it is elevated 63.5 mm (2.5 in) from the horizontal at the lift spacer. Hold 34.5 kPa (5 psi) hydrostatic pressure for 5 min.

5.4.2  **Performance Requirement**

There shall be no leakage from each coupling push fit tubular fitting tested.
5.5 **Impact Test**

5.5.1 **Test Procedure**
Subject 10 unassembled samples of the same push fit tubular fittings (couplings are not subject to this test) to the impact resistance values shown in Table 1 using a 5.4 kg (12 lb) Tup A and Holder B.

5.5.2 **Performance Requirement**
Failure in any test sample shall be any shattering, any crack, or break extending completely through the sample wall that is visible to the naked eye.

(a) At least 9 samples shall pass, but if not
(b) An additional 10 samples shall be tested and at least 17 samples shall pass, but if not
(c) An additional 20 samples shall be tested and at least 32 samples shall pass.

5.6 **Deflection Load Test**

5.6.1 **Test Procedure**
The deflection load test shall be conducted as follows:

(a) Subject 3 unassembled fittings to a minimum load of 11 N/mm (62.5 lbf/in) of centerline length;
(b) Shim the unassembled fittings to give full centerline contact with platens; and
(c) Terminate the test when the load reaches 11 N/mm (62.5 lbf/in) of centerline length.

5.6.2 **Performance Requirement**
Failure in any test sample shall be any cracking or other visible evidence of failure. Observe the load and deflection at the first evidence of cracking, if any. Record the location and type of failure.

6 **Markings and Accompanying Literature**

6.1 Push fit tubular fittings complying with this Standard shall be marked with:

(a) the manufacturer's name or trademark;
(b) the nominal size; and
(c) the compound designation (i.e. PP).

6.2 Markings shall be permanent, legible, and visible after installation.

6.3 Push fit tubular fittings shall be accompanied by instructions for their installation.
Table 1
Impact Resistance of Plastic Push Fit Tubular Fittings
(See Section 5.5.1)

<table>
<thead>
<tr>
<th>Description</th>
<th>Impact Resistance, min., ft-lbf (J)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitting sizes and types (larger than 2 in. nominal OD)</td>
<td>15 (20)</td>
</tr>
<tr>
<td>Fitting sizes and types (2 in. and smaller nominal OD)</td>
<td>7.5 (10)</td>
</tr>
</tbody>
</table>
Figure 1
Unrestrained Hydrostatic Test
(See Sections 5.1 and 5.2.1)

Figure 2
Shear Test
(See Sections 5.1 and 5.3.1)
Figure 3
Deflection Test
(See Sections 5.1 and 5.4.1)