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INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS

IAPMO GUIDE CRITERIA FOR REMOVABLE AND NON-REMOVABLE PUSH FIT FITTINGS

IGC 188-2009

1. PURPOSE

- 1.1** The purpose of this standard is to establish a generally acceptable standard for removable and non-removable fittings that have a quick assembly push-fit mechanism that are used with various types of outside diameter controlled tubing. Push fit fittings can be used with PEX (ASTM F 876, ASTM F 877 or CSA B137.5), copper (ASTM B 88) and CPVC (ASTM D 2846 or CSA B137.6) tubing that conforms to the dimensions as specified in their respective standards.
- 1.2** The provisions of this standard are not intended to prevent the use of any alternate material or method of construction provided that any such alternate meets the intent of this standard.
- 1.3** The fittings described in this standard are intended for use in domestic and commercial applications, for both potable water distribution systems and hydronic heating systems. These fittings shall have a size range of 14 NTS to 2 NTS 6 DN to 50 DN and 14 CTS to 2 CTS 6 DN to 50 DN.

2. SCOPE

- 2.1** This standard serves to supplement ASTM F 877, ASTM D 2846, ASTM B88, CSA B137.5 and CSA B137.6 in describing a test method for a specific type of push-fit fitting system to be used with PEX tubing, copper tubing and CPVC tubing.
- 2.2** This standard covers minimum requirements for materials of construction and prescribes minimum performance requirements for fitting joints, and marking and identification requirements.
- 2.3** When using fittings with PEX tubing, a tube liner must be inserted into the end of the tubing prior to assembly of the tubing and fitting.

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3. REFERENCE STANDARDS

- 3.1** All standards referenced herein shall be the current edition of that standard as published.
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| NSF/ANSI 61 | Drinking Water System Components – Health Effects |
| ASME B16.18 | Cast Copper Alloy Solder Joint Pressure Fittings |
| ASME B16.22 | Wrought Copper and Copper Alloy Solder Joint Fittings |
| ASSE 1061 | Removable and Non-Removable Push-Fit Fittings |
| ASTM A 313 | Stainless Steel Spring Wire |
| ASTM B 88 | Seamless Copper Water Tube |
| ASTM D 2000 | Rubber Products in Automotive Applications |
| ASTM D 2846 | Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems |
| ASTM D 6100 | Extruded, Compression Molded and Injection Molded Acetal Shapes (POM) |
| ASTM F 876 | Crosslinked Polyethylene (PEX) Tubing |
| ASTM F 877 | Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems |
| CSA B137.0 | Thermoplastic Pressure Piping Compendium |
| CSA B137.5 | Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications |
| CSA B137.6 | CPVC Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems |
| UL 969 | Marking and Labeling Systems |

4. GENERAL REQUIREMENTS

- 4.1** Components of fittings covered under this standard shall meet the requirements of ASTM F 877 Section 6.2.3 or section 4.1.1 of the CSA B137.5 or B137.6, NSF/ANSI 61, and the applicable standards specified below.
- 4.2** **Copper Alloys.** Copper alloys machined fittings in contact with potable water shall not exceed 8% lead.
- 4.2.1** Cast copper alloy, wrought copper alloy, and copper alloy solder joint fittings shall comply with the dimensional requirements of ASME B16.18 and B16.22.
- 4.3** Fittings for use in potable water systems shall comply with the requirements of ANSI/NSF 61.
- 4.4** O-ring seals shall be made from non-toxic synthetic rubber that meets the applicable requirements of ANSI/NSF 61, and a minimum tensile strength of 1450 psi (10 MPa) and a hardness of 60-80 durometer in accordance with ASTM D 2000.
- 4.5** Acetal components shall be Type 2, Class 1, and Grade 2 and shall meet the requirements of ASTM D 6100.

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- 4.6 Stainless Steel.** Stainless steel components shall be type 304 complying with the requirements of ASTM A 240. Stainless steel components not in contact with potable water shall be a minimum type 301 in composition complying with the requirements of ASTM A 240.
- 4.7** Inner lining shall be made of a material suitable to meet the performance requirements of this standard.

5. TESTING REQUIREMENTS

- 5.1 Sample Conditioning.** Where required, condition samples shall be conditioned prior to each of the tests performed. Condition the samples by either immersing the fitting assembly in a constant temperature water bath at the required temperature or by flowing water at the required temperature through the fitting assembly to an open discharge.
- 5.2 Hydrostatic Pressure Test**
- 5.2.1** Assemble two fittings with a length of each type of tubing. The tubing shall have a minimum length of 4 inches (101.6 mm).
- 5.2.2** Condition one samples at ambient (75°F (23.9°C) max.) and the other at 200 ± 5°F (93.3 ± 2.8°C) or the manufacturer's maximum rated temperature, whichever is higher, for at least 1 hour prior to testing. Condition the fitting by either immersing the fitting in a water bath or by flowing water through the fitting to an open discharge.
- 5.2.3** Connect the fitting assemblies to the apparatus ensuring all air is removed from the system. Increase the hydrostatic pressure in the assembly to the applicable test pressure (Tables 1A and 1B) within 30 to 60 seconds. Maintain the test pressure with an accuracy of ±10 psi (±0.07 MPa) for the duration of the test. Maintain the temperature with an accuracy of ± 5°F (± 3°C) for the duration of the test.

Table 1A: Pressures for Hydrostatic Pressure Test for Fittings Intended for PEX and CPVC Tubing

Test Temperature	Test Pressure		Test Duration (hours)
°F	psi	kPa	
Ambient (75 max.)	375 ¹	2585.6 ¹	720
180	100 ³	689.5 ³	720