



Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps, for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing¹

This standard is issued under the fixed designation F1807; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification covers metal insert fittings and copper crimp rings, or alternate stainless steel clamps, for use with cross-linked polyethylene (PEX) tubing in Nominal Tubing Size (NTS) $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, and 2 nominal sizes that meet the requirements for Specification F876 or Specification F3253, or for use with polyethylene of raised temperature (PE-RT) tubing in NTS $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, and 2 nominal sizes that meet the requirements of Specification F2623 or Specification F2769. These fittings are intended for use in 100 psi (689.5 kPa) cold- and hot-water distribution systems operating at temperatures up to, and including, 180 °F (82 °C).

1.1.1 When used with PEX tubing in accordance with Specification F876, the fittings covered by this specification are intended for use in, but not limited to, residential and commercial, hot- and cold-potable water distribution systems, reclaimed water, fire protection, municipal water service lines, building supply lines, radiant heating and cooling systems, hydronic distribution systems, snow and ice melting systems, geothermal ground loops, district heating, turf conditioning, compressed air distribution and building services pipe.

1.1.2 When used with PEX tubing in accordance with Specification F3253, the fittings covered by this specification are intended for use in residential and commercial hydronic heating and cooling systems.

1.1.3 When used with PE-RT tubing in accordance with Specification F2769, the fittings covered by this specification are intended for use in residential and commercial, hot- and cold-potable water distribution systems, and building supply lines.

1.1.4 When used with PE-RT tubing in accordance with Specification F2623, the fittings covered by this specification

are intended for use in general fluid transport, including hydronics and irrigations systems.

1.1.5 The requirements for materials, workmanship, dimensions, and markings to be used on the fittings and rings are also included.

NOTE 1—Other code and regulatory requirements may apply to fittings for specific applications.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units which are provided for information only and are not considered the standard.

1.3 Compliance with this specification requires that these fittings be tested and certified to Specification F877 or Specification F3253 when used with PEX tubing and Specification F2769 or Specification F2623 when used with PE-RT tubing.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

A269/A269M Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

A276/A276M Specification for Stainless Steel Bars and Shapes

¹ This specification is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.10 on Fittings.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard

A312/A312M Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
B16/B16M Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines
B62 Specification for Composition Bronze or Ounce Metal Castings
B75/B75M Specification for Seamless Copper Tube
B88 Specification for Seamless Copper Water Tube
B124/B124M Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes
B140/B140M Specification for Copper-Zinc-Lead (Red Brass or Hardware Bronze) Rod, Bar, and Shapes
B283/B283M Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)
B371/B371M Specification for Copper-Zinc-Silicon Alloy Rod
B453/B453M Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Rod, Bar, and Shapes
B584 Specification for Copper Alloy Sand Castings for General Applications
B927/B927M Specification for Brass Rod, Bar, and Shapes
B967/B967M Specification for Copper-Zinc-Tin-Bismuth Alloy Rod, Bar and Wire
D1600 Terminology for Abbreviated Terms Relating to Plastics
D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
E18 Test Methods for Rockwell Hardness of Metallic Materials
F412 Terminology Relating to Plastic Piping Systems
F876 Specification for Crosslinked Polyethylene (PEX) Tubing
F877 Specification for Crosslinked Polyethylene (PEX) Hot and Cold-Water Distribution Systems
F2098 Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Insert Fittings
F2623 Specification for Polyethylene of Raised Temperature (PE-RT) Systems for Non-Potable Water Applications
F2769 Specification for Polyethylene of Raised Temperature (PE-RT) Plastic Hot and Cold-Water Tubing and Distribution Systems
F3253 Specification for Crosslinked Polyethylene (PEX) Tubing with Oxygen Barrier for Hot- and Cold-Water Hydronic Distribution Systems

2.2 ASME Standards:³

B1.20.1 Pipe Threads General Purpose (Inch)
B16.18 Cast Copper Alloy Solder Joint Pressure Fittings
B16.22 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings

2.3 Manufacturer's Standardization Society Standard:⁴

SP-104 Wrought Copper Solder Joint Pressure Fittings

2.4 NSF International Standard:⁵

Standard No. 14 for Plastic Piping Components and Related Materials

Standard No. 61 for Drinking Water System Components-Health Effects

2.5 EN Standards⁶

EN 12164 Copper and Copper Alloys-Rod for Free Machining Purposes

EN 12165 Copper and Copper Alloys-Wrought and Unwrought Forging Stock

EN 1982 Copper and Copper Alloys, Ingots and Castings

3. Terminology

3.1 Definitions are in accordance with Terminology **F412** and abbreviations are in accordance with Terminology **D1600**, unless otherwise indicated.

4. Classification

4.1 This specification covers one class of fittings and copper crimp rings, or alternate stainless steel clamps suitable for use with PEX tubing that meet the requirements of Specification **F876** or Specification **F3253**, or with PE-RT tubing that meet the requirements of Specification **F2623** or Specification **F2769**.

5. Materials and Manufacture

5.1 *Fittings*—The fittings shall be made from one of the following metals:

5.1.1 *Wrought Copper*—Wrought copper fittings shall be made from material meeting the requirements of Specification **B75/B75M** or **B88** for one of the following coppers: copper UNS Nos. C10200, C10300, C10800, or C12200.

5.1.2 *Cast Copper Alloys*—Cast copper alloy fittings shall be made from material meeting the requirements of Specification **B584**, copper alloy UNS Nos. C84400, C83800, C87710, C87850 or C89844 or Specification **B62**, copper alloy UNS No. C83600, or Standard EN 1982, copper alloy EN Symbol CuSn4Zn6Pb3-C.

5.1.3 *Machined Brass*—Machined brass fittings shall be made from material meeting the requirements one of the following listed below:

Specification	Alloy Designation
Specification B16/B16M	UNS C36000
Specification B124/B124M	UNS C46500, C48600, C65680, C87700
Specification B140/B140M	UNS 31400
Specification B371/B371M	UNS C69300, C69850
Standard EN 12164	CW614N
Specification B453/B453M	UNS 35300
Specification B927/B927M	UNS 27450, C27451
Specification B967/B967M	UNS C49260, C49340

⁴ Available from Manufacturers Standardization Society of the Valve and Fittings Industry (MSS), 127 Park St., NE, Vienna, VA 22180-4602, <http://www.msshq.com>.

⁵ Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140, <http://www.nsf.org>.

⁶ Available from European Committee for Standardization (CEN), 36 rue de Stassart, B-1050, Brussels, Belgium, <http://www.cenorm.be>.

³ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.