



Designation: **F2098—08 F2098 – 15**

Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing to Metal Insert and Plastic Insert Fittings^{1,21}

This standard is issued under the fixed designation F2098; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This specification covers stainless steel clamps for use with ~~four~~ five sizes of insert fittings that comply with **F1807** or **F2159**, and cross-linked polyethylene (PEX) plastic tubing that complies with **F876** or **F877**. These clamps are intended as an alternative to the copper-alloy crimp-rings of Specifications **F1807** or **F2159** 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). Included are requirements for materials, workmanship, dimensions and marking of the stainless steel clamps; requirements for deforming the clamps; which apply to assemblies of PEX tubing and Specifications **F1807** and **F2159**, insert fittings secured with deformed clamps per this specification.

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

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

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

D618 Practice for Conditioning Plastics for Testing

D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure

D1599 Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings

D1600 Terminology for Abbreviated Terms Relating to Plastics <https://standards.iteh.ai/document/ASTM/D1600>

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

F1807 Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

F2159 Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing

3. Terminology

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

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. Current edition approved March 1, 2008; Nov. 1, 2015. Published March 2008; February 2016. Originally approved 2001. Last previous edition approved in 2004 as **F2098-04-08**. DOI: 10.1520/F2098-08.10.1520/F2098-15.

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.

4. Classification

4.1 This specification covers one class of stainless steel clamps in ~~four~~ five sizes suitable for securing PEX tubing that meets the requirements of Specifications ~~F876 or F877~~ to insert fittings that meet the requirements of Specifications ~~F1807 and F2159~~.

5. Materials and Manufacture

5.1 *Clamps*—Clamps shall be made from material meeting the requirements of Specification ~~A240/A240M~~ stainless steel UNS S304000.

6. General Requirements

6.1 The following sections of Specification ~~F877~~ constitute a part of this specification.

- 6.1.1 Requirements,
- 6.1.2 Test Methods, and
- 6.1.3 Retest and Rejection.

6.2 In addition, when a section with a title identical to that referenced in 6.1 above, appears in this specification, it contains additional requirements that supplement those appearing in Specification ~~F877~~.

6.3 *General*—All performance tests shall be performed on assemblies of fittings, clamps and PEX tubing. Clamps shall meet the material and dimensional requirements of this specification. Metal insert fittings shall meet the material and dimensional requirements of Specification ~~F1807~~. Plastic insert fittings shall meet the material and dimensional requirements of Specification ~~F2159~~. PEX tubing shall meet the requirements of Specification ~~F876 or F877~~. Assembly of test specimens shall be in accordance with 9.1.1. Each assembly shall contain at least two (2) joints. Use separate sets of assemblies for each performance test requirement.

7. Dimensions

7.1 *Dimensions and Tolerances*—The dimensions and tolerances of clamps shall be as shown in ~~Figs. 1-4~~ Figs. 1-4 and ~~Table 1 and Table 2~~.

8. Workmanship, Finish, and Appearance

8.1 The surfaces of the clamps shall be smooth and free of foreign material. Clamps shall be free of cracks, holes, corrosion, voids, foreign inclusions, or other defects that are visible to the unaided eye that have potential to affect the clamp integrity.

8.1.1 The manufacturer shall verify that any residual manufacturing substances on clamps are compatible with PEX System components such as PEX tube or insert fittings.

9. Assembly

9.1 *Clamp Joints*—Insert fittings shall be joined to PEX tubing by deforming and locking a stainless steel clamp around the outer circumference of the tubing, forcing the tubing material into annular spaces formed by the ribs on the fitting. Metal insert fittings shall meet the material and dimensional requirements of Specification ~~F1807~~. Plastic insert fittings shall meet the material and dimensional requirements of Specification ~~F2159~~. PEX tubing shall meet the requirements of Specifications ~~F876 or F877~~. Clamps shall meet the dimensional and material requirements of this specification.

9.1.1 *Clamping Procedure*—The clamping procedure shall be as follows: slide the clamp onto the tubing, insert the ribbed end of the fitting into the end of the tubing until the tubing contacts the shoulder of the fitting or tube stop. The clamp shall then be positioned on the tubing so the edge of the clamp is 1/8 to 1/4 in. (3.2 to 6.4 mm) from the end of the tube. The ratcheting clamping

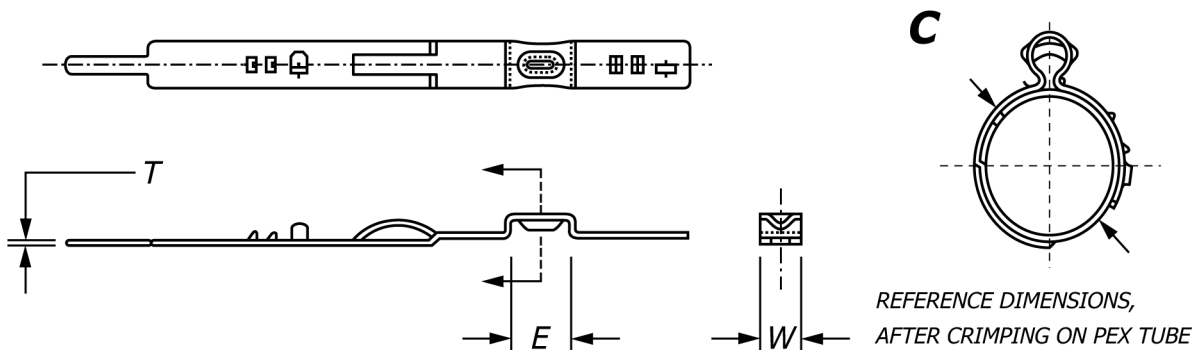


FIG. 1 Design and Layout