



# Standard 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<sup>1</sup>

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 reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This specification covers stainless steel clamps for use with five sizes of insert fittings that comply with [F1807](#) or [F2159](#), and cross-linked polyethylene (PEX) plastic tubing that complies with [F876](#) and for use with polyethylene of raised temperature (PE-RT) tubing that complies with Specification [F2769](#). These clamps are intended as an alternative to the copper-alloy crimp-rings of Specifications [F1807](#) 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 standard. The values given in parentheses are mathematical conversions to SI units that are provided for information 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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.*

<sup>1</sup> 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 Nov. 15, 2018. Published February 2019. Originally approved 2001. Last previous edition approved in 2015 as F2098-15. DOI: 10.1520/F2098-18.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- [A240/A240M](#) Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- [D1600](#) Terminology for Abbreviated Terms Relating to Plastics
- [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
- [F2769](#) Specification for Polyethylene of Raised Temperature (PE-RT) Plastic Hot and Cold-Water Tubing and Distribution Systems

## 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 stainless steel clamps in five sizes suitable for securing PEX tubing that meets

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto: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

the requirements of Specifications F876 or PE-RT tubing that meets the requirements of Specification F2769, 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 and Specification F2769 constitute a part of this specification. Only the sections of the referenced standard which apply to the type of pipe being tested shall be required as part of this section.

- 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 or Specification F2769 .

6.3 *General*—All performance tests shall be performed on assemblies of fittings, clamps and PEX or PE-RT 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 and PE-RT tubing shall meet the requirements of Specification F2769. 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 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 and PE-RT System components such as PEX and PE-RT tube or insert fittings.

**9. Assembly**

9.1 *Clamp Joints*—Insert fittings shall be joined to PEX or PE-RT 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 and PE-RT tubing shall meet the requirements of Specification F2769. 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 tool shall be used to close the clamp. The tool will not release until the clamp is properly closed. Ratcheting hand tools shall conform to the dimensional requirements of Fig. 3.

9.1.2 *Clamping Tools*—Clamps and ratcheting hand tools from different manufacturers have similar appearances. Clamps shall be installed using the tools and calibration methods recommended by the clamp manufacturer.

**10. Retest**

10.1 If any failure occurs, a retest shall be conducted only if agreed upon between the purchaser and the seller. Failure in the retest indicates the quantity of clamps represented by the sample does not conform to the requirements of this specification.

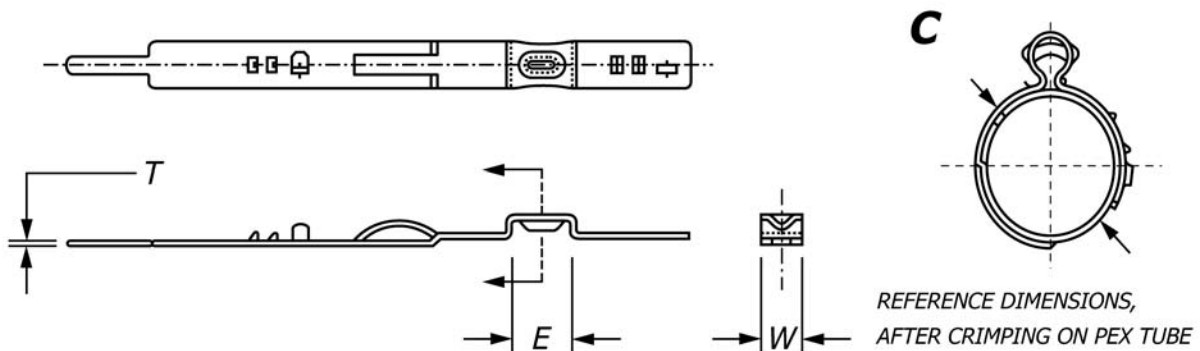


FIG. 1 Design and Layout