Designation: F1387 – 23

An American National Standard

Standard Specification for Performance of Piping and Tubing Mechanically Attached Fittings[1]

This standard is issued under the fixed designation F1387; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification establishes the performance characteristics required for mechanically attached fittings (MAFs) for use in piping and tubing systems. These fittings directly attach to pipe or tube by mechanical deformation of the pipe or tube or fitting, or a combination thereof, creating a seal and a restrained joint. The seal may be created via the mechanical deformation or created independently. Successful completion of the tests described constitutes completion of the technical portion of the qualification process.

1.2 Supplementary requirements are provided for use when additional testing or inspection is desired. These shall apply only when specified in part or whole by the purchaser in the order. Unless otherwise specified, U.S. Navy contracts shall invoke the supplementary requirements in whole.

1.3 Unless specific MAF types are specified, the term "MAF" shall apply to all types described herein.

1.4 The tests specified in Section 13 and described in Annex A1 and the Supplementary Requirements Section are applicable only to ascertain the performance characteristics of MAFs. These tests are not intended for use in the evaluation of non-MAF products.

1.5 A fire performance test is specified in Supplementary Requirement S7. This test provides general guidelines to determine the responsiveness of MAFs when subjected to fire. This test should not be considered for use to evaluate non-MAF products.

1.6 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.7 The following safety hazards caveat applies only to the tests listed in Section 13 and the tests described in the Supplementary Requirements Section and the annexes of this specification: *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.*

1.8 *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]

A53/A53M Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

A106/A106M Specification for Seamless Carbon Steel Pipe for High-Temperature Service

A108 Specification for Steel Bar, Carbon and Alloy, Cold-Finished

A109/A109M Specification for Steel, Strip, Carbon (0.25 Maximum Percent), Cold-Rolled

A167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip (Withdrawn 2014)[3]

A182/A182M Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service

A213/A213M Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater, and Heat-Exchanger Tubes

A234/A234M Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

[1] This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.11 on Machinery and Piping Systems.

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

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

A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
A249/A249M Specification for Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger, and Condenser Tubes
A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
A269/A269M Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
A276/A276M Specification for Stainless Steel Bars and Shapes
A312/A312M Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
A335/A335M Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service
A370 Test Methods and Definitions for Mechanical Testing of Steel Products
A380/A380M Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
A403/A403M Specification for Wrought Austenitic Stainless Steel Piping Fittings
A450/A450M Specification for General Requirements for Carbon and Low Alloy Steel Tubes
A479/A479M Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels
A530/A530M Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe
A564/A564M Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
A576 Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality
A967 Specification for Chemical Passivation Treatments for Stainless Steel Parts
A999/A999M Specification for General Requirements for Alloy and Stainless Steel Pipe
A1016/A1016M Specification for General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes
B16/B16M Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines
B21/B21M Specification for Naval Brass Rod, Bar, and Shapes
B36/B36M Specification for Brass Plate, Sheet, Strip, And Rolled Bar
B75/B75M Specification for Seamless Copper Tube
B88 Specification for Seamless Copper Water Tube
B111/B111M Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock
B117 Practice for Operating Salt Spray (Fog) Apparatus
B121/B121M Specification for Leaded Brass Plate, Sheet, Strip, and Rolled Bar
B122/B122M Specification for Copper-Nickel-Tin Alloy, Copper-Nickel-Zinc Alloy (Nickel Silver), and Copper-Nickel Alloy Plate, Sheet, Strip, and Rolled Bar
B124/B124M Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes
B154 Test Method for Mercurous Nitrate Test for Copper Alloys
B164 Specification for Nickel-Copper Alloy Rod, Bar, and Wire
B251/B251M Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
B369/B369M Specification for Copper-Nickel Alloy Castings
B371/B371M Specification for Copper-Zinc-Silicon Alloy Rod
B564 Specification for Nickel Alloy Forgings
B633 Specification for Electrodeposited Coatings of Zinc on Iron and Steel
B696 Specification for Coatings of Cadmium Mechanically Deposited
B766 Specification for Electrodeposited Coatings of Cadmium
E8/E8M Test Methods for Tension Testing of Metallic Materials
E511 Test Method for Measuring Heat Flux Using a Copper-Constantan Circular Foil, Heat-Flux Transducer
E1529 Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies

2.2 *Federal Specifications:*[4]
QQ-N-281 Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings and Structural and Special Shaped Sections
QQ-N-286 Nickel-Copper-Aluminum Alloy, Wrought (UNS N05500)

2.3 *Military Specifications:*[4]
MIL-DTL-901 Shock Tests, H.I. (High Impact) Shipboard Machinery, Equipment, and Systems, Requirements for
MIL-T-1368 Tube and Pipe, Nickel Copper Alloy Seamless and Welded
MIL-PRF-7808 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Number O-148
MIL-T-8606 Tubing, Steel Corrosion-Resistant (18-8 Stabilized and Extra Low Carbon)
MIL-C-15726 Copper-Nickel Alloy, Rod, Flat Products (Flat Wire, Strip, Sheet, Bar, and Plate) and Forgings
MIL-DTL-16232 Phosphate Coatings, Heavy, Manganese or Zinc Base (for Ferrous Metals)
MIL-T-16420 Tube, Copper Nickel Alloy, Seamless and Welded (Copper Alloy Numbers 715 and 706)
MIL-PRF-17331 Lubricating Oil, Steam Turbine and Gear, Moderate Service
MIL-DTL-18866 Fittings Hydraulic Tube, Flared, 37° and Flareless Steel
MIL-T-24107 Tube, Copper, (Seamless) (Copper Numbers 102, 103, 108, 120, 122, and 142)
MIL-P-24691/1 Pipe and Tube, Carbon Steel, Seamless
MIL-P-24691/2 Pipe and Tube, Chromium-Molybdenum Steel, Seamless

[4] Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, http://quicksearch.dla.mil.