Designation: A 960/A 960M – 08

Standard Specification for Common Requirements for Wrought Steel Piping Fittings[1]

This standard is issued under the fixed designation A 960/A 960M; 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 a group of common requirements that shall apply to wrought steel piping fittings covered in any of the following individual product specifications or any other ASTM specification that invokes this specification or portions thereof:

Title of Specification	ASTM Designation
Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures	A 234/A 234M
Specification for Wrought Austenitic Stainless Steel Piping Fittings	A 403/A 403M
Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service	A 420/A 420M
Specification for Butt-Welding, Wrought-Carbon Steel, Piping Fittings with Improved Notch Toughness	A 758/A 758M
Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures	A 774/A 774M
Specification for Wrought Ferritic, Ferritic/Austenitic, and Martensitic Stainless Steel Piping Fittings	A 815/A 815M
Specification for Heat-Treated Carbon Steel Fittings for Low-Temperature and Corrosive Service	A 858/A 858M
Specification for Wrought High-Strength Low-Alloy Steel Butt-Welded Fittings	A 860/A 860M

1.2 In case of conflict between a requirement of the individual product specification and a requirement of this general requirement specification, the requirements of the individual product specification shall prevail over those of this specification.

1.3 By mutual agreement between the purchaser and the supplier, additional requirements may be specified (See 4.1.7). The acceptance of any such additional requirements shall be dependent on negotiations with the supplier and must be included in the order as agreed upon by the purchaser and supplier.

1.4 The values stated in either inch-pound units or SI units [metric] are to be regarded separately as standard. Within the text and the tables, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification. The inch-pound units shall apply unless the "M" designation [SI] of the product specification is specified in the order.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

A 29/A 29M Specification for Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for

A 234/A 234M Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

A 262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products

A 388/A 388M Practice for Ultrasonic Examination of Heavy Steel Forgings

A 403/A 403M Specification for Wrought Austenitic Stainless Steel Piping Fittings

A 420/A 420M Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

A 758/A 758M Specification for Wrought-Carbon Steel Butt-Welding Piping Fittings with Improved Notch Toughness

A 763 Practices for Detecting Susceptibility to Intergranular Attack in Ferritic Stainless Steels

A 774/A 774M Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures

A 815/A 815M Specification for Wrought Ferritic, Ferritic/Austenitic, and Martensitic Stainless Steel Piping Fittings

A 858/A 858M Specification for Heat-Treated Carbon Steel Fittings for Low-Temperature and Corrosive Service

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.22 on Steel Forgings and Wrought Fittings for Piping Applications and Bolting Materials for Piping and Special Purpose Applications.

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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.**

A 860/A 860M Specification for Wrought High-Strength Low-Alloy Steel Butt-Welding Fittings
A 941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys
A 967 Specification for Chemical Passivation Treatments for Stainless Steel Parts
E 165 Test Method for Liquid Penetrant Examination
E 213 Practice for Ultrasonic Examination of Metal Pipe and Tubing
E 709 Guide for Magnetic Particle Testing
E 1916 Guide for Identification and/or Segregation of Mixed Lots of Metals

2.2 *Manufacturer's Standardization Society Standards:*[3]
MSS-SP-25 The Standard Marking System of Valves, Fittings, Flanges and Unions
MSS-SP-43 Standard Practice for Light Weight Stainless Steel Butt-Welding Fittings
MSS-SP-75 Specification for High Test Wrought Butt-Welding Fittings
MSS-SP-79 Socket Welding Reducer Inserts
MSS-SP-95 Swage(d) Nipples and Bull Plugs

2.3 *American Society of Nondestructive Testing:*[4]
SNT-TC-1A Recommended Practice for Nondestructive Testing Personnel Qualification and Certification

2.4 *ASME Standards:*[5]
B16.9 Steel Butt-Welding Fittings
B16.11 Forged Steel Fittings, Socket Welding and Threaded
Section IX Welding Qualifications

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *bar*—a solid section that is long in relationship to its cross sectional dimensions, with a relatively constant cross section throughout its length. (See Specification A 29/A 29M for definitions relating to the production of hot wrought and cold finished bars.)

3.1.2 *certifying organization*—the company or association responsible for the conformance of, the marking of, and the certification of the product to the specification requirements.

3.1.3 *fitting*—a component for non-bolted joints used in piping systems and pressure vessels.

3.1.4 *flange*—a component for bolted joints used in piping systems and pressure vessels.

3.1.5 *forging*—the product of a substantially compressive hot or cold plastic working operation that consolidates the material and produces the required shape.

3.1.6 *Discussion*—The plastic working must be performed by a forging machine, such as a hammer, press, or ring rolling machine and must deform the material to produce an essentially wrought structure throughout the material cross section.

3.2 *Definitions*—For definitions of other terms used in this specification, refer to Terminology A 941.

4. Ordering Information

4.1 It is the purchaser's responsibility to specify in the purchase order all ordering information necessary to purchase the needed material. Examples of such information include but are not limited to the following:

4.1.1 Quantity,

4.1.2 Description of fitting and nominal dimensions (standard or special),

4.1.3 Steel composition by grade and class designation,

4.1.4 Construction, seamless or welded (unless seamless or welded construction is specified by the purchaser, either may be furnished at the option of the supplier),

4.1.5 Specification number (including the year/date of issue),

4.1.6 Supplementary requirements, and

4.1.7 Additional requirements.

5. Material

5.1 The material for fittings shall consist of forgings, bars, plates and seamless or welded tubular products.

5.2 The steel shall conform to the chemical requirements of the individual product specification and may be made from any process.

5.3 Ferritic steels shall be fully killed.

5.4 If secondary melting is employed, the heat shall be defined as all ingots remelted from a primary heat.

6. Manufacture

6.1 Forging or shaping operations may be performed by any of the methods included in the individual product specification.

6.2 Hollow cylindrically shaped parts up to and including NPS 4 may be machined from bar or seamless tubular material provided the axial length of the part is approximately parallel to the axial length of the fitting. Elbows, return bends, tees and header tees shall not be machined directly from bar stock.

6.3 Fittings, after forming at an elevated temperature, shall be cooled to a temperature below the critical range under suitable conditions to prevent injury by cooling too rapidly.

6.4 All classes of fittings shall have the welders, welding operators, and welding procedures qualified under the provision of Section IX of the ASME Boiler and Pressure Vessel Code except that welds from the original pipe manufacturer made without the addition of filler metal do not require such qualification.

7. Heat Treatment

7.1 Fittings requiring heat treatment shall be treated as specified in the individual product specification using the following procedures:

7.1.1 *Full Annealing*—Fittings shall be uniformly reheated to a temperature above the transformation range and, after holding for a sufficient time at this temperature, cooled slowly to a temperature below the transformation range.

7.1.2 *Solution Annealing*—Fittings shall be heated to a temperature that causes the carbides to go into solution and

[3] Available from Manufacturers Standardization Society of the Valve and Fittings Industry (MSS), 127 Park St., NE, Vienna, VA 22180-4602, http://www.mss-hq.com.

[4] Available from American Society for Nondestructive Testing (ASNT), P.O. Box 28518, 1711 Arlingate Ln., Columbus, OH 43228-0518, http://www.asnt.org.

[5] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, http://www.asme.org.