



Designation: A 960 – 03

Standard Specification for Common Requirements for Wrought Steel Piping Fittings¹

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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:

A 234/A 234M Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures

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

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

A 860/A 860M Specification for Wrought High-Strength Low-Alloy Steel Butt-Welded Fittings

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:

A 29/A 29M Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished, General Requirements for²

A 234/A 234M Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service³

A 262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels⁴

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products⁴

A 388/A 388M Practice for Ultrasonic Examination of Heavy Steel Forgings²

A 403/A 403M Specification for Wrought Austenitic Stainless Steel Piping Fittings³

A 420/A 420M Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service³

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment²

A 751 Test Methods, Practices and Terminology for Chemical Analysis of Steel Products⁴

A 758/A 758M Specification for Wrought Carbon Steel Butt-Welding Piping Fittings with Improved Notch Toughness³

A 763 Practices for Detecting Susceptibility to Intergranular Attack in Ferritic Stainless Steels⁴

A 774/A 774M Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures³

A 815/A 815M Specification for Wrought Ferritic, Ferritic/

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 *Annual Book of ASTM Standards*, Vol 01.05.

³ *Annual Book of ASTM Standards*, Vol 01.01.

⁴ *Annual Book of ASTM Standards*, Vol 01.03.

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

Austenitic, and Martensitic Stainless Steel Piping Fittings³
 A 858/A 858M Specification for Heat-Treated Carbon Steel Fittings for Low-Temperature and Corrosive Service³

A 860/A 860M Specification for Wrought High-Strength Low-Alloy Steel Butt-Welding Fittings²

A 941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys³

A 967 Specification for Chemical Passivation Treatments for Stainless Steel Parts⁴

E 165 Test Method for Liquid Penetrant Examination⁵

E 213 Practice for Ultrasonic Examination of Metal Pipe and Tubing⁵

E 709 Guide for Magnetic Particle Examination⁵

E 1916 Guide for the Identification and/or Segregation of Mixed Lots of Metal⁶

2.2 Military Standard:⁷

MIL-STD-163 Steel Mill Products, Preparation for Shipment and Storage

2.3 Manufacturer's Standardization Society Standards:⁸

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-83 Steel Pipe Unions, Socket-Welding and Threaded

MSS SP-95 Swage(d) Nipples and Bull Plugs

MSS SP-97 Integrally Reinforced Forged Steel Branch Outlet Fittings—Socket Welding, Threaded and Butterfly Ends

2.4 American Society of Nondestructive Testing:⁹

SNT-TC-1A Recommended Practice for Nondestructive Testing Personnel Qualification and Certification

2.5 ASME Standards:¹⁰

B16.9 Steel Butt-Welding Fittings

B16.11 Forged Steel Fittings, Socket Welding and Threaded

B16.28 Wrought Steel Butt-Welding Short Radius Elbows and Returns

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.

⁵ Annual Book of ASTM Standards, Vol 03.03.

⁶ Annual Book of ASTM Standards, Vol 03.06.

⁷ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098.

⁸ Available from Manufacturers Standardization Society of the Valve and Fittings Industry (MSS), 127 Park St., NE, Vienna, VA 22180-4602.

⁹ Available from The American Society for Nondestructive Testing (ASNT), P.O. Box 28518, 1711 Arlington Ln., Columbus, OH 43228-0518.

¹⁰ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990.