



Standard Specification for Carbon Steel and Low-Alloy Steel Pressure-Vessel- Component Forgings with Mandatory Toughness Requirements¹

This standard is issued under the fixed designation A 765/A 765M; 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 specification² covers heat-treated carbon steel and alloy steel forgings with mandatory toughness requirements. These forgings are intended for pressure vessels, feedwater heaters, and similar uses.

1.2 These forgings include tube sheets, covers, channel barrels, integral forged channels, rings, nozzles, flanges, and similar parts.

1.3 All grades are considered weldable under proper conditions.

1.4 The maximum thickness of forgings produced to this specification is limited only by the capacity of the selected grade to respond to any heat treatment specified and to meet the specified mechanical tests, including impact tests at the specified temperature.

1.5 Material supplied to this specification shall conform to the requirements of Specification A 788, which outlines additional ordering information, manufacturing requirements, testing and retesting methods and procedures, marking, certification, product analysis variations, and additional supplementary requirements.

1.6 If the requirements of this specification are in conflict with the requirements of Specification A 788, the requirements of this specification shall prevail.

1.7 The values stated in either inch-pound units or SI [metric] units are to be regarded separately as the standard; within the text and 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.

1.8 Unless the order specifies the applicable “M” specification designation, the material shall be furnished to the inch-pound units.

2. Referenced Documents

2.1 ASTM Standards:

A 275/A 275M Test Method for Magnetic Particle Examination of Steel Forgings³

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

A 388/A 388M Practice for Ultrasonic Examination of Heavy Steel Forgings³

A 788 Specification for Steel Forgings, General Requirements³

E 112 Test Methods for Determining the Average Grain Size⁵

E 165 Practice for Liquid Penetrant Examination⁶

2.2 ASME Standards:

Boiler and Pressure Vessel Code⁷

3. Ordering Information

3.1 In addition to the ordering information requirements of Specification A 788, a detailed sketch or written description of the forging and the method of selecting the test location (see 6.2) should be supplied to the producer, when appropriate areas of significant in-service loading of the forging need to be designated.

3.2 The required impact test temperature should be supplied if different than the temperature listed in Table 1, otherwise the impact test shall be conducted at the temperature listed in Table 1 for the chosen Grade.

3.3 If a hubbed tube sheet is to be supplied for ASME Boiler and Pressure Code Application Supplementary Requirement S12 of Specification A 788 should be specified.

4. Heat Treatment for Mechanical Properties

4.1 Heat treatment shall consist of normalizing and tempering, double normalizing and tempering, or quenching and

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-765/SA-765M in Section II of that code.

³ *Annual Book of ASTM Standards*, Vol 01.05.

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

⁵ *Annual Book of ASTM Standards*, Vol 03.01.

⁶ *Annual Book of ASTM Standards*, Vol 03.03.

⁷ Available from American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.

