



Standard Specification for Pressure Vessel Forgings, Alloy Steel, Higher Strength Chromium-Molybdenum-Tungsten for Elevated Temperature Service¹

This standard is issued under the fixed designation A1048/A1048M; 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 chromium-molybdenum-tungsten alloy steel forgings intended primarily for use in boilers and pressure vessels for elevated temperature service.

1.1.1 Elevated temperatures are temperatures in the range where creep and stress rupture properties are important for the alloy steels in this specification.

1.2 Supplementary requirements are provided both in this specification and in the General Requirements Specification [A788/A788M](#) for use when additional testing or inspection is desired. These shall apply only when specified individually by the purchaser in the purchase order or contract.

1.3 Unless the order specifies the applicable “M” specification designation, the forgings shall be supplied to the inch-pound units.

1.4 The values stated in either inch-pound or SI (metric) units are to be regarded separately as standard. Within the text and tables, the SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

2. Referenced Documents

2.1 ASTM Standards:²

[A275/A275M Practice for Magnetic Particle Examination of Steel Forgings](#)

[A388/A388M Practice for Ultrasonic Examination of Steel Forgings](#)

[A788/A788M Specification for Steel Forgings, General Requirements](#)

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 [A01.06](#) on Steel Forgings and Billets.

Current edition approved Oct. 1, 2011. Published January 2012. Originally approved in 2006. Last previous edition approved in 2006 as A1048/A1048M – 06. DOI: 10.1520/A1048_A1048M-06R11.

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.

[A966/A966M Practice for Magnetic Particle Examination of Steel Forgings Using Alternating Current](#)

3. Ordering Information and General Requirements

3.1 In addition to the ordering information required by Specification [A788/A788M](#), the purchaser should include with the inquiry and order the following information:

3.1.1 A drawing, sketch, or written description of the required forging and the manner of providing test material (see Section 6).

3.1.2 Desired supplementary requirements including those from Specification [A788/A788M](#).

3.1.3 Requirements for alternate ultrasonic examination procedure (see [7.1.2](#)).

3.1.4 At the purchaser's option Test Method [A966/A966M](#) shall be used for the magnetic particle examination.

3.2 Forgings supplied to this specification shall conform to the requirements of Specification [A788/A788M](#) which, in addition to ordering information, includes manufacturing requirements, testing and retesting methods and procedures, marking, certification, product analysis variations and additional supplementary requirements.

3.3 If the requirements of this specification are in conflict with those of Specification [A788/A788M](#), the requirements of this specification shall prevail.

4. Materials and Manufacture

4.1 The steel melting procedures of Specification [A788/A788M](#) shall apply except that the open hearth process shall not be used, and that the molten steel shall be vacuum degassed prior to or during teeming of the ingot to remove objectionable gasses, notably hydrogen.

4.2 Heat Treatment:

4.2.1 After being permitted to transform following completion of forging the material may be given an intermediate heat treatment such as normalizing and tempering or a subcritical anneal prior to preliminary machining to the required heat treatment contour. The purchaser may specify supplementary requirement S1 to have the forgings rough machined before the final heat treatment.