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American Association State Highway and Transportation Officials Standard AASHTO No.: M 102M/M 102

Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use¹

This standard is issued under the fixed designation A668/A668M; 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 covers untreated and heat-treated carbon and alloy steel forgings for general industrial use. Other ASTM specifications for forgings are available for specific applications such as pressure vessels, railroad use, turbine generators, gearing, and others involving special temperature requirements.

1.2 Hot-rolled or cold finished bars are not within the scope of this specification.

1.3 Six classes of carbon steel and seven classes of alloy steel forgings are listed (see Section 7), which indicates their required heat treatments, as well as mechanical properties.

1.4 Provision, with the suffix H for certification and marking, for the supply of forgings after hardness testing only.

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1.5 Supplementary requirements, including those in Specification A788/A788M, of an optional nature are provided. These shall apply only when specified by the purchaser.

1.6 Appendix X1 lists the current classes corresponding to the various classes of Specifications A235, A237, and A243, which have been superseded by this specification.

1.7 The values stated in either SI units or inch-pound 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 are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.8 Unless the order specifies the applicable "M" specification, the forgings shall be furnished to the inch-pound units.

1.9 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.

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

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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.

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2. Referenced Documents

2.1 ASTM Standards:²

A275/A275M Practice for Magnetic Particle Examination of Steel Forgings A370 Test Methods and Definitions for Mechanical Testing of Steel Products A388/A388M Practice for Ultrasonic Examination of Steel Forgings A788/A788M Specification for Steel Forgings, General Requirements E290 Test Methods for Bend Testing of Material for Ductility E340 Practice for Macroetching Metals and Alloys

3. Terminology

3.1 The terminology section of Specification A788/A788M is applicable to this specification.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 class-a description of steel forgings based on heat treatment, mechanical properties and composition.

3.2.2 controlling cross section thickness (T_c) —the diameter of the largest theoretical sphere which can be inscribed within the volume of the forging.

3.2.3 T_P —designates prolongations which have a size other than the controlling cross section thickness (T_C).

4. Ordering Information and General Requirements

4.1 Material supplied to this specification shall conform to the requirements of Specification A788/A788M which outlines additional ordering information, manufacturing requirements, testing and retesting methods and procedures, marking, certification, product analysis variations and additional supplementary requirements.

4.1.1 If the requirements of this specification are in conflict with the requirements of Specification A788/A788M, the requirements of this specification shall prevail.

4.2 When this specification is to be applied to an inquiry, contract, or order, the purchaser should furnish the following information:

4.2.1 The ordering information required by Specification A788/A788M,

4.2.2 The class of forging desired as listed in Table 1,

4.2.3 Location(s) of areas of significant loading if test specimens are to be located in accordance with 7.1.4.5,

4.2.4 The options which may be selected as found in 5.3.2, 6.1, and 7.3, and

4.2.5 Any applicable supplementary requirements.

5. Materials and Manufacture

5.1 Discard-Sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

5.2 Forging Process:

5.2.1 The forging shall be brought as close as practical to finished shape and size by hot mechanical work.

5.2.2 Supplementary Requirements S2, S14, and S15 may be specified by the purchaser to satisfy concerns about the utility of the proposed forging.

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.