



Designation: A1091/A1091M – 16^{ε1}

Standard Specification for Steel Castings, Creep-Strength Enhanced Ferritic Alloy, for Pressure-Containing Parts, Suitable for High Temperature Service¹

This standard is issued under the fixed designation A1091/A1091M; 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 approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Table 3 was editorially corrected in April 2017.

1. Scope

1.1 This specification covers creep-strength enhanced alloy steel castings for valves, flanges, fittings, and other pressure-containing parts intended primarily for high-temperature service (see **Note 1**). However, they are not restricted to such applications, and the castings may be used for other applications for which the attributes of the material, as defined by this specification, are suitable.

1.2 One grade of martensitic alloy steel, Grade C91, is covered (see **Note 2**). It is provided in two classes, differentiated by the type of heat treatment after weld repairs. This and similar steels are characterized by a predominantly tempered martensitic or tempered Bainitic microstructure that is stabilized by the precipitation of temper-resistant particles at various precipitate nucleation sites in the microstructure. Such steels are designed to have creep-rupture strengths significantly superior to those of alloys of nominally similar compositions, but in which the precipitates or nucleation sites are absent. Since this crucial difference cannot be revealed by room-temperature mechanical property tests, these alloys require tighter controls on manufacturing and processing.

NOTE 1—The grades covered by this specification represent materials that are generally suitable for assembly with other castings or wrought steel parts by fusion welding. It is not intended to imply that these grades possess equal degrees of weldability; therefore, it is the responsibility of the purchaser to establish a suitable welding technique. Since these grades possess varying degrees of suitability for high-temperature service, it is also the responsibility of the purchaser to determine which grade shall be furnished, due consideration being given to the requirements of the applicable construction codes.

NOTE 2—The committee formulating this specification has included one grade of material that is considered to represent a type of ferritic alloy steel suitable for valves, flanges, fittings, and other pressure-containing parts. Additional alloy steels will be considered for inclusion in this specification by the committee as the need becomes apparent.

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 A01.18 on Castings.

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1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. 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 non-conformance with the standard.

1.4 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

A335/A335M Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service
A703/A703M Specification for Steel Castings, General Requirements, for Pressure-Containing Parts
A802/A802M Practice for Steel Castings, Surface Acceptance Standards, Visual Examination
A985/A985M Specification for Steel Investment Castings General Requirements, for Pressure-Containing Parts
A999/A999M Specification for General Requirements for Alloy and Stainless Steel Pipe

2.2 ANSI Standards³

ANSI B46.1 Surface Texture

2.3 ASME Boiler and Pressure Vessel Code⁴

ASME Boiler and Pressure Vessel Code Section I
ASME Boiler and Pressure Vessel Code Section III

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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, <http://www.asme.org>.