



Standard Specification for Austenitic Ductile Iron Castings for Pressure-Containing Parts Suitable for Low-Temperature Service¹

This standard is issued under the fixed designation A571/A571M; 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 austenitic ductile iron, Type D-2M, Classes 1 and 2, for compressors, expanders, pumps, valves, and other pressure-containing parts intended primarily for low-temperature service.

1.2 These grades of austenitic ductile iron are characterized by having their graphite substantially in a spheroidal form and free of flake graphite. They are essentially free of carbides and contain sufficient alloy content to produce a stable austenitic matrix down to -423°F [-252°C] (liquid hydrogen).

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.

1.3.1 Within the text, the SI units are shown in brackets.

1.4 The following precautionary caveat pertains only to the test methods portion, Section 11, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards*:³

A941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys

E8 Test Methods for Tension Testing of Metallic Materials

E23 Test Methods for Notched Bar Impact Testing of Metallic Materials

E30 Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron (Withdrawn 1995)⁴

E59 Practice for Sampling Steel and Iron for Determination of Chemical Composition (Withdrawn 1996)⁴

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 Quantity (weight or number of pieces),

3.1.2 ASTM designation and year of issue,

3.1.3 Material class (**Table 1**),

3.1.4 Impact test temperature requirement (Section 11),

3.1.5 Place of inspection (Section 13), and

3.1.6 Certification requirements (Section 14).

4. Materials and Manufacture

4.1 *Material*—The iron shall be made in the electric-arc furnace, induction furnace, cupola, or any other furnace which is capable of producing castings meeting the chemical compositions and mechanical properties in this specification.

4.2 *Heat Treatment*:

4.2.1 All castings shall be heat treated.

4.2.2 Heat treatment shall be performed before machining except in instances when reheat treating is necessary.

4.2.3 Heat treatment shall consist of annealing. The procedure for this type treatment shall consist of heating the casting to a minimum of 1600°F [870°C] but not greater than 1800°F [980°C] holding at that temperature not less than 1 h/in. [1 h/25 mm] of section and furnace cooling. (See Terminology **A941**.)

5. Chemical Requirements

5.1 Drillings taken from test coupons, broken test specimens or castings shall conform to the requirements as to chemical composition prescribed in **Table 2**.

¹ This specification is under the jurisdiction of the ASTM Committee A04 on Iron Castings and is the direct responsibility of Subcommittee A04.02 on Malleable and Ductile Iron Castings.

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² For ASME Boiler and Pressure Vessel Code applications see related Specification SA-571 in Section II of that code.

³ 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.

⁴ The last approved version of this historical standard is referenced on www.astm.org.