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Standard Specification for Steel Castings, Carbon, for General Application[1]

This standard is issued under the fixed designation A 27/A 27M; 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 Department of Defense.

1. Scope*

1.1 This specification covers carbon steel castings for general applications that require up to 70 ksi ~~[485 MPa]~~(485 MPa) minimum tensile strength.

NOTE 1—The grades covered by this specification represent materials that are suitable for assembly with other steel castings or wrought steel parts by fusion welding. It is not intended to imply that all these grades possess the same degree of weldability or that the same welding techniques can be used on all castings. It is the responsibility of the purchaser to establish for himself a suitable welding technique.

1.2 Several grades and two classes of steel castings are covered, as indicated below. The grade and class desired shall be specified by the purchaser.

1.2.1 *Grade N-1*—Chemical analysis only.

1.2.2 *Grade N-2*—Heat-treated but not mechanically tested.

1.2.3 *Grade U-60-30 [415-205]*—Mechanically tested but not heat-treated.

1.2.4 *Grades 60-30* [415-205], *65-35* [450-240], *70-36* [485-250], *and 70-40* [485-275]—Heat-treated and mechanically tested.

1.2.5 Class 1 and Class 2 steel castings shall be specified in accordance with 9.2.

~~1.3The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, 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. Inch-pound units are applicable for material ordered to Specification A27 and SI units for material ordered to Specification A27M.~~

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

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.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

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

A 732/A 732M Specification for Castings, Investment, Carbon and Low Alloy Steel for General Application, and Cobalt Alloy for High Strength at Elevated Temperatures

A 781/A 781M ~~Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use~~ Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use

A 957/A 957M Specification for Investment Castings, Steel and Alloy, Common Requirements, for General Industrial Use

3. General Conditions for Delivery

~~3.1Material furnished to this specification shall conform to the requirements of Specification A781/A781M~~

3.1 Except for steel investment castings, material furnished to this specification shall conform to the requirements of Specification A 781/A 781M, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the general requirements of Specification A 781/A 781M constitutes nonconformance with ~~this~~the specification. In case of a conflict between the requirements of this specification and Specification A 781/A 781M, this specification shall prevail.

3.2 Steel investment castings furnished to this specification shall conform to the requirements of Specification A 957/A 957M, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the common requirements of Specification A 957/A 957M constitutes nonconformance with this specification. In case of conflict between the requirements of this specification and Specification A 957/A 957M, Specification A 957/A 957M shall prevail.

4. Ordering Information

4.1 Orders for material under this specification should include the following information in proper sequence.

4.1.1 Quantity,

4.1.2 Specification, grade (1.2), and class (9.2),

4.1.3 Description of the casting by pattern number or drawing,

4.1.4 Options in the specification, and

4.1.5 Supplementary requirements desired, including standards of acceptance.

5. Heat Treatment

5.1 All castings of Grades N-2, 60-30 [415-205], 65-35 [450-240], 70-36 [485-250], and 70-40 [485-275] shall be heat-treated by full annealing, normalizing, normalizing and tempering, or quenching and tempering. Unless otherwise specified in the inquiry, contract, or order, the castings may be heat-treated by any one or combination of these heat-treatments at the option of the manufacturer.

5.1.1 Heat-treatment shall be performed after castings have been allowed to cool from the pouring temperature to below the transformation range.

5.2 Furnace temperatures for heat-treating shall be regulated by the use of pyrometers.

6. Chemical Composition

6.1 The steel shall conform to the requirements as to chemical composition prescribed in Table 1. Product analysis tolerances shall conform to the Product Analysis Tolerances shown in Specification A 781/A 781M. When residual element chemical content

[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.

TABLE 1 Chemical Requirements

Grade (UNS No.)[A]	Composition, %				
	Carbon,[B] max	Manganese,[B] max	Silicon, max	Sulfur, max	Phosphorus, max
Grade N-1 (J02500)	0.25	0.75	0.80	0.06	0.05
Grade N-2 (J03500)	0.35	0.60	0.80	0.06	0.05
Grade U-60-30 [415-205] (J02500)	0.25	0.75	0.80	0.06	0.05
Grade 60-30 [415-205] (J03000)	0.30	0.60	0.80	0.06	0.05
Grade 65-35 [450-240] (J03001)	0.30	0.70	0.80	0.06	0.05
Grade 70-36 [485-250] (J03501)	0.35	0.70	0.80	0.06	0.05
Grade 70-40 [485-275] (J02501)	0.25	1.20	0.80	0.06	0.05

[A] Specify Class 1 or Class 2 in addition to grade designation (see 9.2).

[B] For each reduction of 0.01 % carbon below the maximum specified, an increase of 0.04 % manganese above the maximum specified will be permitted to a maximum of 1.40 % for Grade 70-40 [485-275] and 1.00 % for the other grades.