
Standard Specification for Steel Castings, Carbon, for General Application

AASHTO Designation: M 103M/M 103-19 (2023)

Technically Revised: 2019

Reviewed but Not Updated: 2023

Editorially Revised: 2022

Technical Subcommittee: 4f, Metals

ASTM Designation: A27/A27M-20



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1. SCOPE

- 1.1. This specification covers carbon steel castings for general applications that require up to 485 MPa [70 ksi] 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-415-205 [60-30]*—Mechanically tested but not heat treated.

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

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

- 1.3. This specification is applicable to orders in either SI units (as M 103M) or inch-pound units (as M 103). 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 nonconformance with the standard. Inch-pound units are shown in brackets in the text for clarity, but they are the applicable values when the material is ordered to M 103.

- 1.4. 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 or regulatory limitations prior to use.

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standard:*
< T 244, Mechanical Testing of Steel Products
- 2.2. *ASTM Standards:*
< A781/A781M, Standard Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use
< A957/A957M, Standard Specification for Investment Castings, Steel and Alloy, Common Requirements, for General Industrial Use

3. GENERAL CONDITIONS FOR DELIVERY

- 3.1. Except for steel investment castings, material furnished to this specification shall conform to the requirements of ASTM A781/A781M, including any supplementary requirements that are indicated on the purchase order. Failure to comply with the general requirements of ASTM A781/A781M constitutes nonconformance with the specification. In case of a conflict between this specification and ASTM A781/A781M, this specification shall prevail.
- 3.2. Steel investment castings furnished to this specification shall conform to the requirements of ASTM A957/A957M, including any supplementary requirements that are indicated in the purchase order. Failure to comply with the common requirements of ASTM A957/A957M constitutes nonconformance with the specification. In case of a conflict between the requirements of this specification and ASTM A957/A957M, ASTM A957/A957M 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 (Section 1.2), and class (Section 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, 415-205 [60-30], 450-240 [65-35], 485-250 [70-36], and 485-275 [70-40] shall be heat treated by 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.