



Standard Specification for Austenitic and Martensitic Stainless Steel Bars, Billets, and Forgings for Liquid Metal Cooled Reactor Core Components¹

This standard is issued under the fixed designation A 831/A831M; 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 specification covers hot- and cold-finished austenitic and martensitic stainless steel bars, billets, and forgings intended for use in manufacturing core components used at high temperatures in liquid metal cooled nuclear reactors.

1.2 The bars, billets, and forgings are intended for machining, welding, hot- and cold-forming operations.

1.3 The 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 shall be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

1.4 This specification and the applicable material specifications are expressed in both inch-pound and SI units. However, unless the order specifies the applicable “M” specification designation (SI units), the material shall be furnished in inch-pound units.

2. Referenced Documents

2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products²

A 388/A388M Practice for Ultrasonic Examination of Heavy Steel Forgings³

A 484/A484M Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings³

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products²

E 3 Methods of Preparation of Metallographic Specimens⁴

E 45 Practice for Determining the Inclusion Content of Steel⁴

E 112 Test Methods for Determining Average Grain Size⁴

E 407 Test Methods for Microetching Metals and Alloys⁴

2.2 *ANSI Standard:*

B 46.1 Surface Texture⁵

2.3 *ASNT Standard:*

SNT-TC-1A Recommended Practice for Nondestructive Testing Personnel Qualifications and Certification⁶

2.4 *ASME Standard:*

NQA-1 Quality Assurance Program Requirements for Nuclear Facilities⁷

3. Ordering Information

3.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Such requirements may include but are not limited to the following:

3.1.1 Quantity (weight or number of pieces).

3.1.2 Condition (cold-worked, annealed, or tempered).

3.1.3 Finish.

3.1.4 Applicable dimensions, including size, thickness, width, and length (if forgings, include prints or sketches).

3.1.5 Form (bars, billets, etc.).

3.1.6 Grade designation.

3.1.7 ASTM designation and year of issue.

3.1.8 Marking requirements.

3.1.9 Other applicable documents (2.4).

3.1.10 Melting process (4.1).

3.1.11 Approval of procedures for conversion of ingots (4.2).

3.1.12 Cold working requirements for austenitic grades (4.4.3).

3.1.13 Identification requirements (4.6).

3.1.14 Chemistry requirements (5.1).

3.1.15 Product analysis tolerances (5.3).

3.1.16 Grain size limits for bar, billets, and forgings requiring rework (6.1).

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 A01.17 on Flat Stainless Steel Products.

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² *Annual Book of ASTM Standards*, Vol 01.03.

³ *Annual Book of ASTM Standards*, Vol 01.05.

⁴ *Annual Book of ASTM Standards*, Vol 03.01.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁶ Available from American Society for Nondestructive Testing, P.O. Box 5642, 3200 Riverside Dr., Columbus, OH 43228.

⁷ Available from American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.