



Standard Specification for Niobium-Titanium Alloy Billets, Bar, and Rod for Superconducting Applications¹

This standard is issued under the fixed designation B 884; 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 niobium-titanium alloy billets, bars, and rods, at 46 to 48 % titanium. This material is used in the manufacture of wire for superconducting applications.

1.2 The values stated in either inch-pound or SI units are to be regarded separately as standard. The values stated in each system are not exact equivalents; therefore each system must be used independent of the other; SI values cannot be mixed with inch-pound values. SI units are stated in parentheses.

1.3 The following precautionary caveat pertains only to the test methods portion, Section 13, 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:

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications²

E 92 Test Method for Vickers Hardness of Metallic Materials³

E 112 Test Methods for Determining Average Grain Size³

E 165 Test Method for Liquid Penetrant Examination⁴

E 213 Practice for Immersed Ultrasonic Examination by the Reflection Method Using Pulsed Longitudinal Waves⁴

E 384 Test Method for Microhardness of Materials³

2.2 ANSI Standard:

ANSI B46-1 Surface Texture⁵

2.3 ASNT Standard:

ASNT SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing⁶

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *bar*—material greater than or equal to 2.5 in. (60 mm) and less than 6 in. (150 mm) in diameter.

3.1.2 *billet*—material greater than 6 in. (150 mm) in diameter.

3.1.3 *lot*—a lot shall consist of all material produced from the same ingot at one time, with the same cross section and with the same nominal metallurgical parameters.

3.1.4 *Rod*—material greater than 0.5 in. (13 mm) and less than 2.5 in. (60 mm) in diameter.

3.2 For the purpose of determining compliance with the specified limits of property requirements, an observed value or a calculated value shall be rounded in accordance with the rounding method of Practice E 29.

4. Ordering Information

4.1 Purchase orders for material under this specification should include:

4.1.1 ASTM designation and year of issue,

4.1.2 Quantity in weight, number of pieces, and dimensions,

4.1.3 Marking (see Section 17),

4.1.4 Packaging (see Section 18),

4.1.5 Disposition of rejected material (see Section 15),

4.1.6 Surface texture, if required (see 10.3),

4.1.7 Annealing condition, if different from 7.1,

4.1.8 Permissible variations in length (see 9.2),

4.1.9 Sampling and analytical methods, if required (see 11.3),

4.1.10 Inspection requirements (see Section 14),

4.1.11 Certification and report needs (see Section 16), and

4.1.12 Additions to the specification and supplementary requirements, if required.

5. Materials and Manufacture

5.1 Materials covered by this specification shall be made from ingots which are produced by vacuum or plasma-arc melting, electron beam furnace melting, or a combination of these methods. All melting is to be carried out in furnaces usually used for reactive metals.

5.2 The products covered by this specification are formed with conventional forging, swaging, rolling, extruding, and drawing equipment normally available in metal working plants.

¹ This specification is under the jurisdiction of ASTM Committee B-10 on Reactive and Refractory Metals and Alloys and is the direct responsibility of Subcommittee B10.03 on Niobium and Tantalum.

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² Annual Book of ASTM Standards, Vol 14.02.

³ Annual Book of ASTM Standards, Vol 03.01.

⁴ Annual Book of ASTM Standards, Vol 03.03.

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

⁶ Available from The American Society for Nondestructive Testing, Inc., 1711 Arlington Lane, P. O. Box 28518, Columbus, OH 43228-0518