



Standard Specification for Wrought Titanium-6 Aluminum-7 Niobium Alloy for Surgical Implant Applications [UNS R56700]¹

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1. Scope

1.1 This specification covers the chemical, mechanical, and metallurgical requirements for wrought annealed titanium-6 aluminum-7 niobium alloy bar and wire to be used in the manufacture of surgical implants (1-4).²

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI equivalents in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

E 8 Test Methods for Tension Testing of Metallic Materials³

E 120 Test Methods for Chemical Analysis of Titanium and Titanium Alloys⁴

E 1409 Test Method for Determination of Oxygen in Titanium and Titanium Alloys by the Insert Gas Fusion Technique⁴

E 1447 Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by the Insert Gas Fusion Thermal Conductivity Method⁵

F 981 Practice for Assessment of Compatibility of Biomaterials for Surgical Implants with Respect to Effect of Materials in Muscle and Bone⁶

2.2 ISO Standards:

ISO 5832-11 Implants for Surgery—Metallic Materials—Part 11: Wrought Titanium 6–Aluminum 7–Niobium Alloy⁷

ISO 6892 Metallic Materials—Tensile Testing⁷

2.3 Aerospace Material Specification:

AMS 2249 Chemical Check Analysis Limits, Titanium and Titanium Alloys⁸

2.4 American Society for Quality Standard:

ASQ C1 Specification of General Requirements for a Quality Program⁹

3. Product Classification

3.1 Bar—Rounds or flats from 0.1875 in. (4.76 mm) to 4 in. (101.60 mm) in diameter or thickness. Other sizes and shapes by special order.

3.2 Forging Bar—Bar as described in 3.1, used for the production of forgings, may be furnished in the hot rolled condition.

3.3 Wire—Rounds or flats less than 0.1875 in. (4.76 mm) in diameter or thickness.

4. Ordering Information

4.1 Include with inquiries and orders for material under this specification the following information:

4.1.1 Quantity (weight or number of pieces),

4.1.2 Applicable ASTM designation, date of issue.

4.1.3 Form (bar or wire),

4.1.4 Condition (see 5.3),

4.1.5 Mechanical Properties (if applicable for special conditions),

4.1.6 Finish (see 5.2),

4.1.7 Applicable dimensions including size, thickness, width, or drawing number,

4.1.8 Special tests, if any,

4.1.9 Other requirements.

5. Materials and Manufacture

5.1 The various titanium mill products covered in this specification normally are formed with the conventional forging and rolling equipment found in primary ferrous and nonferrous plants. The alloy is usually multiple melted in arc furnaces (including furnaces such as plasma arc and electron beam) of a type conventionally used for reactive metals.

5.2 Finish—The mill product may be furnished to the

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² The boldface numbers in parentheses refer to a list of references at the end of the text.

³ *Annual Book of ASTM Standards*, Vols 01.02, 02.01, 02.02, 02.03, and 03.01.

⁴ *Annual Book of ASTM Standards*, Vol 03.05.

⁵ *Annual Book of ASTM Standards*, Vol 03.06.

⁶ *Annual Book of ASTM Standards*, Vol 13.01.

⁷ Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY, 10036.

⁸ Available from Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096.

⁹ Available from American Society for Quality, 600 N. Plankinton Ave., Milwaukee, WI 53203.