



Standard Specification for Wrought Titanium-15 Molybdenum Alloy for Surgical Implant Applications (UNS R58150)¹

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1. Scope

1.1 This specification covers the chemical, mechanical, and metallurgical requirements for wrought titanium-15 molybdenum alloy to be used in the manufacture of surgical implants (1).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 112 Test Methods for Determining Average Grain Size³

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

E 290 Test Methods for Bend Testing of Material for Ductility³

E 1409 Test Method for Determination of Oxygen in Titanium and Titanium Alloys by the Inert Gas Fusion Technique⁵

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

F 67 Specification for Unalloyed Titanium for Surgical Implant Applications⁶

F 748 Practice for Selecting Generic Biological Test Methods for Materials and Devices⁶

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

F 1408 Practice for Subcutaneous Screening Test for Implant Materials⁶

2.2 Aerospace Material Specification:

AMS 2249 Chemical Check Analysis Limits, Titanium and Titanium Alloys⁷

2.3 American Society for Quality Standard:

ASQ C1 Specification of General Requirements for a Quality Program⁸

2.4 ISO Standard:

ISO 6892 Metallic Materials — Tensile Testing⁹

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *beta annealed, n*—the condition of the material that is obtained if, following the final hot-working or cold-working operation, the mill product is rapidly quenched, for example, by water quenching or pressurized helium gas quench, from a temperature above the beta transus of approximately 1382°F (750°C).

3.1.2 *beta transus, n*—the minimum temperature at which the alpha plus beta phase can transform to 100 % beta phase.

4. Product Classification

4.1 *Strip*—Any product under 0.1875 in. (4.76 mm) in thickness and under 24 in. (610 mm) wide.

4.2 *Sheet*—Any product under 0.1875 in. (4.76 mm) in thickness and 24 in. (610 mm) or more in width.

4.3 *Plate*—Any product 0.1875 in. (4.76 mm) thick and over and 10 in. (254 mm) wide and over, with widths greater than five times the thickness. Plate up to 4 in. (101.60 mm), thick inclusive, is covered by this specification.

4.4 *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.)

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

5. Ordering Information

5.1 Include with inquiries and orders for material under this specification the following information.

5.1.1 Quantity,

¹ This specification is under the jurisdiction of ASTM Committee F04 on Medical and Surgical Materials and Devices and is the direct responsibility of Subcommittee F04.12 on Metallurgical Materials.

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² The boldface numbers in parentheses refer to the list of references at the end of this standard.

³ *Annual Book of ASTM Standards*, Vol 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 the American Society of Automotive Engineers, 400 Commonwealth Dr., Warrendale, PA 15096.

⁸ Available from the American Society for Quality, 600 N. Plankinton Ave., Milwaukee, WI 53203.

⁹ Available from the American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.