



Standard Specification for Unalloyed Titanium Wire UNS R50250,¹ UNS R50400,¹ UNS R50550,¹ UNS R50700,¹ for Surgical Implant Applications²

This standard is issued under the fixed designation F 1341; 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 the chemical, mechanical, and metallurgical requirements for four grades of unalloyed titanium wire used for the manufacture of surgical implants.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given 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 527 Practice for Numbering Metals and Alloys (UNS)⁵

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

E 1447 Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by the Inert Gas Fusion Thermal Conductivity Method⁶

F 67 Specification for Unalloyed Titanium for Surgical Implant Applications⁷

F 981 Practice for Assessment of Compatibility of Biomaterials for Surgical Implants with Respect to Effect of Materials on Muscle and Bone⁷

2.2 Aerospace Material Specification:

AMS 2249 Chemical Check Analysis Limits, Titanium and Titanium Alloys⁸

2.3 American Society for Quality (ASQ) Standard:

C1 Specifications of General Requirements for a Quality Program⁹

2.4 Society of Automotive Engineers Standard:

SAE J1086 Practice for Numbering Metals and Alloys (UNS)⁸

3. Product Classification

3.1 *Wire*—Round product with a diameter equal to or less than 0.3125 in. (7.94 mm). Flat and special shape wire with a major dimension equal to or less than 0.3125 in. (7.94 mm) may also be ordered as agreed upon between the supplier and the purchaser.

4. Ordering Information

4.1 Inquiries and orders for material under this specification shall include the following information:

4.1.1 Quantity (weight or number of pieces),

4.1.2 Grade (1, 2, 3, or 4),

4.1.3 ASTM designation,

4.1.4 Form (wire),

4.1.5 Condition (5.1),

4.1.6 Mechanical Properties (if applicable, for special conditions),

4.1.7 Finish (5.2),

4.1.8 Applicable dimensions including size, thickness, width, spool size, coil diameter, and length (exact, random, multiples) or print number, and

4.1.9 Special Tests, if any.

5. Manufacture

5.1 *Condition*—Material shall be furnished in the annealed or cold worked condition.

5.2 *Finish*—Types of finish available for wire products are bright annealed, pickled, cold drawn, cold rolled, ground, ground and polished, or as specified in the purchase order.

6. Chemical Composition

6.1 The heat analysis shall conform to the requirements as to chemical composition prescribed in Table 1. Ingot analysis may be used for reporting all chemical requirements except hydrogen, samples of which shall be taken from the finished product. The supplier shall not ship material that is outside the limits specified in Table 1 for the applicable grade.

6.1.1 Requirement for the major and minor elemental constituents are listed in Table 1. Also listed are important residual elements. Analysis for elements not listed in Table 1 is not required to verify compliance with this specification.

¹ New designation established in accordance with E 527 and SAE J1086.

² This specification is under the jurisdiction of ASTM Committee F-04 on Medical and Surgical Materials and Devices and is the direct responsibility of Subcommittee F04.12 on Resources.

Current edition approved May 10, 1999. Published August 1999. Originally published as F 1341 - 92. Last previous edition F 1341 - 92.

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 01.01.

⁶ *Annual Book of ASTM Standards*, Vol 03.06.

⁷ *Annual Book of ASTM Standards*, Vol 13.01.

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

⁹ Available from American Society for Quality, 1611 E. Wisconsin Ave., Milwaukee, WI 53203.