



Designation: F 1108 – 02

Standard Specification for Titanium-6Aluminum-4Vanadium Alloy Castings for Surgical Implants (UNS R56406)¹

This standard is issued under the fixed designation F 1108; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope *

1.1 This specification covers the chemical, mechanical, and metallurgical requirements for cast titanium-6aluminum-4vanadium alloy (UNS R56406).

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI equivalents of inch-pound units may be approximate.

2. Referenced Documents

2.1 ASTM Standards:

B 600 Guide for Descaling and Cleaning Titanium and Titanium Alloy Surfaces²

E 8 Test Methods for Tension Testing of Metallic Materials³

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

E 165 Test Method for Liquid Penetrant Examination⁵

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

E 1447 Test Method for Determination Hydrogen in Titanium and Titanium Alloys by the Inert Gas Fusion Thermal Conductivity Method⁴

F 136 Specification for Wrought Titanium 6Al-4V ELI Alloy for Surgical Implant Applications⁶

F 601 Practice for Fluorescent Penetrant Inspection of Metallic Surgical Implants⁶

F 629 Practice for Radiography of Cast Metallic Surgical Implants⁶

2.2 ISO Standard:

ISO 6892 Metallic Materials—Tensile Testing at Ambient Temperature⁷

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 Control Program⁹

2.5 Society of Automotive Engineers:

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

3. Ordering Information

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

3.1.1 Quantity,

3.1.2 ASTM designation and issue date,

3.1.3 Applicable dimensions or drawing number,

3.1.4 Condition (see 4.1 and 4.2),

3.1.5 Finish (see 4.4 and 4.5),

3.1.6 Special tests (see Section 7),

3.1.7 Other requirements.

4. Materials and Manufacture

4.1 Castings conforming to this specification shall be produced by vacuum investment casting.

4.2 Castings covered by this specification shall be in the annealed and hot isostatically pressed condition.

NOTE 1—While hot isostatic processing (HIP) may enhance mechanical properties of Ti6Al-4V castings, it has also been shown to reduce the scatter in mechanical properties and therefore increases the confidence in reliability of castings.

4.3 Surface defects may be repaired by welding.

4.3.1 Weld repair shall be carefully executed as per written procedures by individuals qualified to perform those procedures.

4.3.2 ELI weld rod conforming to Specification F 136 shall be used where filler metal is needed.

4.3.3 Weld repairs shall be performed prior to final thermal processing.

NOTE 2—Under certain circumstances, a weld repair will act as a stress

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.

Current edition approved Apr. 10, 2002. Published June 2002. Originally published as F 1108 - 88. Last previous edition F 1108 - 97a.

² Annual Book of ASTM Standards, Vol 02.04.

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 03.03.

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, Inc., 400 Commonwealth Dr., Warrendale, PA 15096-0001.

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

*A Summary of Changes section appears at the end of this standard.