



Standard Specification for Additive Manufacturing Titanium-6 Aluminum-4 Vanadium ELI (Extra Low Interstitial) with Powder Bed Fusion¹

This standard is issued under the fixed designation F3001; 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 additively manufactured titanium-6aluminum-4vanadium with extra low interstitials (Ti-6Al-4V ELI) components using full-melt powder bed fusion such as electron beam melting and laser melting. The components produced by these processes are used typically in applications that require mechanical properties similar to machined forgings and wrought products. Components manufactured to this specification are often, but not necessarily, post processed via machining, grinding, electrical discharge machining (EDM), polishing, and so forth to achieve desired surface finish and critical dimensions.

1.2 This specification is intended for the use of purchasers or producers or both of additively manufactured Ti-6Al-4V ELI components for defining the requirements and ensuring component properties.

1.3 Users are advised to use this specification as a basis for obtaining components that will meet the minimum acceptance requirements established and revised by consensus of the members of the committee.

1.4 User requirements considered more stringent may be met by the addition to the purchase order of one or more supplementary requirements, which may include, but are not limited to, those listed in S1-S4 and S1-S16 in Specification [F2924](#).

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards*:²

[B214](#) Test Method for Sieve Analysis of Metal Powders

¹ This specification is under the jurisdiction of ASTM Committee [F42](#) on Additive Manufacturing Technologies and is the direct responsibility of Subcommittee [F42.05](#) on Materials and Processes.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[B243](#) Terminology of Powder Metallurgy

[B600](#) Guide for Descaling and Cleaning Titanium and Titanium Alloy Surfaces

[B769](#) Test Method for Shear Testing of Aluminum Alloys

[D3951](#) Practice for Commercial Packaging

[E3](#) Guide for Preparation of Metallographic Specimens

[E8/E8M](#) Test Methods for Tension Testing of Metallic Materials

[E9](#) Test Methods of Compression Testing of Metallic Materials at Room Temperature

[E11](#) Specification for Woven Wire Test Sieve Cloth and Test Sieves

[E29](#) Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

[E238](#) Test Method for Pin-Type Bearing Test of Metallic Materials

[E407](#) Practice for Microetching Metals and Alloys

[E539](#) Test Method for Analysis of Titanium Alloys by X-Ray Fluorescence Spectrometry

[E1409](#) Test Method for Determination of Oxygen and Nitrogen in Titanium and Titanium Alloys by Inert Gas Fusion

[E1447](#) Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by Inert Gas Fusion Thermal Conductivity/Infrared Detection Method

[E1820](#) Test Method for Measurement of Fracture Toughness

[E1941](#) Test Method for Determination of Carbon in Refractory and Reactive Metals and Their Alloys by Combustion Analysis

[E2371](#) Test Method for Analysis of Titanium and Titanium Alloys by Direct Current Plasma and Inductively Coupled Plasma Atomic Emission Spectrometry (Performance-Based Test Methodology)

[F136](#) Specification for Wrought Titanium-6Aluminum-4Vanadium ELI (Extra Low Interstitial) Alloy for Surgical Implant Applications (UNS R56401)

[F2792](#) Terminology for Additive Manufacturing Technologies

[F2924](#) Specification for Additive Manufacturing Titanium-6 Aluminum-4 Vanadium with Powder Bed Fusion

2.2 *ISO/ASTM Standards*:²

[52915](#) Specification for Additive Manufacturing File Format (AMF) Version 1.1