



Designation: B 817 – 98

Standard Specification for Powder Metallurgy (P/M) Titanium Alloy Structural Components¹

This standard is issued under the fixed designation B 817; 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 powder metallurgy (P/M) structural components fabricated from commercially pure (CP) titanium powder mixed with master alloy powder and minor elemental powders in appropriate quantity to yield combined material chemistries comparable to ingot metallurgy (I/M) alloys Titanium 6Al-4V and Titanium 6Al-6V-2Sn.

1.2 This specification covers the following materials:

1.2.1 Two types depending on alloy composition as detailed in Table 1.

1.2.1.1 Type I is comparable to I/M Ti-6Al-4V.

1.2.1.2 Type II is comparable to I/M Ti-6Al-6V-2Sn.

1.2.2 Two grades of each type that result from the specific titanium powder used are as follows:

1.2.2.1 Grade 1 is made from sponge fines with residual levels of chlorine and sodium.

1.2.2.2 Grade 2 is made from hydride/dehydride (HDH) or other process titanium with significantly lower chlorine and sodium content.

1.2.3 Two classes as a function of density (see Table 2) are as follows:

1.2.3.1 Class A density ratio is 94 % minimum.

1.2.3.2 Class B density ratio is 99 % minimum.

NOTE 1—**Warning:** CP titanium powder may be pyrophoric; its use may involve an explosion hazard.

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

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Specific precautionary statements are given in Note 1.*

2. Referenced Documents

2.1 *ASTM Standards:*

B 243 Terminology of Powder Metallurgy²

B 311 Test Method for Density Determination for Powder Metallurgy (P/M) Materials Containing Less Than Two Percent Porosity²

B 328 Test Methods for Density, Oil Content, and Interconnected Porosity of Sintered Powder Metal Structural Parts and Oil-Impregnated Bearings²

E 8 Test Methods for Tension Testing of Metallic Materials³

3. Terminology

3.1 *Definitions*—Definitions of powder metallurgy terms can be found in Terminology B 243.

3.2 *Descriptions of Terms Specific to This Standard*—Additional descriptive information is available in the Related Material section of Volume 02.05 of the *Annual Book of ASTM Standards*.

4. Ordering Information

4.1 Orders for components under this specification shall include the following information:

4.1.1 Dimensions (see Section 9),

4.1.2 Chemical composition (see Section 6 and Table 1),

4.1.3 Density (see 7.1 and Table 2),

4.1.4 Mechanical properties (see Section 8 and Table X1.1), and

4.1.5 Certification (see Section 13).

5. Materials and Manufacture

5.1 Structural components shall be fabricated by cold compacting a mixture of CP titanium, master alloy, and other elemental powders into suitable shapes. The compacts shall be vacuum sintered and hot isostatically pressed, if necessary, to provide parts conforming to the requirements of this specification.

¹ This specification is under the jurisdiction of ASTM Committee B-9 on Metal Powders and Metal Powder Products and is the direct responsibility of Subcommittee B09.11 on Near Full Density Powder Metallurgy Materials.

Current edition approved Oct. 10, 1998. Published December 1998. Originally published as B 817 – 91. Last previous edition B 817 – 93 (1997).

² *Annual Book of ASTM Standards*, Vol 02.05.

³ *Annual Book of ASTM Standards*, Vol 03.01.