Designation: F 560 – 04

Standard Specification for Unalloyed Tantalum for Surgical Implant Applications (UNS R05200, UNS R05400)[1]

This standard is issued under the fixed designation F 560; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers the chemical, mechanical, and metallurgical requirements for unalloyed tantalum plate, sheet, strip, rod, and wire used in the manufacture of surgical implants.

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:* [2]

B 364 Specification for Tantalum and Tantalum Alloy Ingots

B 365 Specification for Tantalum and Tantalum Alloy Rod and Wire

B 708 Specification for Tantalum and Tantalum Alloy Plate, Sheet, and Strip

E 8 Test Methods for Tension Testing of Metallic Materials

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

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

2.2 *American Society for Quality Control Standard:*[3]

ASQ C1 Specifications of General Requirements for a Quality Program

2.3 *ISO Standard:*[4]

ISO 6892 Metallic Materials Tensile Testing at Ambient Temperature

3. General Requirements for Delivery

3.1 In addition to the requirements of this specification, all requirements of the current editions of Specifications B 364, B 365, and B 708 shall apply.

3.2 In the case where a conflict exists between this specification and those listed in 2.1, 2.2, and 3.1, this specification shall take precedence.

TABLE 1 Chemical Requirements (Ingot)

Element	Compositions, max % mass/mass[A]	
	R05200[B]	R05400[C]
Carbon	0.010	0.010
Oxygen	0.015	0.03
Nitrogen	0.010	0.010
Hydrogen	0.0015	0.0015
Niobium	0.10	0.10
Iron	0.010	0.010
Titanium	0.010	0.010
Tungsten	0.050	0.050
Molybdenum	0.020	0.020
Silicon	0.005	0.005
Nickel	0.010	0.010
Tantalum	balance[D]	balance[D]

[A] For purposes of determining conformance with this specification, all compositional limits are absolute limits, as defined in Practice E 29.

[B] Electron beam or vacuum-arc cast tantalum.

[C] Sintered tantalum.

[D] The percentage of tantalum is determined by difference and need not be determined or certified.

4. Ordering Information

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

4.1.1 Quantity (weight or number of pieces),

4.1.2 ASTM designation,

4.1.3 Composition designation,

4.1.4 Form (strip, sheet, plate, rod, wire),

4.1.5 Condition (see 5.1),

4.1.6 Applicable dimensions, including size, thickness, width, and length (random, exact, multiples), or drawing number,

4.1.7 Special tests,

4.1.8 Special requirements, and

4.1.9 Mechanical properties (see 7.1).

[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] 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.

[3] Available from American Society for Quality (ASQ), 600 N. Plankinton Ave., Milwaukee, WI 53203.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

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