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Designation: F 560 – 98

# 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 requirements for unalloyed tantalum sheet, rod, and 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 metric equivalents of inch-pound units may be approximate.

## 2. Referenced Documents

2.1 *ASTM Standards:*

B 364 Specification for Tantalum and Tantalum Alloy Ingots[2]

B 365 Specification for Tantalum and Tantalum Alloy Rod and Wire[2]

B 708 Specification for Tantalum and Tantalum Alloy Plate, Sheet, and Strip[2]

E 8 Test Methods of Tension Testing of Metallic Materials[3]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[4]

F 981 Practice for Assessment of Compatibility of Biomaterials for Surgical Implants with Respect to Effect of Materials on Muscle and Bone[5]

2.2 *American Society for Quality Control Standard:*[6]

Cl Specifications of General Requirements for a Quality Program

## 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 and 2.2, this specification shall take precedence.

**TABLE 1 Chemical Requirements (Ingot)**

| Element | Compositions, Maximum Weight Percent Allowed[A] | |
|---|---|---|
| | R05200[B] | R05400[C] |
| Carbon | 0.010 | 0.010 |
| Oxygen | 0.0150 | 0.030 |
| Nitrogen | 0.010 | 0.010 |
| Hydrogen | 0.0015 | 0.0015 |
| Niobium | 0.100 | 0.100 |
| Iron | 0.010 | 0.010 |
| Titanium | 0.010 | 0.010 |
| Tungsten | 0.05 | 0.05 |
| Molybdenum | 0.020 | 0.020 |
| Silicon | 0.0050 | 0.0050 |
| Nickel | 0.010 | 0.010 |
| Tantalum | balance | balance |

[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.

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## 4. Ordering Information

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

4.1.1 Quantity (weight and number of pieces),

4.1.2 ASTM designation,

4.1.3 Composition designation,

4.1.4 Form (sheet, rod, wire)

4.1.5 Condition (see 5.1)

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

4.1.7 Special tests, and

4.1.8 Special requirements.

## 5. Manufacture

5.1 *Condition:*

5.1.1 Flat mill products material shall be supplied in the cold-worked, cold-worked and stress-relieved or annealed condition.

[1] This specification is under the jurisdiction of ASTM Committee F-4 on Medical and Surgical Materials and Devices, and is the direct responsibility of Subcommittee F04.12 on Metallurgical Materials.

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[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 14.02.

[5] *Annual Book of ASTM Standards*, Vol 13.01.

[6] Available from American Society for Quality Control, 161 West Wisconsin Ave., Milwaukee, WI 53203.

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