



Standard Specification for Tantalum and Tantalum Alloy Seamless and Welded Tubes¹

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1. Scope

1.1 This specification covers tantalum and tantalum alloy seamless and welded tubes of the following grades:

1.1.1 *UNS Grade R05400*—Unalloyed tantalum, powder-metallurgy consolidation,

1.1.2 *UNS Grade R05200*—Unalloyed tantalum, vacuum melted,

1.1.3 *UNS Grade R05252*—Tantalum + 2.5 % tungsten alloy, vacuum melted.

1.1.4 *UNS Grade R05255*—Tantalum + 10 % tungsten alloy, vacuum melted.

1.1.5 *UNS Grade R05240*—Tantalum alloy, 60 % tantalum, 40 % columbium, electron-beam furnace or vacuum arc melt, or both.

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

2. Referenced Documents

2.1 *ASTM Standards*:²

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

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *lot*—all material produced from the same ingot or single powder blend, of the same size and last annealed in the same furnace charge.

3.1.2 *process length*—the one-piece length of each tube that results from the production operation that first yields the tubular form. Sampling and testing should in general be based on process lengths unless specifically stated otherwise.

4. Ordering Information

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

4.1.1 Quantity,

4.1.2 UNS grade,

4.1.3 Type (welded or seamless),

4.1.4 Dimensions,

4.1.5 Nondestructive test requirements, if any, and

4.1.6 Additions to the specification and supplementary requirements, if any.

5. Materials and Manufacture

5.1 Seamless tube shall be made by any seamless method that will yield a product meeting the requirements of this specification.

5.2 Welded tube shall be made from flat-rolled product by an automatic or semiautomatic fusion welding process with no addition of filler metal.

6. Chemical Composition

6.1 The material shall conform to the requirements of chemical composition prescribed in Table 1.

6.1.1 Analysis for elements not listed in Table 1 and not normally expected in tantalum shall not be required unless specified at time of purchase.

6.2 The manufacturer's ingot analysis shall be considered the chemical analysis for products supplied under this specification.

6.3 When requested by the purchaser at the time of purchase the manufacturer shall report the values of the interstitial elements carbon, oxygen, hydrogen, and nitrogen as specified in Table 2 for each lot of finished product.

7. Mechanical Properties

7.1 *Tensile*—The tensile properties of the finished tube material shall conform to the requirements of Table 3.

7.2 *Flare*—A section of the finished tube shall be capable of being flared without cracking visibly to the unaided eye. The flare shall be made with a tool having a 60° included angle until the outside diameter has been increased 20 %.

7.3 *Reverse Flattening*—A section of welded tube that is slit longitudinally 90° either side of the weld shall be opened and flattened with the weld at the point of maximum bend. No cracking is permitted.

7.4 One set of these mechanical tests shall be made on each lot of tubes and for each fifty process length tubes of each lot or fraction thereof.

¹ This specification is under the jurisdiction of ASTM Committee B10 on Reactive and Refractory Metals and Alloys and is the direct responsibility of Subcommittee B10.03 on Niobium and Tantalum.

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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.