

AEROSPACE MATERIAL SPECIFICATION

Issued JAN 1988
Cancelled SEP 2006

Superseded by AMS 7848

Tantalum Alloy Bars and Rods
90Ta - 10W
Annealed

UNS R05255

RATIONALE

AMS 7846A places this specification in cancelled status.

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of September, 2006, and has been superseded by AMS 7848. The requirements of the latest issue of AMS 7848 shall be fulfilled whenever reference is made to the cancelled AMS 7846. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications, noting that it has been superseded by AMS 7848.

Cancelled specifications are available from SAE.

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1. SCOPE:

1.1 Form: This specification covers a tantalum alloy in the form of bars and rods.

1.2 Application: Primarily for parts requiring exposure to ultra-high temperatures. Applications on oxidizing atmosphere necessitate a protective coating.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096

2.1.1 Aerospace Material Specifications:

AMS 2261 - Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Bars and Forging Stock

MAM 2261 - Tolerances, Metric, Nickel, Nickel Alloy, and Cobalt Alloy Bars and Forging Stock

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E8 - Tension Testing of Metallic Materials

ASTM E92 - Vickers Hardness of Metallic Materials

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

- 3.1 **Composition:** Shall conform to the following percentages by weight; metallic elements shall be determined spectrochemically, carbon shall be determined conductometrically, oxygen shall be determined by the inert gas or vacuum fusion method, nitrogen shall be determined by the Kjeldahl method or by vacuum fusion, and hydrogen shall be determined by the vacuum fusion or vacuum extraction method.

	min	max
Tungsten	8.50	11.00
Columbium	--	0.10
Molybdenum	--	0.030
Nickel	--	0.010
Iron	--	0.010
Oxygen	--	0.010 (100 ppm)
Carbon	--	0.005
Nitrogen	--	0.005 (50 ppm)
Hydrogen	--	0.001 (10 ppm)
Tantalum	remainder	

- 3.2 **Condition:** Fully annealed.

- 3.3 **Properties:** The product shall conform to the following requirements:

- 3.3.1 **Tensile Properties:** Shall be as specified in Table I, determined in accordance with ASTM E8 with the rate of strain maintained at 0.003 - 0.007 in./in. per min. (0.003 - 0.007 mm/mm per min.) through the yield strength and then increased so as to produce failure in approximately one additional minute. When a dispute occurs between purchaser and vendor over the yield strength values, a referee test shall be performed on a machine having a strain rate pacer, using a rate of 0.005 in./in. per min. (0.005 mm/mm per min.) through the yield strength and a minimum crosshead speed of 0.10 in. (2.5 mm) per min. above the yield strength.

TABLE I

Nominal Diameter or Distance Between Parallel Sides Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset, psi, min	Elongation in 2 in. or 4D %, min
Up to 2.000, excl	75,000	60,000	15
2.000 to 3.500, incl	70,000	55,000	15

TABLE I (SI)

Nominal Diameter or Distance Between Parallel Sides Millimetres	Tensile Strength MPa, min	Yield Strength at 0.2% Offset, MPa, min	Elongation in 50 mm or 4D %, min
Up to 50.00, excl	515	415	15
50.00 to 87.50, incl	485	380	15

3.3.1.1 Tensile property requirements apply in both the longitudinal and transverse direction but tests in the transverse direction need be made only on product from which a specimen not less than 2.50 in. (62.5 mm) in length can be taken. Tests in the longitudinal direction are not required on product tested in the transverse direction.

3.3.1.2 Tensile property requirements for product over 3.500 in. (87.50 mm) in nominal diameter or distance between parallel sides shall be as agreed upon by purchaser and vendor.

3.3.2 Hardness: Should be not higher than 235 HV30, or equivalent, determined in accordance with ASTM E92 but the product shall not be rejected on the basis of hardness if the tensile property requirements are met.

3.4 Quality: The product, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the product.

3.5 Tolerances: Shall conform to all applicable requirements of AMS 2261 or MAM 2261.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the product shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling: Shall be in accordance with the following; a lot shall be all product of the same nominal size from the same heat processed at the same time and annealed in the same heat treat batch: