

AEROSPACE MATERIAL SPECIFICATION

SAE AMS-7848

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Superseding AMS-7848A

BARS AND RODS, TANTALUM ALLOY 90Ta - 10W

UNS R05255

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 in oxidizing atmospheres 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 SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

2.1.1 Aerospace Material Specifications:

AMS-2261 - Tolerances, Nickel, Nickel Alloy, and Cobalt Alloy Bars, Rods, and Wire

MM-2261 - Tolerances, Metric, Nickel, Nickel Alloy and Cobalt Alloy Bars, Rods, and Wire

AMS-2809 - Identification, Titanium and Titanium Alloy Wrought Products

2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM E 8 - Tension Testing of Metallic Materials

ASTM E 8M - Tension Testing of Metallic Materials (Metric)

ASTM E 92 - Vickers Hardness of Metallic Materials

2.3 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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2.3.1 Military Specifications:

ML-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	
Carbon	--	0.005	
Oxygen	--	0.010	(100 ppm)
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 E 8 or ASTM E 8M with the rate of strain maintained at 0.003 - 0.007 inch/inch/minute (0.003 - 0.007 mm/mm/minute) 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 inch/inch/minute (0.005 mm/mm/minute) through the yield strength and a minimum crosshead speed of 0.10 inch (2.5 mm) per minute 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 Inches or 4D %, min
Up to 2.000, excl	75,000	65,000	15
2.000 to 3.500, incl	70,000	60,000	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 50.8 mm or 4D %, min
Up to 50.80, excl	517	448	15
50.80 to 88.90; incl	483	414	15

3.3.2 Hardness: Should be not higher than 235 HV30, or equivalent, determined in accordance with ASTM E 92, 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, condition sound, and free from the 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. 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 for all technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.

4.3 Sampling and Testing: 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.

4.3.1 Composition: One sample from each heat, except that for carbon, oxygen, nitrogen, and hydrogen determinations one sample from each lot,

4.3.2 Tensile Property and Hardness Requirements: One sample from each lot.

4.4 Reports: The vendor of the product shall furnish with each shipment a report showing the results of tests for chemical composition of each heat, the results of tests on each lot to determine conformance to the carbon, oxygen, nitrogen, and hydrogen requirements and for tensile property and hardness requirements, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS-7847B, size, and quantity.

4.5 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Shall be in accordance with AMS-2809.

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5.2 Packaging:

5.2.1 Product shall be packed in wooden boxes, or other suitable protective containers of 2000 pounds (907 kg) maximum lifts, to prevent damage to surfaces during shipping and handling.

5.2.2 Product shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.

5.2.3 For direct U.S. Military procurement, packaging shall be in accordance with ML-STD-163, Commercial Level, unless Level A is specified in the request for procurement.

6. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

7. REJECTIONS: Product not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES:

8.1 Marginal Indicia: The phi (0) symbol to indicate technical changes from the previous issue of this specification.

8.2 Dimensions and properties in inch/pound units are primary; dimensions and properties in SI units are shown as the approximate equivalents of the primary units and are presented only for information.

8.3 For direct U.S. Military procurement, purchase document should specify not less than the following:

Title, number, and date of this specification
Form and size or part number of product desired
Quantity of product desired
Level A packaging, if required (See 5.2.3).