

AEROSPACE MATERIAL SPECIFICATION

SAE AMS-7847

REV
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Submitted for recognition as an American National Standard

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TANTALUM ALLOY SHEET, STRIP, AND PLATE 90Ta - 10W

UNS R05255

1. SCOPE:

1.1 Form: This specification covers a tantalum alloy in the form of sheet, strip, and plate.

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-2242 - Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate

MAM-2242 - Tolerances, Metric, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate

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

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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.

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; carbon shall be determined conductometrically, oxygen by the inert gas or vacuum fusion method, nitrogen by the Kjeldahl method or by vacuum fusion, hydrogen by the vacuum fusion or vacuum extraction method, and metallic elements by spectrochemical methods or by other analytical methods acceptable to purchaser.

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

3.2 Condition: Cold rolled and fully annealed, having a surface appearance comparable to a commercial corrosion resistant steel No. 2D finish (See 8.2).

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

3.3.1 Tensile Properties: Shall be as follows for product 0.010 - 0.250 inch (0.25 - 6.35 mm), incl, in nominal thickness, 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 at 0.05 inch/inch/minute (0.05 mm/mm/minute) above the yield strength:

| | |
|---|----------------------|
| Tensile Strength, minimum | 70,000 psi (483 MPa) |
| Yield Strength at 0.2% Offset, minimum | 60,000 psi (414 MPa) |
| Elongation in 1 Inch (25.4 mm), minimum | 15% |

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- 3.3.1.1 Tensile property requirements for product under 0.010 inch (0.25 mm) or over 0.250 inch (6.35 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.
- 3.3.2 Hardness: Not higher than 260 HV10, or equivalent, determined in accordance with ASTM E 92.
- 3.3.3 Bending: Sheet and strip 0.187 inch (4.75 mm) and under in nominal thickness shall withstand, without cracking, bending at room temperature through an angle of 105 degrees around a diameter equal to twice the nominal thickness of the product with axes of bend both parallel and perpendicular to the direction of rolling, using a ram speed of not less than 1 inch/minute (0.423 mm/second).
- 3.3.3.1 Bending requirements for product over 0.187 inch (4.75 mm) in nominal thickness shall be as agreed upon by purchaser and vendor.
- 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-2242 or MAM-2242 and the following:
- 3.5.1 Flatness: When measured using a straight edge touching the product at two points, the perpendicular distance from the straight edge to the sheet shall not exceed 0.05 x L inches (0.05 x L mm) at any point between the two points of contact, where "L" is the distance in inches (mm) between the two points of contact.
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 thickness, from the same heat, processed at one time:
- 4.3.1 Composition: One specimen from each heat, except that for carbon, oxygen, nitrogen, and hydrogen determination one specimen from each lot.
- 4.3.2 Tensile and Bend Properties: One specimen from each lot.

- 4.3.2.1 Tensile specimens from widths 9 inches (229 mm) and over shall be taken with the axis of the specimen perpendicular to the direction of rolling; for widths under 9 inches (229 mm), specimens shall be taken with the axis parallel to the direction of rolling.
- 4.3.2.2 Bend specimens shall be nominally 0.5 inch (13 mm) wide by not less than 2 inches (51 mm) long and shall be deburred.
- 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 and of tests on each lot to determine conformance to the carbon, oxygen, nitrogen, and hydrogen content, tensile properties, and bending 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.
- 0
- 5.2 Packaging:
- 5.2.1 The 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.
- 0
- 5.2.2 For direct U.S. Military procurement, packaging shall be in accordance with MIL-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 (ϕ) symbol is used to indicate technical changes from the previous issue of this specification.
- 8.2 Commercial corrosion-resistant steel finishes are defined in ASTM A 480/A 480M.