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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 7847A
Superseding AMS 7847

Issued 9-1-65
Revised 10-1-84

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

UNS R05255

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 10-25-83. It is recommended that this specification not be specified for new designs.

This cover sheet should be attached to the "A" revision of the subject specification.

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

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Revised 1-15-76

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

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 and assemblies 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 Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2242 - Tolerances, Corrosion and Heat Resistant Steel and Iron Base Alloy Sheet, Strip, and Plate and Titanium and Titanium Alloy Sheet, Strip and Plate
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 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Federal Standards:

Federal Test Method Standard No. 151 - Metals; Test Methods

2.3.2 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 Ø 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 spectrographic methods in accordance with Federal Test Method Standard No. 151, Method 112, or by other approved analytical methods:

	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 corrosion resistant steel No. 2D finish.

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 in. (0.25 - 6.35 mm), incl, in nominal thickness, determined in accordance with ASTM E8 with the rate of strain maintained at 0.003 - 0.007 in. per min. (9.003 - 0.007 mm/mm/min.) through the yield strength and at 0.05 in. per in. per min. (0.05 mm/mm/min.) above the yield strength:

Tensile Strength, min	70,000 psi (483 MPa)
Yield Strength at 0.2% Offset, min	60,000 psi (414 MPa)
Elongation in 1 in. (25.4 mm), min	15%

3.3.1.1 Tensile property requirements for product less than 0.010 in. (0.25 mm) or over 0.250 in. (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 E92.

3.3.3 Bending: Sheet and strip 0.187 in. (4.75 mm) and under in nominal thickness shall withstand, without cracking, bending at room temperature through an angle of 105 deg (1.83 rad) around a diameter equal to twice the nominal thickness of the product with axes of bend both parallel and perpendicular to the direction or rolling, using a ram speed of not less than 1 in. per min. (0.423 mm/sec).

3.4 Quality: The product shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

3.5 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2242 and the following:

3.5.1 Flatness: When measured using a straight edge touching the product at two points, the perperdicular distance from the straight edge to the sheet shall not exceed 0.05 x L in. (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 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 perform such confirmatory testing as he deems 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 or routine control tests.

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 one time:

Ø 4.3.1 Composition: One specimen from each heat.

Ø 4.3.2 Tensile and Bend Properties: One specimen from each thickness from each heat.

4.3.2.1 Tensile test specimens from widths 9 in. (229 mm) and over shall be taken with the axis of the specimen perpendicular to the direction of rolling; for widths less than 9 in. (229 mm), specimens shall be taken with the axis parallel to the direction of rolling.

4.3.2.2 Bend test specimen shall be nominally 0.5 in. (13 mm) wide by not less than 2 in. (51 mm) long and shall be deburred.

4.4 Reports:

4.4.1 Ø The vendor of the product shall furnish with each shipment three copies of a report of the results of tests for chemical composition of each heat in the shipment and of results of tests on each lot to determine conformance to the carbon, oxygen, nitrogen, hydrogen, tensile property, and bending requirements and stating that the product conforms to the other technical requirements of this specification. This report shall include the purchase order number, heat number, material specification number and its revision letter, size, and quantity from each heat.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

4.5 Ø 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 Ø Identification: Product shall be marked near one end, coils being marked near the outside end, with the purchase order number, AMS 7847A, heat or batch number, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be clearly legible and shall be applied using a suitable marking fluid. The markings shall have no deleterious effect on the product or its performance and shall be sufficiently stable to withstand normal handling. As an alternate method, individual pieces or bundles shall have attached a durable tag marked with the above information, or shall be boxed and the box marked with the same information.

5.2 Packaging:

5.2.1 Ø The product shall be prepared for shipment in accordance with commercial practice to ensure carrier acceptance and safe transportion to the point of delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation. Strip ordered cut to length shall be furnished flat.

5.2.2 Ø For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-163, Level A or Level C, as specified in the request for procurement. Commercial packaging as in 5.2.1 will be acceptable if it meets the requirements of Level C.