

Tantalum Alloy Sheet, Strip, and Plate
90Ta - 10W

(Composition similar to UNS R05255)

RATIONALE

AMS 7847C is a Five Year Review and update of this specification.

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 issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply..

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), or www.sae.org.

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

AMS 2809 Identification, Titanium and Titanium Alloy Wrought Products

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, or www.astm.org.

ASTM E 8 Tension Testing of Metallic Materials

ASTM E 92 Vickers Hardness of Metallic Materials

ASTM E 290 Bend Testing Materials for Ductility

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3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the following percentages by weight shown in Table 1; 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.

TABLE 1 - COMPOSITION

Element	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 to 0.250 inch (0.25 to 6.35 mm), incl, in nominal thickness, determined in accordance with ASTM E 8 with the rate of strain maintained at 0.003 to 0.007 inch/inch/minute (0.003 to 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:

TABLE 2 – TENSILE PROPERTIES

Property	Value
Tensile Strength, minimum	70 ksi (483 MPa)
Yield Strength at 0.2% Offset, minimum	60 ksi (414 MPa)
Elongation in 1 Inch (25.4 mm), minimum	15%

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 evidence of cracking when examined at 20X, bending in accordance with ASTM E 290 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). In case of dispute, results of bend tests using the end supported guided bend test procedure shall govern.

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 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 $0.05 \times L$ inches ($0.05 \times L$ 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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

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 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 7847C, size, and quantity.