AEROSPACE MATERIAL SPECIFICATION

AMS7847™	REV. E

Issued 1965-09
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Revised 2025-03

Superseding AMS7847D

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

(Composition similar to UNS R05255)

RATIONALE

AMS7847E results from a Five-Year Review and update of this specification with changes to update wording to prohibit unauthorized exceptions (see 3.3.1.1, 3.6, 4.4.2, 5.1.1, and 8.4), relocate Definitions (see 2.3), update Applicable Documents (see Section 2), and allow the use of the immediate prior specification revision (see 8.3).

1. SCOPE

1.1 Form

This specification covers a tantalum alloy in the form of sheet, strip, and plate from 0.010 through 0.250 inch (0.25 through 6.35 mm), inclusive (see 8.5).

1.2 Application

Primarily for parts requiring exposure to ultrahigh 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 +1 724-776-4970 (outside USA), www.sae.org.

AMS2242 Tolerances, Corrosion and Heat Resistant Steel, Iron Alloy, Titanium, and Titanium Alloy Sheet, Strip, and Plate

AMS2809 Identification, Titanium and Titanium Alloy Wrought Products

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS7847E/

AS4194 Sheet and Strip Surface Finish Nomenclature

AS7766 Terms Used in Aerospace Metals Specifications

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, www.astm.org.

ASTM A480/A480M General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

ASTM E8/E8M Tension Testing of Metallic Materials

ASTM E290 Bend Testing of Material for Ductility

ASTM E384 Microindentation Hardness of Materials

2.3 Definitions

Terms used in AMS are defined in AS7766.

2.3.1 Commercial corrosion-resistant steel finishes are defined in ASTM A480/A480M and AS4194.

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 the 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 2.3.1).

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), inclusive, in nominal thickness, determined in accordance with ASTM E8/E8M, with the rate of strain set at 0.005 in/in/min (0.005 mm/mm/min) and maintained within a tolerance of ±0.002 in/in/min (±0.002 mm/mm/min) through the 0.2% offset yield strain and 0.05 in/in/min (0.05 mm/mm/min) and maintained within a tolerance of ±0.02 in/in/min (±0.02 mm/mm/min) above the yield strain to fracture.

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 the purchaser and producer and reported per 4.4.2 (see 8.5).

3.3.2 Hardness

Not higher than 260 HV10, or equivalent, determined in accordance with ASTM E384.

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 E290 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 in/min (0.423 mm/s). 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 the 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 AMS2242 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 (millimeters) between the two points of contact.

3.6 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.2.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of the product shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The 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

4.4.1 The producer of the product shall furnish with each shipment a report showing: the results of tests for composition of each heat; the results of tests on each lot to determine conformance to the carbon, oxygen, nitrogen, and hydrogen content; tensile properties; and bending requirements. The report shall state that the product conforms to the other technical requirements and shall include the purchase order number, lot number, AMS7847E, size, and quantity.

4.4.2 When material produced to this specification is beyond the sizes allowed in the scope or tables, or other exceptions are taken to the technical requirements listed in Section 3, the report shall contain a statement "This material is certified as AMS7847E(EXC) because of the following exceptions:" and the specific exceptions shall be listed (see 5.1.1).

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 AMS2809.