

TITANIUM ALLOY SHEET AND STRIP
4Al - 3Mo - 1V
Solution and Precipitation Treated

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 10-7-75. 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.

REAFFIRMED

10-91

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AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 1000

AMS 4913A
Superseding AMS 4913

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TITANIUM ALLOY SHEET AND STRIP 4Al - 3Mo - 1V Solution and Precipitation Treated

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for parts requiring strength up to 600 F (316 C). This material may be characterized by poor crack propagation resistance.
3. **COMPOSITION:**

	min	max
Ø Aluminum	3.75	4.75
Molybdenum	2.50	3.50
Vanadium	0.75	1.25
Iron	--	0.35
Oxygen	--	0.20
Carbon	--	0.08
Nitrogen	--	0.05 (500 ppm)
Hydrogen	--	0.015 (150 ppm)
Other Elements, each (1)	--	0.10
Other Elements, total (1)	--	0.40
Titanium	remainder	

(1) Determination not required for routine acceptance.

- 3.1 **Check Analysis:** Composition variations shall meet the requirements of the latest issue of AMS 2249.
4. **CONDITION:** Unless otherwise ordered, hot rolled with or without subsequent cold reduction, solution heat treated, descaled, leveled, precipitation heat treated, and descaled, having a surface appearance comparable to a commercial corrosion resistant steel No. 2D finish.
5. **TECHNICAL REQUIREMENTS:**
 - 5.1 **Heat Treatment:** Unless otherwise specified, material shall be solution heat treated by heating to $1640\text{ F} \pm 15$ ($893.3\text{ C} \pm 8.3$), holding at heat for a time commensurate with the thickness and the heating equipment and procedure used, but not longer than 30 min., and quenching in oil or water at room temperature, and then shall be precipitation heat treated by heating to $925\text{ F} \pm 15$ ($496.1\text{ C} \pm 8.3$), holding at heat for 10 - 14 hr, and cooling.
 - 5.2 **Tensile Properties:** These properties apply when the rate of strain is maintained at 0.003 - 0.007 in. per in. per min. through the yield strength and then is increased so as to produce failure in approximately one additional minute. When a dispute occurs between purchaser and vendor over the yield strength value, a referee test shall be performed on a machine having a strain rate pacer, using a rate of 0.005 in. per in. per min. through the yield strength and a minimum cross head speed of 0.10 in. per min. above the yield strength; for such referee tests, yield strength shall be determined by the offset method.

REAFFIRMED

16-91

Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 16,400,000)		Elongation % in 2 in. or 4D, min
		psi, min	Extension Under Load in. in 2 in.	
Up to 0.033, excl	170,000	155,000	0.0229	3
0.033 to 0.050, excl	180,000	155,000	0.0229	4
0.050 to 0.1875, excl	180,000	155,000	0.0229	5

5.2.1 For widths 9 in. and over, tensile test specimens shall be taken with the axis perpendicular to the direction of rolling. For widths less than 9 in., tensile test specimens shall be taken with the axis parallel to the direction of rolling.

6. **QUALITY:** Unless otherwise specified, material shall be produced by multiple melting using consumable electrode practice; at least one of the melting cycles shall be under vacuum. The product shall be uniform in quality and condition, clean, sound, and free from "oil cans" of depth in excess of the flatness tolerance, ripples, and foreign materials, and from internal and external imperfections detrimental to fabrication or to performance of parts.

Note. An "oil can" is defined as an excess of material in a localized area of a sheet which causes the sheet to buckle in that area. When the sheet is placed on a flat surface and hand pressure applied to the buckle, the buckle will spring through to the opposite surface or spring up in another area on the sheet.

7. **TOLERANCES:** Unless otherwise specified, tolerances shall conform to the following:

7.1 **Thickness, Width, Length, and Straightness:** The latest issue of AMS 2242.

7.2 **Flatness:** Flatness tolerance for material 36 in. and under in width shall be 3%. Flatness tolerance for material over 36 in. wide shall be as agreed upon by purchaser and vendor.

7.2.1 Flatness shall be determined from the expression $100H/L$ where "L" is the distance between contact points of a straight edge laid in any direction on the material and "H" is the distance from the straight edge to the material at the point of greatest separation.

7.2.2 Flatness tolerances do not apply to coiled products.

8. **REPORTS:**

8.1 Unless otherwise specified, 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 the results of tests on each lot to determine conformance to the hydrogen, tensile, and bending requirements of this specification. A lot is defined as all material of the same nominal thickness from the same heat processed at the same time. This report shall include the purchase order number, heat number, material specification number and its revision letter, thickness, size, and quantity from each heat.

8.2 Unless otherwise specified, 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.