

AEROSPACE MATERIAL SPECIFICATIONS

AMS 7817

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

Issued 1-31-64
Revised

MOLYBDENUM ALLOY SHEET, STRIP, AND PLATE

0.5Ti - 0.090Zr

Arc Cast, Stress Relieved

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for parts requiring high modulus and uniform strength characteristics up to at least 2100 F (1150 C). Because of its excessive oxidation rate, this material is not recommended for use in oxidizing atmospheres at 1000 F (540 C) and above unless protected by a suitable coating.

3. **COMPOSITION:**

	min	max	Check Analysis	
			Under Min or Over Max	
Molybdenum	99.25 (1)	--		
Titanium	0.40	- 0.55	0.05	0.05
Zirconium	0.06	- 0.12	0.02	0.02
Carbon	0.010	- 0.030	0.005	0.005
Iron	--	0.020	--	0.002
Silicon	--	0.010	--	0.002
Nickel	--	0.010	--	0.001
Oxygen	--	0.0030 (30 ppm) (2)	--	--
Nitrogen	--	0.0010 (10 ppm) (2)	--	0.0005 (5 ppm)

- (1) Determination not required for routine acceptance.
- (2) Pending establishment of approved methods of analysis, deviation from these limits alone shall not be cause for rejection.

4. **CONDITION:** Unless otherwise specified, material shall be hot-cold rolled, leveled, and fully stress relieved, having a surface appearance as close as possible to a commercial corrosion resistant steel No. 2D finish; standards for acceptance and rejection shall be as agreed upon by purchaser and vendor.

5. **TECHNICAL REQUIREMENTS:**

- 5.1 The product shall conform to the following requirements as applicable to the orientation of specimen axis with respect to direction of rolling and shall be capable of meeting these requirements after being heated to $2100\text{ F} \pm 25$ ($1148.9\text{ C} \pm 14$), held at heat for 30 min. in a suitable, controlled atmosphere, and cooled rapidly. Specimens shall be tested with axes both parallel and perpendicular to the direction of rolling, using strain rates of 0.003 - 0.007 in. per in. per min. through the 0.6% offset and 0.03 - 0.07 in. per in. per min. between this point and the ultimate.

Nominal Thickness Inches	Specimen Axis Orientation	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 46,000,000)		Elongation % in 2 in. or 4D min
			psi, min	Extension Under Load in. in 2 in.	
Up to 0.1875, incl	Parallel	100,000	90,000	0.0079	6
	Perpendicular	120,000	105,000	0.0086	6
Over 0.1875 to 0.500, incl	Parallel	95,000	85,000	0.0077	3
	Perpendicular	105,000	95,000	0.0081	3
Over 0.500 to 1.500, incl	Parallel	90,000	82,000	0.0076	2
	Perpendicular	100,000	90,000	0.0079	2

5.2 Bending: Sheet and strip 0.065 in. and under in thickness shall withstand, without cracking, bending in a V-block fixture at room temperature through an angle of 105 deg around a diameter equal to a bend factor of 6 times the nominal thickness of the material when the axis of bend is parallel to the direction of rolling and 4 times the nominal diameter of the material when the axis of bend is perpendicular to the direction of rolling, using a ram speed of 1 - 10 in. per minute. Bend specimen width shall be not less than 10 times the nominal thickness and shall be not less than 2 inches.

6. QUALITY: Material shall be vacuum arc melted using consumable electrode practice. The product shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, the following tolerances apply.

Nominal Thickness (T) Inches	Tolerance, Inch, Plus and Minus For Width Ranges Shown, Inches			
	Up to 18, incl	Over 18 to 24, incl	Over 24 to 30, incl	Over 30 to 48, incl
Up to 0.010, incl	0.10T	--	--	--
Over 0.010 to 0.016, incl	0.002	0.0025	--	--
Over 0.016 to 0.020, incl	0.002	0.0025	0.003	--
Over 0.020 to 0.025, incl	0.10T	0.0025	0.003	--
Over 0.025 to 0.030, incl	0.10T	0.10T	0.003	--
Over 0.030 to 0.040, incl	0.10T	0.10T	0.10T	--
Over 0.040	0.10T	0.10T	0.10T	0.10T

7.2 Width:

7.2.1 Sheared Flat Sheet and Plate:

Tolerance, Inch
Plus and Minus

All widths 1/16

7.3 Length:

7.3.1 Sheared Flat Sheet and Plate:

Tolerance, Inch
Plus and Minus

All lengths 3/32

7.4 Camber:

7.4.1 Sheared Flat Sheet:

Nominal Length
Inches

Tolerance, Inch

Up to 95, incl 3/32

7.5 Flatness: Unless otherwise specified, flatness tolerances shall conform to Table VI of the latest issue of AMS 2242, except that for material under 0.030 in. in thickness the permissible variation from flat shall be 3/4 inch.

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 thickness from each heat to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, heat number, material specification number, 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, 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.