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400 COMMONWEALTH DRIVE WARRENDALE PA 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 7811A

Issued 1-15-62
Revised 10-1-82

MOLYBDENUM ALLOY SHEET, STRIP, AND PLATE

0.5Ti

Arc Cast, Stress Relieved

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 3-28-73. It is recommended, therefore, that this specification not be specified for new designs.

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

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This specification has been declared "~~CANCELLED~~" by the Aerospace Materials Division, SAE, as of 10-1-82. By this action, subject specification number and title will be deleted from the active specification index of Aerospace Material Specifications.

This specification is under the jurisdiction of AMS Committee "G".

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AEROSPACE MATERIAL

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

SPECIFICATION

AMS 7811A

Issued 1-15-62

Revised 1-31-64

MOLYBDENUM ALLOY SHEET, STRIP, AND PLATE

0.5Ti

Arc Cast, Stress Relieved

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 high modulus and uniform strength characteristics up to at least 2000 F. Because of its excessive oxidation rate, this material is not recommended for use in oxidizing atmospheres at 1000 F and above unless protected by a suitable coating.
3. **COMPOSITION:**

	min	max	Check Analysis	
			Under	Min or Over Max
Molybdenum	99.35 (1)	--	--	--
Titanium	0.40	0.55	0.05	0.05
Carbon	0.010	0.040	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 $2000\text{ F} \pm 25$, ($1093.3\text{ C} \pm 14$), 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 yield strength and 0.010 - 0.030 in. per min. between yield and 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.
			psi, min	Extension Under Load in. in 2 in.	
Up to 0.1875, incl	Parallel	100,000	90,000	0.0079	6
	Perpendicular	110,000	95,000	0.0081	4
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 at room temperature through an angle of 105 deg around a diameter equal to the bend factor times the nominal thickness of the material, using a ram speed not less than 1 in. per min. and not greater than 10 in. per min. and deburred test specimens 0.5 in. wide and not less than 2 in. in length:

Bend Axis	Bend Factor
Parallel to direction of rolling	6
Perpendicular to direction of rolling	4

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, tolerances shown herein shall apply.

7.1 **Thickness:**

Nominal Thickness (T) Inches	Tolerance, Plus or Minus For Width Ranges Shown, Inches			
	18 and under	Over 18 to 24 incl	Over 24 to 30 incl	Over 30 to 48 incl
Up to 0.010, incl	0.001	--	--	--
Over 0.010 to 0.017, incl	0.002	--	--	--
Over 0.017 to 0.040, incl	0.002	0.0025	0.003	--
Over 0.040 to 0.050, incl	0.05T	0.0025	0.10T	0.10T
Over 0.050 to 0.100, incl	0.05T	0.05T	0.10T	0.10T
Over 0.100	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:

Ø	Nominal Length Inches	Tolerance, Inch Plus and Minus
	96 and under	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.