

AEROSPACE MATERIAL SPECIFICATIONS

AMS 7807

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

Issued 7-15-63
Revised

MOLYBDENUM FORGINGS Arc Cast, Stress Relieved

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.
2. FORM: Forgings and forging stock.
3. APPLICATION: Primarily for forged parts requiring high modulus and uniform strength characteristics up to at least 1800 F (980 C). This material is not recommended for use in oxidizing atmospheres at 1000 F (540 C) and above unless protected by a suitable coating.
4. COMPOSITION:

		Check Analysis	
		Under Min	Over Max
Molybdenum	99.90 min (1)	-	
Carbon	0.010 - 0.030	0.005	0.005
Iron	0.020 max	-	0.002
Silicon	0.010 max	-	0.002
Oxygen	0.0030 (30 ppm) max (2)	-	-
Nickel	0.010 max	-	0.001
Nitrogen	0.0010 (10 ppm) max (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.

5. CONDITION:

- 5.1 Forgings: Hot-cold forged, descaled, and stress relieved.
- 5.2 Forging Stock: Unless otherwise specified, material shall be extruded, or extruded and subsequently reduced or forged to specified size, with a minimum of 50% reduction in ingot cross sectional area, and recrystallized.
 - 5.2.1 Grain Size: Unless otherwise specified, grain size shall be predominantly 3 or finer, as determined by comparison of a polished and etched specimen with the chart in the issue of ASTM E112 listed in the latest issue of AMS 2350.

6. TECHNICAL REQUIREMENTS:

- 6.1 Forgings: The product shall conform to the following requirements, and shall be capable of meeting these requirements after being heated to 1700 F \pm 25 (926.7 C \pm 14), held at heat for 30 min. in a suitable controlled atmosphere, and cooled rapidly.

Section 8.3 of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no requirement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against infringement of patents."

6.1.1 Hardness: Not lower than Brinell 182 (1500 kg) or equivalent.

6.1.2 Tensile Properties: Unless otherwise specified, specimens cut with the axis approximately parallel to the forging flow lines and tested at room temperature 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. to the ultimate shall conform to the following requirements; the location of the test specimen in the forging shall be as agreed upon by purchaser and vendor.

Tensile Strength, psi	75,000 min
Yield Strength at 0.2% Offset or at 0.0068 in. in 2 in. Extension Under Load (E = 46,000,000), psi	65,000 min
Elongation, % in 4D	7 min
Reduction of Area, %	10 min

6.2 Forging Stock:

6.2.1 Hardness: Shall be not higher than Brinell 182 (1500 kg) or equivalent.

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

7.1 When specified, ultrasonic and other nondestructive inspection techniques and acceptance standards shall be as agreed upon by purchaser and vendor.

8. TOLERANCES:

8.1 Forging Stock: Unless otherwise specified, forging stock shall be furnished in random lengths and shall have a uniform section along the entire length within $\pm 2\%$. In addition, removal of local surface imperfections by turning, spot grinding, or hand filing will be permitted provided depth of spots is not greater than 2% of the nominal diameter or distance between parallel sides and spots are smoothly blended into adjacent surfaces.

8.1.1 Forging stock specified cut to length or weight shall meet the following tolerances:

8.1.1.1 Cut to Specified Length: $\pm 1/4$ inch

8.1.1.2 Cut to Specified Weight: $\pm 5\%$.

9. REPORTS:

9.1 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 for tensile properties and hardness of each forging part number from each heat. This report shall include the purchase order number, heat number, material specification number, part number, size of forging stock used, and quantity from each heat.