SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York, N.Y. 10017

AEROSPACE MATERIAL SPECIFICATIONS

AMS 4033B
Superseding AMS 4033A
Issued 6-30-60
Revised 11-1-67

ALUMINUM ALLOY PLATE
4.4Cu - 1.5Mg - 0.60Mn (2024-T351)
Stress-Relief Stretched

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 machined parts where warpage during machining due to residual stresses must be kept to a minimum and for structural parts of good strength. Certain design and processing procedures may cause this material to be susceptible to stress corrosion cracking; ARP 823 recommends practices to minimize such conditions.

3. COMPOSITION:

	min	max
Copper	3.8	4.9
Magnesium	1.2	1.8
Manganese	0.30	0.9
Iron	--	0.50
Silicon	--	0.50
Zinc	--	0.25
Chromium	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

4. CONDITION: Solution heat treated and stress-relieved by stretching.

4.1 Material shall be stretched in the solution heat treated condition to produce a nominal permanent set of 2%, but not less than 1-1/2% nor more than 3%.

4.2 Material shall receive no further straightening operations after stretching.

5. TECHNICAL REQUIREMENTS: The product shall conform to the following requirements; tensile properties shall be determined in accordance with the latest issue of AMS 2355.

5.1 Tensile Properties:

Nominal Thickness Inches	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,500,000) psi, min	Extension Under Load in. in 2 in.	Elongation % in 2 in. or 4D, min
0.250 to 0.499, incl	64,000	40,000	0.0116	12
Over 0.499 to 1.000, incl	62,000	41,000	0.0118	8
Over 1.000 to 1.500, incl	62,000	41,000	0.0118	7
Over 1.500 to 2.000, incl	61,000	41,000	0.0118	6
Over 2.000 to 3.000, incl	60,000	41,000	0.0118	4
Over 3.000 to 4.000, incl	56,000	40,000	0.0116	4

5.1.1 When a dispute occurs between purchaser and vendor over the yield strength values, yield strength determined by the offset method shall apply.

5.1.2 Tensile properties of plate thicker than 4.000 in. shall be as agreed upon by purchaser and vendor.

5.2 Bending: Material 0.499 in. and under in thickness shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to 10 times the nominal thickness of the material, with axis of bend parallel to direction of rolling.

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, 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 shall conform to all applicable requirements of latest issue of AMS 2202.

8. REPORTS:

8.1 Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the chemical composition and technical requirements of this specification. This report shall include the purchase order number, material specification number, thickness, size, and quantity.

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.

9. IDENTIFICATION: Unless otherwise specified, each sheet and plate shall be marked on one face, in the respective location indicated below, with the alloy number and temper, AMS 4033 or applicable Federal or Ø Military specification designation, manufacturer's identification, and nominal thickness in inches. The characters shall be of such size as to be clearly legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling.

9.1 Flat Plate Under 6 In. Wide: Shall be marked in one or more lengthwise rows of characters recurring at Ø intervals not greater than 3 feet.

9.2 Flat Plate 0.375 In. and Under Thick, 6 - 60 In., Incl, Wide, and 36 - 200 In., Incl, Long: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft, the rows being Ø spaced approximately 6 in. on centers across the width and staggered. Every third row shall show the manufacturer's identification and nominal thickness in inches. The other rows shall show the alloy number and temper and AMS 4033 or applicable Federal or Military specification designation.

9.3 Flat Plate Over 0.375 In. Thick, or Over 60 In. Wide, or Over 200 In. Long: Shall be marked as in 9.2 above or, at vendor's discretion, shall be marked in one or two rows of characters recurring at in- Ø tervals not greater than 3 ft and running around the periphery of the piece. If one row is used, it shall show all information of Paragraph 9 above. If two rows are used, one row shall show the alloy number and temper and AMS 4033 or applicable Federal or Military specification designation; the second row shall show the manufacturer's identification and nominal thickness in inches.

9.3.1 If peripheral marking is applied to the full piece as produced but partial plates are supplied, an arrow Ø shall also be applied near one corner indicating the direction of rolling.

9.4 Circles: Shall be marked with the information of Paragraph 9 above if the circle is 24 in. or more in Ø diameter. Circles less than 24 in. in diameter shall be identified as agreed upon by purchaser and vendor.