

AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 4041C

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ALUMINUM ALLOY SHEET, ALUMINUM COVERED 4.5Cu - 1.5Mg - 0.6Mn (Alc 24S-T3)

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 formed structural parts of good strength which are required to exhibit maximum corrosion resistance and to match the color and appearance of other clad aluminum alloy parts.
3. **COMPOSITION:**

Core

Cladding

Copper	3.8 - 4.9	Iron + Silicon	0.7 max
Magnesium	1.2 - 1.8	Copper	0.10 max
Manganese	0.30 - 0.9	Zinc	0.10 max
Iron	0.5 max	Manganese	0.05 max
Silicon	0.5 max	Aluminum, by difference	99.3 min
Chromium	0.10 max		
Zinc	0.10 max		
Other Impurities, each	0.05 max		
Other Impurities, total	0.15 max		
Aluminum	remainder		

- 3.1 When the analysis is made on a sample milled from the material representative of the entire cross section, the percentage of the various elements as determined by analysis, except aluminum, shall be increased by 11% for thicknesses under 0.064 in. and 5% for thicknesses 0.064 in. and over, and these figures shall be taken as the composition of the base metal.
4. **CONDITION:** Solution heat treated and stretcher leveled.
5. **TECHNICAL REQUIREMENTS:**
 - 5.1 **Cladding Thickness:**
 - 5.1.1 **Prior to Rolling:** Aluminum plates which are bonded to the alloy ingot or slab preparatory to rolling to the specified thickness of the composite material shall each have a thickness of not less than 5% of the total composite thickness for material having a finished thickness less than 0.064 in. and not less than 2.5% for material having a finished thickness of 0.064 in. and over.
 - 5.1.2 **Finished Product:** After rolling, the average cladding thickness shall be not less than 80% of the values specified above.
 - 5.2 **Tensile Properties:** Test specimens shall conform to ASTM E8, except from material less than 3/4 in. wide, and shall be cut across the direction of rolling except from material less than 9 in. wide. Elongation requirements apply only to material 3/4 in. and over in width.

Section 7C 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 assurance that the use of any standard or recommended practice, and no commitment to conform to or be guided by any technical report, in formulating and supporting 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."

Nominal Thickness Inch	Tensile Strength psi, min	Yield Strength at 0.2% Offset or at Extension Indicated		Elongation % in 2 in., min
		Extension Under Load		
		psi, min	inch in 2 in.	
0.010 - 0.020, incl	59,000	39,000	0.0122	12
Over 0.020 - 0.063, incl	59,000	39,000	0.0122	15
Over 0.063 - 0.128, incl	62,000	40,000	0.0120	15
Over 0.128 - 0.249, incl	62,000	40,000	0.0120	13

5.2.1 Extension under load is based on $E = 9,500,000$ psi for material 0.063 in. and under in thickness and on $E = 10,000,000$ psi for material over 0.063 in. to 0.249 in. thick.

5.3 Bending: Material shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the bend factor shown below times the nominal thickness of the material, with axis of bend parallel to direction of rolling.

Nominal Thickness Inch	Bend Factor
0.010 - 0.040, incl	4
Over 0.040 - 0.128, incl	5
Over 0.128 - 0.249, incl	8

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2202 as applicable. Thickness tolerances shall conform to Table II.

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 chemical composition and tensile properties of the material conform to the requirements specified. This report shall include the purchase order number, material specification number, thickness, size, and quantity. When material is Government source inspected, reports will not be required.

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 shall be marked, in the respective location indicated below, with the manufacturer's identification, and, in addition, the alloy name or number and temper, or AMS 4041, and nominal