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

AMS 4071F

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ALUMINUM ALLOY TUBING, HYDRAULIC, SEAMLESS, DRAWN, ROUND
2.5Mg - 0.25Cr (5052-0)

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 aircraft hydraulic systems up to 1500 psi operating pressure.

3. COMPOSITION:

	min	max
Magnesium	2.2	2.8
Chromium	0.15	0.35
Iron + Silicon	--	0.45
Zinc	--	0.10
Ø Manganese	--	0.10
Copper	--	0.10
Other Impurities, each	--	0.05
Other Impurities, total	--	0.15
Aluminum	remainder	

4. CONDITION: Annealed, then drawn if required to meet dimensional tolerances.

4.1 Unless otherwise specified, tubing shall be supplied unground.

5. TECHNICAL REQUIREMENTS:

5.1 Tensile Properties: Unless otherwise specified, tubing shall conform to the following requirements:

Tensile Strength psi	Yield Strength at 0.2% Offset or at Extension Indicated (E = 10,100,000)	
	psi	Extension Under Load in. in 2 in.
26,000 min	10,000 min	0.0060
35,000 max	20,000 max	0.0080

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

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5.2 Flattening: Tubing having nominal wall thickness less than 10% of the nominal OD shall be capable of withstanding, without cracking, flattening sideways under a load applied gradually at room temperature until the outside dimension under load is equal to 3 times the nominal wall thickness.

5.2.1 If tubing does not pass the flattening test of 5.2, a section of the tube not less than 1/2 in. in length and embracing 1/3 to 1/2 the circumference of the tube shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the nominal wall thickness of the tubing with axis of bend parallel to axis of tube and with inside of tube on inside of bend.

5.3 Flarability: Tubing with nominal OD of 0.375 in. and under shall be capable of being double-flared and tubing with nominal OD over 0.375 in. shall be capable of being single-flared without formation of cracks or other visible defects. Specimens for flaring may be cut from any portion of the tube, or an entire tube may be used as a ø specimen. The end of the specimen to be flared shall be cut square, with the cut end smooth and free from burrs, but not rounded except for sizes 0.375 in. and under. The specimen shall, at room temperature, be forced axially with steady pressure over a hardened and polished tapered steel pin having a 74 deg included angle, to produce a flare having the permanent expanded OD specified in the following table:

Nominal OD Inches	Expanded OD Inches, min	Nominal OD Inches	Expanded OD Inches, min
0.125	0.200	0.750	0.937
0.188	0.302	1.000	1.187
0.250	0.359	1.250	1.500
0.312	0.421	1.500	1.721
0.375	0.484	1.750	2.106
0.500	0.656	2.000	2.356
0.625	0.781	2.500	2.856
		3.000	3.356

5.3.1 Tubing with intermediate nominal OD shall take the same percentage flare as that for the next larger OD.

5.3.2 Tubing with nominal OD greater than 3.000 in. or less than 0.125 in. shall have flarø ability as agreed upon by purchaser and vendor.

5.4 Hydraulic Strength: Each length of tubing shall be capable of withstanding an internal ø hydrostatic pressure (P), based on the following formula, without developing leaks and without an increase in mean diameter of more than 0.2%.

$$P = S \frac{D^2 - d^2}{D^2 + d^2}$$

Where, S = Minimum yield strength from 5.1.
D = Maximum OD (nominal OD plus tolerance) inches.
d = Maximum ID (computed as D minus twice the minimum permissible wall thickness) inch.

5.4.1 Mean diameter is the average of two diameters at right angles to each other in the same transverse plane; measurements before and after testing should be taken at substantially the same location.

6. QUALITY:

6.1 Tubing 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. A polished and etched cross-section of a tube shall show no evidence of cracks, seams, or folds when examined at a magnification of 100 diameters.

6.2 Cleanliness of Tubing: Tubing shall be free from grease or other foreign matter and shall have a good workmanlike finish. No metallic flakes or particles shall be collected by a clean white cloth when it is drawn through the length of the bore of a test sample. The presence of metallic flakes or particles on the cloth will be cause for rejection. Discoloration of the cloth, without the presence of flakes or grit, will not be cause for rejection.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to all applicable Ø requirements of the latest issue of AMS 2203.

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, 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, tubing shall be identified as follows:

9.1 Straight Tubes 0.250 In. and Over in OD: Shall be marked with the alloy number and temper, and AMS 4071 or "HYD", and manufacturer's identification. The characters Ø shall be of such size as to be clearly legible, shall be applied recurring at intervals not greater than 3 ft using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling.