# AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
29 West 39th Street
New York City

**AMS 4083 A**

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## ALUMINUM ALLOY TUBING
## 1.0Mg - 0.6Si - 0.25Cu - 0.25Cr (61S-T6)
## Hydraulic

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. COMPOSITION:

| | |
|---|---|
| Magnesium | 0.80 - 1.20 |
| Silicon | 0.40 - 0.80 |
| Copper | 0.15 - 0.40 |
| Chromium | 0.15 - 0.35 |
| Iron | 0.70 max |
| Zinc | 0.20 max |
| Manganese | 0.15 max |
| Titanium | 0.15 max |
| Other Impurities, each | 0.05 max |
| Other Impurities, total | 0.15 max |
| Aluminum | remainder |

3. CONDITION:

3.1 Solution and precipitation heat treated.

3.2 Unless otherwise specified, tubing shall be supplied unground.

4. TECHNICAL REQUIREMENTS:

4.1 Physical Properties:

| Nominal OD | Nominal Wall Thickness | Tensile Strength | Yield Strength at 0.2% offset or at extension indicated | | Elongation |
|---|---|---|---|---|---|
| | | | | Extension Under Load | |
| Inches | Inch | psi. min | psi. min | Inch in 2 in. | % in 2 in., min |
| 0.25 to 2, incl | 0.025 - 0.049 | 42,000 | 35,000 | 0.0110 | 8 |
| 0.25 to 2, incl | 0.050 - 0.500 | 42,000 | 35,000 | 0.0110 | 10 |

4.2 Flattening:

4.2.1 Tubing having wall thickness less than 10% of the outside diameter shall be capable of being flattened perpendicular to the longitudinal axis under a gradually applied load, without cracking, to an outside dimension eight times the wall thickness while under load.

4.2.2 Tubing having wall thickness 10% or more of the outside diameter shall be capable of being flattened perpendicular to the longitudinal axis under a gradually applied load, without cracking, to an outside dimension of 90% of the outside diameter while under load.

4.3 Hydraulic Strength: Each length of tubing shall be capable of withstanding an internal hydrostatic pressure (P), calculated according to the following formula, without developing leaks and without an increase in mean diameter of more than 0.2%:

$$P = \frac{1.9tS}{D-t}$$

where:

P=test pressure in pounds per square inch,
t=minimum wall thickness (nominal wall thickness minus maximum negative tolerance) in inches,
S=minimum yield strength from 4.1, and
D=nominal OD of tube in inches.

Note: 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.

5. QUALITY:

5.1 Tubing shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external defects 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.

5.2 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.

6. TOLERANCES: Unless otherwise specified, tolerances shall conform to the latest issue of AMS 2203 as applicable. Diameter and wall thickness tolerances shall be as specified below:

6.1 Diameter: Table I, Columns headed "Mean Diameter", and "Individual Diameter" for Heat Treatable Alloys.

6.2 Wall Thickness: Table II, Columns headed "Mean Wall Thickness" and "Individual Wall Thickness" for Heat Treatable Alloys.

7. REPORTS:

7.1 Unless otherwise specified, the vendor of tubing shall furnish with each shipment three copies of a notarized report stating that the physical properties and chemical composition of the tubing conform to the requirements specified. This report shall include the purchase order number, material specification number, size, and quantity.