

Specification for

# Tube of aluminium- magnesium-silicon- copper-chromium alloy —

(Solution treated and artificially aged:  
not tested hydraulically)  
(Not exceeding 10 mm thickness)  
(Mg 1.0, Si 0.6, Cu 0.28, Cr 0.2)

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 3 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been approved by the Aerospace Industry Standards Committee, was published under the authority of the Executive Board on 30 May 1975

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The following BSI references relate to the work on this standard:  
Committee reference ACE/24  
Draft for comment 73/35606 DC

### Amendments issued since publication

Amd. No.	Date of issue	Comments
3827	March 1982	Indicated by a sideline in the margin

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NOTE 1 Tube of similar composition, in the same heat treatment condition and tested hydraulically is covered by BS L 118.

NOTE 2 The chemical composition of this material complies with that registered as International Designation 6061.

## 1 Inspection and testing procedure

This British Standard shall be used in conjunction with sections 1 and 11 of the latest issue of BS L 100, except as specified in 6.2 and clause 7 below.

## 2 Quality of material

The material shall be made from aluminium and alloying constituents, with or without approved scrap at the discretion of the manufacturer.

## 3 Chemical composition

The chemical composition of the material shall be:

Element	%	
	min.	max.
<b>Silicon</b>	<b>0.40</b>	<b>0.8</b>
Iron	—	0.7
<b>Copper</b>	<b>0.15</b>	<b>0.40</b>
Manganese	—	0.15
<b>Magnesium</b>	<b>0.8</b>	<b>1.2</b>
<b>Chromium</b>	<b>0.04</b>	<b>0.35</b>
Zinc <sup>a</sup>	—	0.25
Titanium <sup>a</sup>	—	0.15
Others: each <sup>a</sup>	—	0.05
Others: total <sup>a</sup>	—	0.15
<b>Aluminium</b>	—	<b>Remainder</b>

<sup>a</sup> Subject to the discretion of the Inspecting Authority, determination of these elements need be made on a small proportion only of the samples analysed.

## 4 Condition

The material shall be supplied solution treated and artificially aged.

## 5 Heat treatment

The material shall be heat treated as follows:

- a) solution treat by heating uniformly at a temperature between 510 °C and 540 °C and quenching in water at a temperature not exceeding 40 °C;
- b) artificially age by heating uniformly at a temperature between 165 °C and 195 °C for 3 h to 12 h.

## 6 Mechanical properties

**6.1 Tensile test.** The mechanical properties obtained from test pieces selected and prepared in accordance with the relevant requirements of BS L 100 shall be not less than the following values:

Nominal thickness		0.2 % proof stress	Tensile strength	Elongation on gauge length of 50 mm	
				Full tube section	Strip test piece
mm		MPa (= N/mm <sup>2</sup> )	MPa (= N/mm <sup>2</sup> )	%	%
Over	Up to and including				
	1.0	240	290	10	8
1.0	5.0	240	290	12	10
5.0	10.0	240	290	14	12

NOTE Information on SI units is given in BS 3763 "The International System of units (SI)" and BS 350 "Conversion factors and tables".

**6.2 Flattening test.** If stated on the order, the specified number of tubes shall be subjected to the flattening test. The distance between the inner sides of the test piece after flattening shall not exceed the following values:

Thickness ( <i>T</i> )	Maximum distance
mm	mm
Up to and including 6.0	$6T$
Over 6.0	$4T$

## 7 Tolerances

**7.1 Thickness.** The thickness of the tube shall comply with the requirements of Table 1.

**7.2 Diameter.** The diameters of drawn round tube shall comply with the requirements of Table 2.

**Table 1 — Tolerances on thickness**

All dimensions in millimetres

Nominal thickness		Mean thickness <sup>a</sup> tolerance	Eccentricity <sup>b</sup>
Over	Up to and including	±	±
0.25	0.90	0.05	0.08 or 10 % of nominal thickness, whichever is the greater
0.90	1.25	0.08	
1.25	2.10	0.10	
2.10	3.05	0.13	
3.05	5.15	0.15	
5.15	7.60	0.20	
7.60	9.50	0.38	

<sup>a</sup> *Mean thickness*: the sum of the thicknesses measured at the ends of any two diameters at right angles, divided by four.

<sup>b</sup> *Eccentricity*: allowable deviation of the thickness, at any point, from the nominal thickness.

**Table 2 — Tolerances on outside or inside diameters of drawn round tube**

All dimensions in millimetres

Nominal outside or inside diameter		Deviation of mean diameter <sup>a</sup> from nominal	Ovality <sup>b</sup>
Over	Up to and including	±	±
	13.0	0.08	0.15
13.0	25.5	0.10	0.20
25.5	51.0	0.13	0.25
51.0	76.5	0.15	0.30
76.5	127.0	0.20	0.40
127.0	155	0.25	0.50

<sup>a</sup> *Mean diameter*: half the sum of any two diameters at right angles.  
<sup>b</sup> *Ovality*: allowable deviation of the diameter, at any point, from the nominal diameter.

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