

**BRITISH STANDARDS INSTITUTION**  
2 PARK STREET, LONDON W1A 2BSINCORPORATED BY ROYAL CHARTER  
Telephone: 01-629 9000  
Telex: 266933**BRITISH STANDARD: AEROSPACE SERIES**  
**SPECIFICATION FOR**  
**TUBE**  
**OF ALUMINIUM-COPPER-MAGNESIUM-**  
**SILICON-MANGANESE ALLOY**  
(Solution treated and precipitation treated)  
(Cu 4.4, Mg 0.5, Si 0.7, Mn 0.8)

**NOTE 1.** Attention is drawn to the necessity for special precautions, both during and after manufacture, to protect the tubes from intercrystalline corrosion to which they are particularly susceptible.

**NOTE 2.** Attention is drawn to the warning contained in Clause 6.1.

**NOTE 3.** Other forms of material of similar composition are covered by British Standards as listed in Appendix A.

**1. INSPECTION AND TESTING PROCEDURE**

This British Standard shall be used in conjunction with Sections 1 and 11 of British Standard L.100.

**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.
Copper	3.9	5.0
Magnesium	0.20	0.8
Silicon	0.50	0.90
Iron	-	0.5
Manganese	0.40	1.2
*Nickel	-	0.2
*Zinc	-	0.2
*Lead	-	0.05
*Tin	-	0.05
*Titanium plus Zirconium	-	0.2
*Chromium	-	0.10
Aluminium	-	The remainder

\*Subject to the discretion of the Inspecting Authority, determination of these elements need be made on a small proportion only of the samples analysed.

# 3L.63, August, 1971

(Superseding British Standard 2L.63)

## 4. CONDITION

Unless otherwise agreed in accordance with British Standard L.100, Section 11, the material shall be supplied solution treated, drawn and subsequently precipitation treated.

## 5. HEAT TREATMENT

The material shall be heat treated as follows:

(1) Solution treat by heating at a temperature of  $505 \pm 5^\circ\text{C}$  and quenching in water at a temperature not exceeding  $40^\circ\text{C}$ .

(2) Precipitation treat by heating uniformly for the requisite period at a temperature between  $160^\circ\text{C}$  and  $190^\circ\text{C}$ .

NOTE. The following temperatures and times at temperature have been found appropriate:

Temperature	Time at temperature
$^\circ\text{C}$	hours
165	12 to 18
175	9 to 12
185	3 to 6

## 6. MECHANICAL PROPERTIES

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

0.2% proof stress	Tensile strength	Elongation on gauge length of 50 mm
$\text{N/mm}^2$	$\text{N/mm}^2$	%
370	450	7

\*WARNING. Tube re-heat treated in accordance with Clause 5 without cold drawing after solution treatment may be expected to have the following minimum properties:

0.2% proof stress	325 $\text{N/mm}^2$
Tensile strength	415 $\text{N/mm}^2$

NOTE.  $1 \text{ N/mm}^2 = 1 \text{ MN/m}^2 = 0.102 \text{ kgf/mm}^2 = 0.1 \text{ hbar} = 0.065 \text{ tonf/in}^2$ . Information on SI units is given in BS 3763, 'The International System of units (SI)' and in PD 5686, 'The use of SI units'. See also BS 350, 'Conversion factors and tables'.

6.2 Hardness test. The value of X shall be as shown in the following table:

Tensile strength of test piece	Value of X
$\text{N/mm}^2$	%
450 to less than 465	5
465 to less than 480	7.5
480 to less than 495	10
495 and over	12.5

## APPENDIX A

BRITISH STANDARDS COVERING OTHER FORMS OF MATERIAL  
OF SIMILAR COMPOSITION

Form	Solution treated and aged at room temperature	Solution treated and precipitation treated	Supplied for solution treatment by the user
Bars and extruded sections (not exceeding 200 mm diameter or minor sectional dimension)	L.102	L.65	—
Forging stock and forgings	L.103	L.77	—
Hexagonal bars for nuts, couplings and hollow machined parts (free from peripheral and asymmetric coarse grain)	—	L.87	—
Sheet and strip	L.70	L.104	L.106*
Aluminium-coated sheet and strip	L.72	L.73	L.107*
Close toleranced sheet and strip (aluminium-coated)	L.89	L.90	L.108*
Tube (not exceeding 10 mm wall thickness)	L.105	—	—
Wire for solid, cold-forged rivets (not exceeding 10 mm diameter)	—	—	L.37
Plate: controlled stretched	—	L.93	—
Plate: not controlled stretched	—	L.94	—

\*In course of preparation.

This British Standard, having been approved by the Aerospace Industry Standards Committee, was published under the authority of the Executive Board of the Institution on 31 August, 1971.

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The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

*British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.*

The following BSI references relate to the work on this standard:  
Committee reference ACE/24      Draft for comment 69/23023