MINISTRY OF SUPPLY

D.T.D. 5074

(Superseding in part Specification D.T.D. 363A)

March, 1958

Aircraft Material Specification

ALUMINIUM - ZINC - MAGNESIUM - COPPER - CHROMIUM ALLOY BARS AND EXTRUDED SECTIONS

(Not exceeding 6 inches diameter or minor sectional dimension)

(Solution treated and precipitation treated)

NOTE 1.—This specification is one of a series issued by the Ministry of Supply, either to meet a limited requirement not covered by any existing British Standard for aircraft material or to serve as a basis for inspection of materials the properties and uses of which are not sufficiently developed to warrant submission to the British Standards Institution for standardisation.

NOTE 2.—This specification, in conjunction with specification D.T.D. 5064, now supersedes specification D.T.D. 363A.

A. Cast ingots, billets and slabs for hot working.

C. Bars for machining and extruded sections.

D. Bars and extruded sections for highly stressed structures.

1. Inspection and testing procedure

1. 1. This specification shall be used in conjunction with the relevant sections of British Standard L.100 as follows:—

A.	Cast ingots, billets and slabs for hot working	Sections One and Two.
C.	Bars for machining and extruded sections	Sections One and Five.
D.	Bars and extruded sections for highly stressed structures	Sections One and Six.

2. Quality of material

2. 1. The material shall be made from aluminium complying with the requirements of British Standards L.31 or L.48, and alloying constituents, with or without approved scrap, at the discretion of the manufacturer.

3. Chemical composition

3. 1. The chemical composition of the material shall be:

Copper	not less than 1·0 and not more than 2·2 per cent.
Magnesium	not less than 2·0 and not more than 3·0 per cent.
Silicon	not more than 0·5 per cent.
Iron	not more than 0·5 per cent.
Manganese	not more than 0.3 per cent.
*Nickel	not more than 0·1 per cent.
Zinc	not less than 5·0 and not more than 7·5 per cent.
*Lead	not more than 0·05 per cent.
*Tin	not more than 0·05 per cent.
Titanium..	not more than 0·3 per cent.
Chromium	not less than 0·08 and not more than 0·25 per cent.
Chromium plus Manganese	not less than 0·18 and not more than 0·50 per cent.
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.

4. Condition

4. 1. Cast ingots, billets and slabs for hot working shall be supplied in the non-heat-treated condition.

4. 2. Unless otherwise agreed between the purchaser and the manufacturer, and stated on the order, bars for machining and extruded sections shall be supplied in the condition as solution treated, stretched to a permanent extension of 1½ per cent minimum and subsequently precipitation treated.

5. Heat treatment

5.1. Bars for machining and extruded sections shall be heat treated as follows:—

Solution treat by heating at 460 ± 10°C. Quench in water or oil.

Note.—Material that has not to be subsequently stretched shall be quenched in water at a temperature of not less than 85°C, or in oil. Under these conditions the specified properties will not necessarily be obtained.

Precipitation treat by heating at a temperature of 135 ± 5°C for not less than 12 hours.

6. Mechanical properties

6. 1. The mechanical properties obtained from test pieces selected and prepared as stated in the appropriate clauses of British Standard L.100 shall be as follows:—

6. 2. *Tensile test.*

Test piece from test samples representing	0·1 *per cent proof stress* (tons/sq. in.)	*Ultimate tensile stress* (tons/sq. in.)	*Elongation* (per cent)
	not less than	not less than	not less than
Bars for machining and extruded sections* of diameter or minor sectional dimension:—			
Not greater than $\frac{3}{8}$ in.	30·0	35·0	5
Over $\frac{3}{8}$ in. and not greater than 6 in...	33·0	38·0	5

*Except where the properties are required by British Standard L.100 to be fixed by agreement between the manufacturer and the purchaser.

Note.—Where material is supplied that has not been stretched subsequent to solution treatment, the mechanical properties shall be agreed between the manufacturer and the purchaser.

6. 3. *Hardness test.*

TABLE SHOWING VALUE OF X

Ultimate tensile stress (tons/sq. in.) of test piece representing bars for machining and extruded sections		Value of X
Not over $\frac{3}{8}$ in.	Over $\frac{3}{8}$ in. up to 6 in.	
35 to under 36	38 to under 39	5
36 to under 37	39 to under 40	$7\frac{1}{2}$
37 to under 38	40 to under 41	10
38 and over	41 and over	$12\frac{1}{2}$

Approved for issue,

H. SUTTON,

Director of Materials Research and Development (Air).

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