

**Ministry of Defence
Defence Procurement Agency, ADRP2
Abbey Wood
Bristol
BS34 8JH**

OBSOLESCENCE NOTICE

All DTD specifications were declared obsolescent from 1st April 1999. All DTD 900 series approvals also lapsed at that time. The standards will no longer be updated but will be retained as obsolescent documents to provide for the servicing of existing equipment.

Further Guidance

The aim in declaring the specifications obsolescent is to recognise that the documents are not being updated and thus should be used with care by both purchaser and supplier. For example, a specification could contain valid technical information but may also contain type approval clauses that contradict procurement policy and/or use materials that do not comply with environmental legislation. The obsolescent specification can still be used as a basis for a purchase provided that the supplier and purchaser agree suitable changes to the specification within the purchase order/contract.

For the DTD 900 system, each specification has provided an MoD approved material and process. For these items, the declaration of obsolescence will constitute the termination of both the extant MoD approval and the continuing MoD assessment that had underpinned those approvals. Again, the technical content of the document remains valid and can be used by both purchaser and supplier as a basis for a contract but an acceptable (to the parties) approval/assessment procedure would be required.

Aerospace Material Specification

**DIE FORGINGS OF
ALUMINIUM-ZINC-MAGNESIUM-COPPER-ZIRCONIUM ALLOY**
(Solution treated water quenched and artificially aged to an overaged condition)
(Zn 6.2, Mg 2.4, Cu 1.7, Zr 0.13)
(7010-T736)

5 HEAT TREATMENT

Delete clause 1 and insert:

- (1) Solution treat by heating at a temperature of $475 \pm 5^\circ\text{C}$ and quenching in water at a temperature of $70 \pm 10^\circ\text{C}$. If agreed between the manufacturer and the purchaser, quenching may be carried out in polyalkylene glycol solutions as long as all other requirements of this specification are met.

6 MECHANICAL PROPERTIES

6.1 Tensile test

Add the following:

When agreed between the manufacturer and purchaser, separate test pieces prepared in accordance with procedure A of British Standard L100 may be employed. The separate test pieces shall meet the longitudinal mechanical property requirements for ruling thickness up to and including 75 mm.

6.2 Hardness test

Delete 145 (H_B10)

Insert 148 (H_B10)

7 RESISTANCE TO STRESS CORROSION CRACKING

7.1 Delete existing text and insert:

Material in the fully heat treated condition shall be capable of conforming with the requirements of the test specified in Appendix A. Tests shall be completed at the frequency stated in the inspection and test schedule. The stress corrosion test shall override the electrical conductivity test in 7.2.

7.2 Delete 23 MS/m (39.7% IACS)

Insert 22.3 MS/m (38.4% IACS)

Appendix A

In the first sentence delete 'conducted'

insert 'demonstrated'

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NOTE: This specification is one of a series issued by the Procurement Executive, Ministry of Defence to meet a requirement not covered by an existing British Standard for aerospace material.

1. INSPECTION AND TESTING PROCEDURE

This specification shall be used in conjunction with the relevant sections of the latest issue of British Standard L100 as follows:

Cast billets and slabs for hot working	- Sections 1 and 2.
Extruded bars and sections for forging	- Sections 1 and 3.
Forgings	- Sections 1 and 7.

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	Per cent	
	min	max
Silicon	-	0.12
Iron	-	0.15
Copper	1.5	2.0
Manganese	-	0.1
Magnesium	2.1	2.6
*Chromium	-	0.05
*Nickel	-	0.05
Zinc	5.7	6.7
Zirconium	0.10	0.16
Titanium	-	0.06
Others:		
Each	-	0.05
Total	-	0.15
Aluminium	The remainder	

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

4. CONDITION

4.1 Forging stock. Ingots, billets, slabs or extruded stock shall be supplied non-heat treated.

4.2 Forgings. Unless otherwise agreed between the manufacturer and the purchaser and stated on the order, the material shall be supplied solution treated and artificially aged in accordance with Section 5.

5. HEAT TREATMENT

The forgings shall be heat treated as follows:

- (1) solution treat by heating at a temperature of $475 \pm 5^\circ\text{C}$ and quenching in water at a temperature of $70 \pm 10^\circ\text{C}$.
- (2) artificially age by heating at a temperature of $110 \pm 5^\circ\text{C}$ for 8 hours, followed with or without cooling, by further heating at a temperature of $175 \pm 3^\circ\text{C}$ for 10 to 16 hours, followed by air cooling.

6. MECHANICAL PROPERTIES

6.1 Tensile test. Unless fixed by agreement between the manufacturer and the purchaser as allowed in British Standard L100, the mechanical properties obtained from test pieces selected and prepared in accordance with procedure C or D in British Standard L100 shall be not less than the values specified in 6.1 and 6.2

Ruling thickness at heat treatment	Direction	0.2% proof stress MPa		Tensile strength	Elongation on gauge length of 5D
		min	max		
mm				MPa	%
Up to and including 75	Longitudinal	430	500	500	7
	Long transverse*	420	490	480	4
Over 75 up to and including 100	Longitudinal	425	495	490	7
	Long transverse*	400	470	465	3

*If required by drawing or order.

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 Hardness test. The Brinell hardness number of the forgings and forged test pieces, heat treated in accordance with 5, shall be not less than 145 ($H_B 10$).

7. RESISTANCE TO STRESS CORROSION CRACKING

7.1 Material in the fully heat treated condition shall be capable of conforming with the requirements of the test specified in Appendix A. This shall be demonstrated by testing at the frequency stated in the inspection and test schedule.

7.2 The electrical conductivity of each piece of material in each batch shall be determined by a method approved by the Quality Assurance Authority. The material shall be acceptable only if the average conductivity is not less than 23 MS/m (39.7% IACS).

8. ADDITIONAL AGEING TREATMENT OR RE-HEAT TREATMENT

Material found to be unacceptable when tested according to Sections 6 and 7, may be treated in accordance with one of the following procedures.

- (a) Additional artificial ageing at, $175 \pm 3^\circ\text{C}$
- (b) A repeat of the heat treatment specified in Section 5.

If the requirements of Sections 6 and 7 are satisfied when the tests are fully repeated, then the material shall be considered acceptable.

Appendix A

**TEST FOR DETERMINATION OF RESISTANCE
TO STRESS CORROSION CRACKING**

A1. Resistance to stress corrosion cracking shall be conducted in accordance with the test method specified in ASTM G47/79. Specimens shall be stressed at 240 MPa in the short transverse direction for 20 days without evidence of cracking.

A2. Standard stress corrosion test specimens shall be used as described in ASTM G47/79. Where section thickness permits specimens shall be tensile bar type of diameter 3.175 ± 0.025 mm and gauge length 12.7 mm. Where section thickness is insufficient to allow use of the tensile bar specimen, then specimens of the C-ring type with a nominal diameter of not less than 20 mm shall be used.

Approved for issue,

Dr D K THOMAS

Head of Materials Department
Royal Aircraft Establishment
Farnborough.

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