602

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EMERGENCY STANDARD
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STANDARDS ASSOCIATION OF AUSTRALIA.

Headquarters :

Science House, Gloucester and Essex Streets, Sydney.

AUSTRALIAN STANDARD SPECIFICATION FOR AIRCRAFT MATERIAL

(Emergency Series)

ALUMINIUM-SILICON ALLOY SAND OR DIE CASTINGS
(HEAT TREATED)

This standard forms one of a series prepared by the Standards Association of Australia at the request of Departments of the Commonwealth Government for use in relation to the supply of materials required for defence purposes. In appropriate cases these specifications will be reviewed for inclusion in the normal series of Australian Standards.

This specification covers one grade of aluminium-silicon alloy sand or die castings for use where conditions are such that the regular alloy (A.S. No. (E)D.601) cannot be properly poured, due to relatively large thin sections.

1. **Quality of Material.**

(*a*) The aluminium used for making this alloy shall be in accordance with the latest issue of British Standard Specification No. L.31.

(*b*) No scrap shall be used other than that derived from the maker's own manufacture under this or other approved specification for aircraft material.

(*c*) The maker shall supply to the inspector when required (i) the relevant analysis of the aluminium used for making the alloy, and (ii) details of the origin of the scrap used.

2. **Chemical Composition.**

(*a*) The chemical composition of the castings shall conform to the following requirements :

Silicon	6·0 to 8·0%
Magnesium	not more than 0·75%
Iron	,, ,, ,, 0·50%
Copper	,, ,, ,, 0·20%
Other Impurities	,, ,, ,, 0·40%
Aluminium	the remainder.

3. **Chemical Test.** The maker shall supply a complete analysis of the castings.

4. **Heat Treatment.** The castings shall be heat treated to produce material that will conform to the requirements specified and be delivered in this condition.

5. **Margins of Manufacture.**

(*a*) The castings shall be capable of being machined where required to the finished dimensions shown on the drawings, without leaving evidence of the cast surface.

(*b*) The thickness of castings where not machined shall be not less than the nominal thickness shown on the drawings and shall not exceed it by more than 10%.

6. **Freedom from Defects.**

(*a*) The castings shall be of uniform quality and condition, free from blow-holes, porosity, hard spots, shrinkage defects, cracks or other injurious defects. They shall be cleaned by sand blasting, tumbling, chipping or other approved process.

(*b*) Any casting may be rejected for faults in manufacture, defects or incorrectness of dimensions, whether discovered during inspection or subsequently during machining, notwithstanding that the casting had been passed and accepted as conforming to the chemical composition and mechanical tests of this specification.

7. **Provision and Preparation of Test Samples.**

(*a*) At least one test sample shall be cast to represent each cast or charge which does not exceed 100 lb. weight. In the case of casts in excess of 100 lb., test samples shall be cast at the rate of one for each 100 lb. or part thereof.

(*b*) Each test sample shall be stamped in such a way as will ensure full identification with the particular cast. They shall be heat treated with the castings they represent.

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(*c*) The test samples shall be cast in dry sand moulds of the dimensions shown in Fig. 1. The mould shall be rammed in one piece ; it shall be inclined at 30 degrees from the vertical during pouring and shall be poured from the top. The temperature of the mould immediately prior to casting shall be between 10° C. and 40° C.

(*d*) Test pieces shown in Fig. 2 shall be machined from the test samples as required by Clause 7 (*a*).

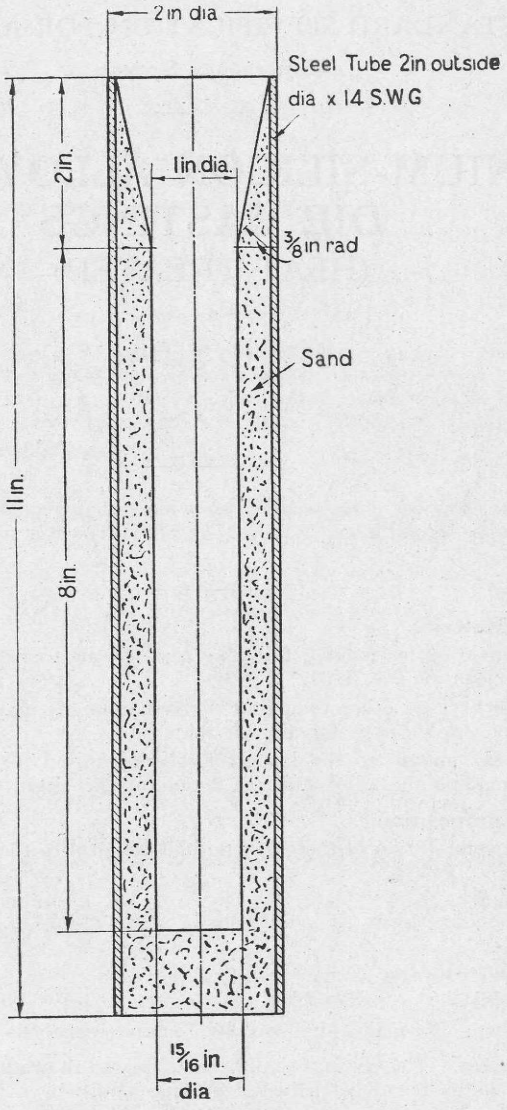

Fig. 1. Mould for Test Samples.

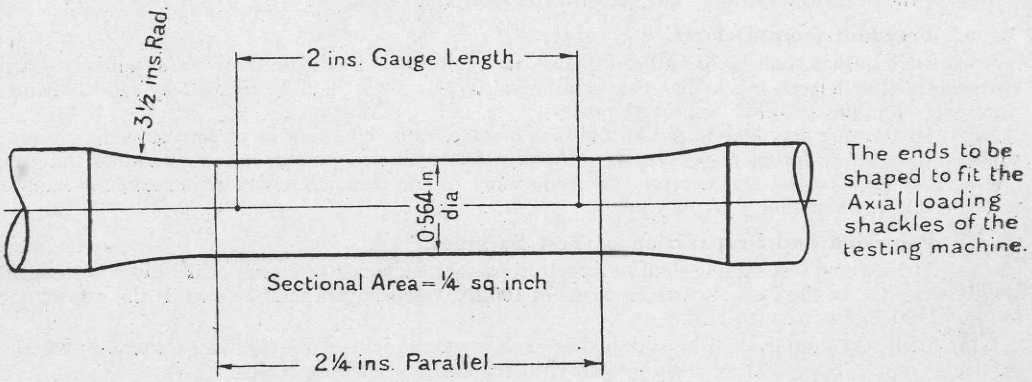

Fig. 2. Tensile Test Piece.

8. **Tensile Test.** The test pieces prepared as specified in Clause 7 shall comply with the following test, which shall be carried out to the satisfaction of the inspector.

The testing appliances shall be such that the load when applied shall be axial.

Should a tensile test piece break outside the middle half of its gauge length, the test may be discarded and another test made.

The test pieces shall give the following results:

Proof stress (0·2% set)	- - -	not less than	9·0 tons/sq.in.
Tensile strength - - - - -	,, ,, ,,		13·5 ,, ,,
Elongation (on 2 in.) - - - -	,, ,, ,,		3%

9. **Re-Tests.**

(*a*) If any test specimen shows defective machining or reveals casting defects, it may be discarded and replaced by another specimen selected from the same cast. If additional test samples are not available, the replacement specimen may be taken from the body of a casting from the same cast.

(*b*) If any test specimen fails to meet the test specified in Clause 8, the maker may select for test two further samples from the same cast or prepared from the body of a casting from that cast. Test pieces prepared from these samples shall both conform to the requirements of Clause 8.

10. **Rejection of Castings.**

(*a*) Any or all of a batch of castings may be rejected for failure to meet the requirements of Clauses 5, 6 or 11.

(*b*) The whole of a batch of castings shall be rejected if the relevant test samples fail to meet the requirements of Clauses 8 and 9.

11. **Identification.**

(*a*) All castings shall be marked in such a manner as shall ensure full identification of the material with its particular cast or batch.

(*b*) Small castings manufactured from the same cast of material may be made into parcels which shall bear a tag carrying the information required by Clause 11 (*a*).

(*c*) All castings over ½ lb. in weight each shall be stamped in such a way as will ensure full identification of the material. All stamping shall be done where it is least liable to be detrimental to the strength of the casting.

(*d*) Where specified on the drawings, the part number of the castings shall be cast as shown in raised numerals or lettering.

APPENDIX.

Heat Treatment. The castings may be heat treated by soaking at 550° C. followed by quenching in cold water.

For the purposes of this specification as an Australian Standard the term "Inspector" shall be interpreted in the manner directed by the Australian Airworthiness Authority concerned.

This Specification, prepared by the Special Committee on Aircraft Materials and Components, was approved on behalf of the Council of the Association on 1st August, 1940.

NOTE.

In order to keep abreast of progress in the industries concerned, Australian Standards are subject to periodical review. Suggestions for improvement, addressed to the Headquarters of the Association, will be welcomed.

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