NOVEMBER, 1941

EMERGENCY STANDARD
No. (E)D. 831—1941
Being British Standards Institution
Specification for Aircraft Material
B.S. No. 3V.2*
endorsed with amendments

STANDARDS ASSOCIATION OF AUSTRALIA.

Headquarters :

Science House, Gloucester and Essex Streets, Sydney.

AUSTRALIAN STANDARD SPECIFICATION FOR AIRCRAFT MATERIAL

(Emergency Series)

CASEIN CEMENT

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.

1. **Description.** The material shall be in the form of powder, the adhesive constituent of which shall be mainly casein. When prepared with water in accordance with the manufacturer's instructions it shall yield a homogeneous pasty fluid, free from grit, and of satisfactory consistency. The mixture shall be of such a nature that it may be easily applied without injury to woodwork or to any constructional material with which it may come in contact either during or after application.

2. **Strength.** The mean strength of cemented joints prepared and tested by the methods described in Appendix I shall be not less than :

(*a*) 1,200 lb. per sq. in. for the Normal Test.

(*b*) 1,100 lb. per sq. in. for the Water Immersion Test.

3. **Keeping Qualities.** The cement should not show signs of decomposition after storage for 12 months in air-tight containers, in a cool place, and should retain all the properties specified in Clauses 1 and 2.

4. **Containers.** The cement shall be delivered in approved air-tight containers.

5. **Instructions for Use.** The manufacturer shall affix to each container detailed instructions for the preparation and use of the cement.

APPENDIX I.

Method for the Determination of Strength.

(*a*) *Test Pieces.* Each test piece shall be made from two slips of carefully selected, straight grained, dry alpine ash (*Eucalyptus gigantea*) or mountain ash (*Eucalyptus regnans*) having from 5 to 10 rings per inch, an air-dry density after reconditioning not less than 39 nor more than 45 lb. per cu. ft. and an Izod value not less than 8 ft. lb. The size of each slip shall be $4\frac{1}{2}$ in. $\times \frac{3}{8}$ in. $\times 1$ in. The $4\frac{1}{2}$ in. length shall be approximately parallel to the longitudinal direction of the grain but shall preferably make a small angle (about 3°) with the grain. The two parts of the test piece shall be assembled so that the grain tends to run through the joint from one piece of wood to the other as shown in Fig. 1. The overlapped surfaces shall be toothed by hand with a fine toothing plane having 20 to 25 teeth per inch. All cutting tools shall be sharp, to avoid any burnishing of the wood.

(*b*) *Preparation of Cement.* The cement shall be prepared by mixing with water in accordance with the instructions supplied by the manufacturer.

(*c*) *Preparation of the Test Joints.* At the time of application of the cement the wood shall be at ordinary air temperature but not below 10° C. (50° F.). The cement shall be applied with the finger, avoiding air bubbles, to one surface of each of two test slips. After a lapse of 5 minutes or such other time as may be specified by the manufacturer, the surfaces shall be placed together without rubbing so as to produce a one inch overlap joint (see Fig. 1).

(*d*) *Number of Test Pieces.* Six test pieces in all shall be prepared as described above.

(*e*) *Conditioning of Test Pieces.* Each test piece, immediately after application of the cement, shall be clamped in a suitable press under a pressure of about 200 lb. per sq. in. for 16 hours, care being taken to prevent any slipping of the wood. A suitable clamping device is shown in Fig. 2.

* This Australian standard is British Standard Specification No. 3 V.2 with amendment regarding the timber for test pieces, and with consequential amendments to the test strengths. For reference to the specification in its amended form it is essential that the Australian classification number (E) D.831 be used.

Price 1/–, *post free* 1/2.

After removal of the clamps the following procedure shall be adopted:

(i) *Normal Test.* Three test pieces shall be allowed to remain at ordinary room temperature (preferably between 55° and 75° F.) and humidity (preferably between 50 and 75% R.H.) for 72 hours.

(ii) *Water Immersion Test.* Three test pieces shall be allowed to remain at ordinary room temperature for 72 hours. They shall then be immersed in water at 15·5° C. (60° F.) for three hours. After removal from the water they shall be allowed to dry for half an hour under ordinary room conditions. (Temperature between 55° and 75° F.; humidity between 50 and 75% R.H.).

(*f*) *Application of the Load.* The test pieces shall be pulled in an approved testing machine. The grips shall be so arranged that load is applied in the plane of the (unstrained) joint. The joint shall be centrally placed between the grips which shall be 4 in. apart.

Load shall be applied uniformly at a rate of about 3,000 lb. per min. Care shall be taken that the test pieces do not slip in the grips under load.

Should the fracture of the test piece show extensive wood fracture at either end of the lap the test may at the discretion of the inspector be discarded.

Both sets of test pieces shall be broken on the same day in order that the results obtained may be comparable. The total load required to break a joint divided by the actual cemented area of the test piece in square inches shall be regarded as the strength of the joint.

NOTE.

Effect of Variation of Dimensions of Test Piece. Where the dimensions of the test piece vary from those specified in Appendix I (*a*) the following effects on the apparent mean shear stress are introduced:

Overlap. Decrease of 1% in overlap gives *increase* of 1% in apparent mean shear stress.

Thickness. Decrease of 1% in thickness gives *decrease* of 0·5% in apparent mean shear stress.

Width. Change of width produces *no change* in apparent mean shear stress.

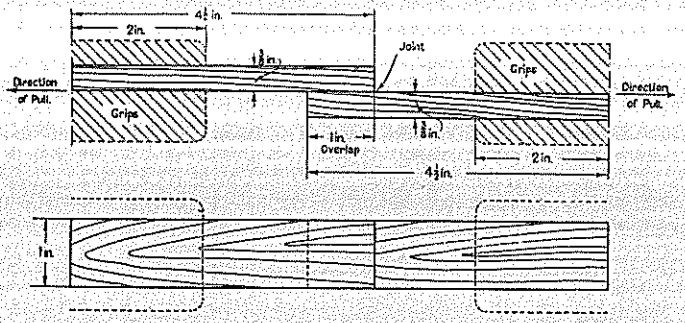

Fig. 1. Test Piece.

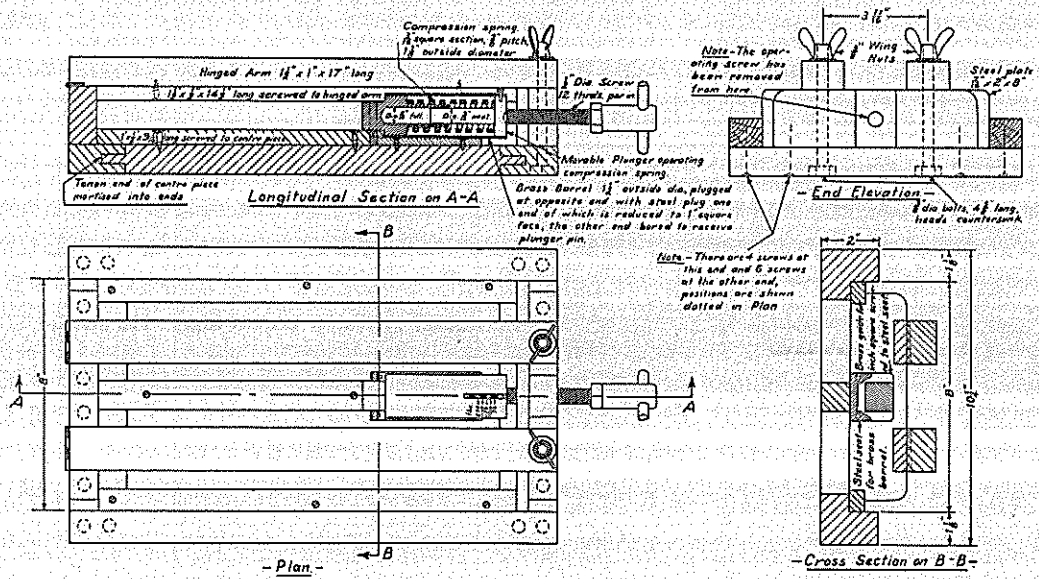

Fig. 2. A Suitable Clamping Device.

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 7th November, 1941.

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.

AUSTRALASIAN MEDICAL PUBLISHING COMPANY LIMITED