

Specification for Aircraft Material

High strength plywood for aircraft

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 25 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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NOTE This Specification details requirements for two grades of plywood, *e.g.*,

i) Grade A, for 3-ply only. This grade is intended to be used only where it is necessary for design reasons, and for bent parts.

ii) Grade B for 3-ply other than that covered by Grade A, and also for multiply.

Grade B will be supplied unless otherwise specified.

Part 1: Species of Timber and Quality of Veneer

1 Species of Timber

The species of timber used in the construction of the plywood shall be:—

Birch [European, Sweet, Yellow or Paper (Eastern and Western)], and Rock Maple for both grades of plywood.

European Beech for Grade B plywood only. This timber must only be supplied with the concurrence of the designing firm.

2 Quality of Veneer

- a) The veneers, which may be rotary or slice cut, shall be approved individually by the Inspector before assembly.

b) The growth and other characteristics of the veneers shall be in accordance with the following table:—

Characteristics ^a	Grade A Birch or Maple only	Grade B	
		Birch or Maple	Beech
i) Splits	Admit of width not exceeding 0.01 inch	As Grade A	As Grade A
ii) Dote	Admit not exceeding the extent shewn by Figure 1. ^b	1) <i>Cores.</i> As Grade A 2) <i>Faces.</i> Admit not exceeding the extent shewn by Figure 2 or approximate equivalent Dote areas in face veneers shall only be permitted to coincide when the extent of the dote in one face is not greater than that shewn in Figure 1, and the extent in the other face does not exceed that shewn in Figure 2 Dote exceeding the extent shewn in Figure 1 and irregular grain [see vii) below] shall not be permitted in the same place in any one veneer	1) <i>Cores.</i> Exclude 2) <i>Faces.</i> As Grade A
iii) Streak discolouration	Admit	Admit	Admit
iv) Ingrown bark (See Figure 10)	Exclude	Admit	1) <i>Cores.</i> Exclude 2) <i>Faces.</i> Admit up to an aggregate width of 1 in. in any 12 in.
v) Burr (See Figure 11)	Admit not exceeding the extent shewn by Figure 11.	Admit not exceeding the extent shewn by Figure 11.	Exclude
vi) Bird pecks (See Figure 12)	Admit	Admit	Admit
vii) Irregular Grain			
a) Short Grain	Admit short grain around knots and to the extent shewn in Figure 3 which indicates mild short grain due to crook in the log	1) <i>Cores.</i> As Grade A 2) <i>Faces.</i> Admit short grain around knots and to the extent shewn in Figure 5 which indicates appreciable short grain due to crook in the log	As Grade A
b) Wavy Grain (See Figure 18)	Admit	Admit	Admit
c) Wild Grain	Admit to the extent shewn in Figure 4 which indicates only slight disturbance of the grain, with, in particular, the fibres only slightly inclined to the surface	1) <i>Cores.</i> As Grade A 2) <i>Faces.</i> Admit to the extent shewn in Figure 6–Figure 8 which indicate appreciable grain disturbance, with the bands of wild grain slightly rough but considerably less severe than the shelling off state shewn in Figure 9 Irregular grain and dote exceeding the extent shewn in Figure 1 shall not be permitted to occur at opposite points in the face veneers	Exclude

Characteristics ^a	Grade A Birch or Maple only	Grade B	
		Birch or Maple	Beech
viii) Rough cutting	Exclude	Admit to the degree shewn in Figure 13.	Exclude
ix) Knots ^c	Admit live knots up to $\frac{1}{4}$ in. diameter or approximately equivalent area, the minimum distance between the centres of any two in any one veneer ^d to be not less than 6 inches. Exclude dead knots or knot holes.	1) <i>Cores</i>. Admit live or dead knots of width not exceeding $\frac{1}{4}$ in. or length in the direction of the grain not exceeding $\frac{1}{2}$ in. Holes may be present in the knots 2) <i>Faces</i>. Admit as above $\frac{3}{8}$ in. and $\frac{3}{4}$ in. respectively The minimum distance between the centres of any two knots described above, either of which is of width greater than $\frac{1}{8}$ in. and up to and including $\frac{1}{4}$ in., in any one veneer^d, shall be not less than 6 inches If width exceeds $\frac{1}{4}$ in. the distance shall be not less than 10 inches Clusters of small live or dead knots, of width not exceeding $\frac{1}{8}$ in. or length not exceeding $\frac{1}{4}$ in. may be present in all veneers. No cluster shall be more than 1 in. in width, or more than 2 in. in length in the direction of the grain. The minimum distance between the centres of the clusters in any one veneer^d shall be 6 inches. Holes may be present in the knots	1) <i>Cores</i>. Exclude 2) <i>Faces</i>. As Grade B, Birch or Maple
x) Birds Eye	Exclude	1) <i>Cores</i>. Exclude 2) <i>Faces</i>. Admit to the extent shewn in Figure 17	As Grade B, Birch or Maple
xi) Holes other than knot holes	Exclude	Any such hole shall be regarded as a knot of equivalent area and its size and position relative to other holes or knots shall be as specified in ix) above	As Grade B, Birch or Maple
xii) Filling or inlaying	Exclude	Exclude	Exclude
^a For description of these characteristics <i>see</i> Appendix A. ^b The illustrations which are intended to show the number of defects per unit area and also the degree of severity of the particular defects illustrated, are of yellow birch, but are also representative of rock maple. They indicate the extent but not the precise nature of the defects in beech. ^c The influence of a knot on strength depends on the extent and degree of the accompanying grain disturbance rather than on the diameter of the actual knot, but the difficulty of defining and measuring short grain leaves no option but to base the specification on knot diameter (<i>see</i> Figure 15 and Figure 16) even at the risk of introducing anomalies. Anomalies may also arise in the case of knots less than $\frac{1}{8}$ in. diameter, but this also is unavoidable in view of the necessity of limiting the number of categories. ^d The term "one veneer" means a veneer, jointed or unjointed, as assembled into a board.			

Part 2: Construction of Boards

3 Assembly of Veneers

The following precautions shall be observed in assembling the veneers:—

- a) Unless otherwise specified in the contract, the grain of the outer veneers of 3-ply shall run parallel to the length of the board, and that of the core shall run at right angles thereto.
- b) Unless otherwise specified in the contract, the grain of adjacent veneers of multiply shall cross at right angles throughout the thickness of the board.
- c) Beech veneers shall not be mixed with veneers of birch or rock maple. (Birch and rock maple veneers may be mixed).

4 Edge Joins in Veneers

- a) Veneers may contain edge joins, *i.e.*, joins running parallel to the grain direction. The number of such joins shall be at the option of the manufacturer.
- b) The joins shall be completed in the individual veneers before assembly of the veneers into boards.
- c) All jointed veneers shall be approved individually by the Inspector before assembly.
- d) All joins shall be square cut.
- e) All joins in core veneers shall be edge glued.
- f) All joins in face veneers shall be either edge glued or taped with paper. The tape shall be on that face of the veneer which will be an outer face of a board, and the tape shall be removed from the board before delivery.

5 Thickness

- a) Unless otherwise specified on the order, the thicknesses of the boards shall be as shewn in Appendix B.
- b) The two outer veneers in the finished board shall be of the same nominal thickness.
- c) The nominal thickness of the core of 3-ply shall be not less than one-third and not greater than five-twelfths of the nominal thickness of the board.
- d) The thickness of any veneer in multiply shall not exceed twice the thickness of any other veneer in the same board.
- e) Each veneer shall be of uniform thickness.
- f) No veneer shall exceed 0.110 in. in thickness.

6 Type of Glue

The glues used in the manufacture of the plywood shall be of the hot press, thermosetting, synthetic resin type.

7 Scarf joins in Boards

Scarf joins through the thickness of the board shall be permitted only with the concurrence of the designing firm.