

Hardwood Plywood and Veneer Association

HPVA Grading For Hardwood Plywood:

Characteristics vary according to species, but there is a basic grading structure which is followed for all species

described in the current Voluntary Standard. The most uniform color and grain is at the top of the scale for face grade.

Grade	Sub Grade	Applications & Descriptions
Face Grade	AA	The best quality face grade for high end uses such as architectural paneling, doors and cabinets, case goods, and quality furniture.
	A	Where AA is not required but excellent appearance is very important as in cabinets and furniture.
	B	Where the natural characteristics and appearance of the species are desirable.
	C,D, and E	Provide sound surfaces but allow unlimited color variation; grades C, D, and E, respectively, allow repairs in increasing size ranges. Applications: where surface will be hidden or a more natural appearance is desired.
	Specialty	Appearance characteristics are not standardized and are subject to agreement between the individual buyer and seller, as in factory finished wall paneling. Usually, effects such as those created by wormy chestnut, bird's eye maple, and English brown oak are considered specialty grade.
Back Grade	1,2,3,and 4	Back grades are designed by numbers: 1,2,3, and 4. Requirements of grade 1 are most restrictive, with grade 2, 3, and 4 being progressively less restrictive. Grade 1 and 2 provide sound surfaces with all openings in the veneer repaired except for vertical worm holes not larger than 1.6mm(1/16)". Grades 3 and 4 permit some open defects; however, grade 3 can be obtained with repaired splits, joints, bark pockets, laps, and knotholes to achieve a sound surface if specified by the buyer. Grade 4 permits knotholes up to 102mm (4" ,in diameter and open splits and joints limited by width and length.
Veneer Inner Ply Grade	J , K , L, and M	Four inner ply grades are described with the following letter designations: J,K L, and M. Grade J is the most restrictive, allowing minimal size openings. Grades K, L, and M are progressively less restrictive. The least restrictive grade (M) is usually reserved for piles not adjacent to faces and allows round and similar shaped openings not to exceed 63.5mm (2 1/2" and elongated openings up to 25.4mm(1" as visible on the edges or ends of panels.

British Standards Institution

1. Defects Of Plywood

Table 1. Defects inherent in wood	
Category	Type
1 Pin knots	
2 Sound intergrown knots with a diameter greater than 3 mm	
3 Partially intergrown knots, unsound knots and non-adhering knots; also holes due to bores and parasitic plants	1 Partially adhering or intergrown knots 2 Non-adhering knots 3 Knots holes 4 Dog holes
4 Irregularities in the structure of the wood	1 Angle grain 2 Curly grain including burls 3 Interlocked grain 4 Spiral grain 5 Short grain
5 Splits Checks	1 Open 2 Closed
6 Bark pockets, resin pockets and resin streaks	1 Open 2 Closed
7 Defects due to borers, vines and parasitic plants	1 Small worm holes(pinworm holes) 2 Large worm holes and worm channels 3 Marine Borer holes 4 Marks of vines or parasitic plants 5 Chicken track
8 Sound discoloration	1 Blue stain

	<p>2 Colored sap stains</p> <p>3 False heartwood</p> <p>4 Other discoloration such as chemical stain and color streaks</p> <p>5 Mould</p>
9 Rot	
NOTE. Defects and characteristics inherent in wood are defined in BS 6566: Part 2.	

Table 2. Manufacturing defects	
Category	Type
10 Open joints	
11 Overlaps and pleats on the surface	
12 Blisters	
13 Hollows Imprints Bumps	
14 Roughness	
15 Sanding through	
16 Glue penetration	
17 Inclusion of metal partial (see note 2)	
18 Repairs	<p>1 Patches</p> <p>2 Shims</p> <p>3 Synthetic filling</p>
19 Defects at the edges of the panel	<p>1 Sanding defects</p> <p>2 Sawing defects</p>
20 Other defects	

NOTE. 1. Manufacturing defects are defined in BS 6566: Part 2.

NOTE. 2. It should be noted that 'ferrous' metal particles are prohibited in all grades in plywood.

2 Requirements for tolerances on dimensions of plywood

2.1 Compliance

When tested in accordance with appendix A, the plywood shall comply with 2.2 to 2.6.

2.2 Thickness

The deviation between the mean thickness and the nominal thickness and the maximum difference in thickness measurements within the panel shall be within the tolerance.

2.3 Edge straightness

The deviation in edge straightness shall not exceed +/- 1mm per meter length of the panel being assessed.

2.4 Squareness

The out of squareness of the edge of the panel shall not exceed +/-1.5mm per meter of the edge of the panel being assessed. It shall be permissible to determine this by measurement of diagonals, but these differ by more than 0.25%, where there is doubt about the validity of the diagonal measuring method, e.g. when the shorter edges of the panel incline to or away from the center by a similar amount, and in case of dispute, the try-square method shall be employed.

2.5 Length and width

The tolerances on the nominal length and width of a panel shall be within +0, -4mm for the modular range (see appendix B) and within +/-4mm for other sizes.

NOTE. Panels for some special end user may have tolerance different from those specified in this clause.

2.6 Flatness

This standard does not specify a requirement for flatness.

NOTE. The amount of distortion that can be tolerated will depend not only on the thickness of the panel, the construction and the species but also on the requirements of the end user.

Table 1. Thickness tolerances for veneer plywood within outer plies of coniferous species

Maximum deviations permitted between the mean thickness of a panel and	Maximum permitted difference between
--	--------------------------------------

its nominal thickness.				thickness measurements of an individual sample panel	
Sanded		Unsanded		Sanded	Unsanded
Nominal thickness	Deviation	Nominal thickness	Deviation		
mm	mm	mm	mm	mm	mm
Up to and including 18	+/-0.5	Up to and including 20.5	+1.0 -0.5		
Over 18	+/-3% of t*	Above 20.5	+/-8% of t* -.05	0.8	1.5
*t is the nominal thickness (in mm).					
NOTE. Tolerances for touch sanded plywood are not covered by this table.					

Table 2. Thickness tolerances for veneer plywood with outer plies of broadleaved species and for core plywood					
Maximum deviations permitted between the mean thickness of a panel and its nominal thickness.			Maximum permitted difference between thickness measurements of an individual sample panel		
Nominal thickness	Sanded	Unsanded	Nominal thickness	Sanded	Unsanded
mm	mm	mm	mm	mm	mm
Up to and including 4	+0.2 -0.4	+0.8	Up to and including 12	0.4	0.8
Over 4	+0.2 -(0.4+3% of t)*	-(0.3+3% of t)*	Over 12	0.6	1.0
*t is the nominal thickness (in mm).					

3. Grade Of Plywood

(b) Grades B, BB and C*				
No.	Categories of defectst	Grade		
		B (face)	BB	C* (back)
1	Pin Knots	Permitted if tight and not clustered	permitted	permitted
2	Sound intergrown knots exceeding 3 mm in diameter	Four permitted per 3 square metres of the surface of the outer ply, to a maximum individual diameter of 13mm (not closed)	Five permitted per 3 square metres of the surface of the outer ply, to a maximum individual diameter of 25mm	permitted

3	Partially intergrown knots, unsound knots and nonadhering knots; also holes due to borers and parasitic plants	Not permitted	Permitted to a maximum individual diameter of 9mm, provided their cumulative diameter does not exceed 40mm per square metre and they are properly filled	permitted
4	Irregularities in the structure of the wood: sound burls (curely grain)	permitted if smooth	permitted	permitted
5	Splits			
	(a) Open splits (puttied)	Two permitted at each end of a panel, to a maximum individual width of 3mm and a maximum individual length of 6% of the panel length	Two permitted at each end of a panel, to a maximum individual width of 5mm and a maximum individual length of 12.5% of the panel length	Eight permitted at each end of a panel, to a maximum individual width of 15mm and a maximum individual length of 40% of the panel length
	(b) Close splits (hairline)	Three permitted per panel at the ends and to a maximum individual length of 100mm	permitted	permitted
	(c) Compression failure (cross break)	One permitted per outer ply provided hairline and of a length not exceeding 10% of the panel width	One permitted per outer ply provided hairline and of a length not exceeding 10% of the panel width	
6	Bark pockets	Not permitted	Permitted if very slight	permitted
	Resin pockets	Not permitted	One permitted per square metre of the outer ply, to a maximum individual width of 4mm and to a maximum individual length of 100mm	permitted
	Resin exudation	Not permitted	permitted if slight	permitted
7	Defects due to borers, vines and parasitic plants			
	(a) Worm holes and channels	Not permitted	Pinworm holes permitted provided they are occasional, scattered and well puttied. No discoloration permitted. Worm channels not permitted.	permitted
	(b) Marks of parasite			

	plants and vines	Two permitted per outer ply, to a maximum individual width of 4mm and maximum individual length of 100mm, provided they are smoothly sanded and leveled	permitted if occasional and smoothly sanded and leveled	permitted
	(c) Chicken track	Permitted if isolated and slight	permitted	permitted
8	Sound discoloration (natural), stain/mineral streak	Permitted if very slight	Permitted if not excessive	permitted
9	Rot	Not permitted	Not permitted	Not permitted
10	Open joints	Not permitted	Three permitted per outer ply, to a maximum individual width of 3mm and to a maximum individual length of 10% of the panel length, if properly filled	Permitted to a maximum individual width of 15mm and to a maximum individual length of 60% of the panel length
	Mechanical defects, e.g. chainmarks, machinery stain, sander burns, metal stain, grease, oil or colored chalk on face	Not permitted	Permitted if slight and occasional	permitted
14	Roughness, brashness or torn grain	Permitted if very slight and occasional	Permitted if slight	Permitted if not excessive
17	Inclusion of metal particles	Permitted if non-ferrous and in inner plies or cores only	Permitted if non-ferrous and in inner plies or cores only	Permitted if non-ferrous and in inner plies or cores only
	Sanding	Smooth	Reasonably smooth	No special requirements
18	Repairs, boat or symmetrical patch	Not permitted	Five permitted per outer ply, to a maximum individual width of 100mm and to a maximum individual length of 150mm, provided they are well made, are of similar grain and are color matched	Permitted
	Shims	Not permitted	Permitted to a maximum individual width of 5mm and to a maximum individual length of 300mm, provided they are well made, are of similar grain and	Permitted

			are color matched	
	Tape or glue residue, putty mark	Not permitted	Permitted if slight and smoothly sanded	Permitted
	Knifemark	Not permitted	Permitted to a width of 0.8mm if slight	Permitted
20	Other defects which are not indicated	Not permitted unless they resemble a defect already defined in which case they shall be considered under that category	Not permitted unless they resemble a defect already defined in which case they shall be considered under that category	Not permitted unless they resemble a defect already defined in which case they shall be considered under that category
*It is intended that classification by appearance of tropical hardwood plywood covered by this table will, in a reasonable time, comply with the grading requirements for grades □ □ and □ given to the grade descriptions in table 6(a).				
Numbers cross reference, where possible, to those in table 5,6(a) and 7.				
Sometimes designated CC quality.				

JPIC

PLYWOOD FOR GENERAL USES

Standard of inspection, method of inspection, grades, standards of grades and methods of determining grades.

A.. Grading:

Item	Quality	a	b	c	d
Knot (pin knot is excluded), bark pocket or pitch pocket	Total number of knot, bark pocket and pitch pocket (Bark pocket and pitch pocket having 1/8 in. or less of maximum diameter are excluded)	Total number shall not exceed a quotient resulted from dividing the surface area in sq.ft. by 5 sq.ft For China, the total number shall not exceed two multiples of above quotient. (If the quotient has any fraction, the quotient shall read as its integer plus ''	Total number shall not exceed two multiples of a quotient resulted from dividing the surface area in sq.ft. For China, the total number shall not exceed three multiples of above quotient. (If the quotient has any fraction, the quotient shall read as its integer plus ''	Not limited	Not limited
	Sound knot	1/2 in. or less of maximum diameter	3/4 in. or less of maximum diameter	2 in. or less of maximum diameter	Not limited
	Dead Knot	1/8 in. or less of maximum diameter	1/4 in. or less of maximum diameter	1/2 in. or less of maximum diameter	1 1/2 in. or less of maximum diameter
	Knot Hole	1/8 in. or less of maximum diameter and it shall be mended skillfully	1/4 in. or less of maximum diameter and it shall be mended skillfully	1/2 in. or less of maximum diameter and it shall be mended skillfully	1 1/2 in. or less of maximum diameter
	Bark Pocket or pitch pocket	1/4 in. or less of maximum diameter. Or 1/16 in. or less of width and 3/4 in. or less of length.	1/2 in. or less of maximum diameter. Or 1/8 in. or less of width and 3/4 in. or less of length.	3 in. or less of maximum diameter	Not limited
	Bark Pocket	1/4 in. or less of	1/2 in. or less of	3 in. or less of	Not limited

	or pitch pocket	maximum diameter. Or 1/16 in. or less of width and 3/4 in. or less of length.	maximum diameter. Or 1/8 in. or less of width and 3/4 in. or less of length.	maximum diameter	
Pin Knot		It shall not impair visibly appearance.	It shall not impair visibly appearance so remarkably	Not Limited	Not Limited
Discoloration		Very Slightly	Slight	Not conspicuous	Not conspicuous
Split		It shall be filled skillfully. 1/32 in. or less of width; and length shall not exceed 5 percent of the piece length	It shall be filled skillfully. 1/16 in. or less of width; and length shall not exceed 10 percent of the piece length	It shall be filled. 1/8 in. or less of width; and length shall not exceed 15 percent of the piece length	1/4 in. or less of width and length shall not exceed 20 percent of the piece length. But the filled one shall not exceed 1/2 in. of width and length of 25 percent of the piece length.
Cross break		None	None	Length shall not exceed 10 percent of the piece width	Length shall not exceed 20 percent of the piece width
Worm hole		1/16 in. or less of maximum diameter. Those shall be mended skillfully and shall not be clustered	1/8 in. or less of maximum diameter. Those shall be mended skillfully and shall not be clustered	1/4 in. or less of maximum diameter. Those shall be mended	3/4 in. or less of maximum diameter. Not limited for the mended ones
False Heartwood (Applicable only to Beech)		Colors shall be well matched	Colors shall be matched	Not Limited	Not Limited
Sound Burl		Very Slight	Slight	Not Conspicuous	Not Limited
Rough cut , Torn grain, Brashness		3 percent or less of the surface area, Very slight	Do	5 percent or less of the surface area, slight	10 percent or less of the surface area, Not conspicuous
Shim		Length shall not exceed 10 percent of the piece length, Colors and grains	Colors and grains shall be matched. Gap is not acceptable	Colors shall be matched. Gap is not acceptable	Not Limited

	shall be matched. Gap is not acceptable			
Joint	Colors and grains shall be matched in conformity to the condition of joint. Gap is not acceptable. Joint running slatendicular shall not be conspicuous	Colors and grains shall be matched in conformity to the condition of joint. Gap shall not exceed 1/64 in. of width and length of 10 percent of the piece length. It shall be mended skillfully. Joint running slatendicular shall be scarcely conspicuous	Colors and grains shall be almost matched in conformity to the condition of joint. Gap shall not exceed 1/32 in. of width. It shall be mended. Joint running slatendicular shall be scarcely conspicuous.	Gap shall not exceed 1/8 in. of width
Blister	None	None	None	None
Wrinkle	None	None	None	Slight
Flaw and depression	None	None	Very slight	Not conspicuous
Hole (worm hole is excluded)	1/16 in. or less of maximum diameter. It shall be mended skillfully	1/8 in. or less of maximum diameter. It shall be mended skillfully	1/4 in. or less of maximum diameter. It shall be mended	1 1/2 in. or less of maximum diameter.
Finishing	Good Finish	Do	Almost good finish	Do
Insufficient removal of tape	None	Do	Do	Slight
Perforation and other process (Applicable only to the processed plywood)	Good Finish	Do	Do	Not Rough
Finishing of transparent coating which does not obscure the grain or texture.(Applicable only to plywood finished by transparent coating)	Good Finish	Do	Do	
Other defects	Very slight	Slight	Do	Not limited

SFS

GRADES OF FINNISH BIRCH FACE VENEERS IN ACCORDANCE WITH SFS 2413

· B (I)

Pin knots permitted. Other knots and holes permitted up to 6 mm diameter, limited to a cumulative diameter of 12 mm per m². Closed splits and checks permitted up to an individual length of 100 mm and one per metre of panel width. Slight discoloration and streaks permitted. Other defects strictly limited.

· S (II)

Pin knots permitted. Sound intergrown knots permitted up to an individual diameter of 20 mm, limited to a cumulative diameter of 50 mm per m². Other knots and repaired holes permitted up to 10 mm diameter, limited to a cumulative diameter of 25 mm per m². Repaired splits and checks up to 2 mm width, length 200 mm limited to one per metre of panel width. Closed splits and checks permitted up to 200 mm length and two per metre of panel width. Discoloration and coloured streaks permitted. One wooden patch/m² permitted.

· BB (III)

Pin knots permitted. Sound knots permitted up to 25 mm diameter, limited to a cumulative diameter of 60 mm per m². Other knots and holes permitted up to 6 mm diameter, limited to a cumulative diameter of 25 mm per m². Open splits and checks, repaired, permitted up to 2 mm wide and 200 mm long not exceeding 1 per metre of panel width. Discoloration, roughness and sanding through permitted if all slight. Wooden patches permitted up to 3 % of area. Glue penetration limited to 5 % of panel surface.

· WG (IV)

Pin knots and sound knots permitted up to 65 mm diameter, limited to a cumulative diameter of 600 mm per m². Other knots and holes up to 15 mm diameter limited to a cumulative diameter of 100 mm per m². Open splits and checks up to 4 mm wide and 2 per metre width of panel. Discoloration, streaks, roughness, slight sanding through, glue penetration and patches are permitted.

CE

CE marking

CE marking is essentially a 'passport' that allows goods to pass freely throughout Europe without manufacturers having to carry out further testing or certification in order to prove that their products meet the legal requirements in each member state.

In order to affix the CE marking to a product, the manufacturer has to perform certain tasks, defined in the 'harmonised' Euro standard (HEN) or European Technical Approval (ETA).

Some of the tasks must be performed by a Notified Body (NB). NBs are either certification bodies (such as TRADA Technology's sister company BM TRADA Certification) or testing laboratories (such as TRADA Technology's sister company Chiltern International Fire). BM TRADA and Chiltern Fire are both fully Notified Bodies.

Only a few HENs and ETAs have been completed so far, which is why so few construction products on the market currently carry CE marking. As more and more HENs and ETAs start to appear, CE marking will become more commonplace.

Panel products - testing, appraisal and certification

Panel products are used in a multitude of applications, often performing more than one function at a time. It is vital therefore that the panel specified is suitable for the particular end-use. For panels used in structural applications, the characteristic design and performance data must be available.

CE marking has been possible since April 2003 and has been a requirement in most of Europe since April 2004. For details of our CE marking services.

TRADA Technology provides testing in accordance with EN test methods listed in the harmonised standard EN 13986.

Other methods which meet DIN and ASTM requirements are also possible.

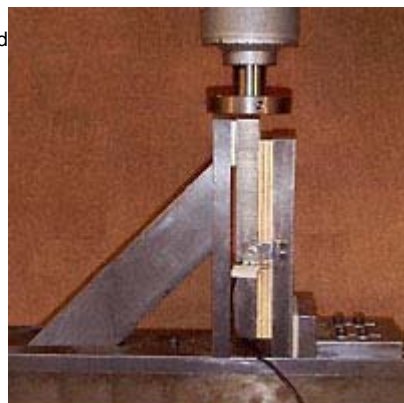
Key properties involved in evaluating compliance with the product standard

include:

- bond quality (plywood)
- bending
- internal bond
- moisture resistance and thickness swelling

For Initial Type Testing (ITT) purposes for specific end-uses, the following

test methods can be carried out:



- EN 789 & EN 1058 'bending, tension, compression and shear
- walls, floors, roofs, impact and point load
- reaction to fire
- water vapour permeability
- mechanical durability

We can conduct experimental trials to evaluate the external performance of panels and coating systems and residual performance after various exposure lengths.

We are directly involved with standards development, both at BSI and CEN level. We have been actively involved in the development of new test methods, which places us in a strong position to assist manufacturers to develop new products.

BM TRADA Certification (TRADA Technology's sister company) runs Q-Mark product certification schemes for panel products and is a Notified Body for CE Marking purposes.