

Introduction

CEB [^]ç ã operating 3 plywood mills and 2 veneer mills located in the highlands of Southern Brazil.

CEB [^]ç softwood plywood production capacity exceeds 350,000m³ per year, placing it amongst the 10 largest plywood producers in the world with export markets covering Europe, North and Central America, the Middle East and Asia.

AI !A9L is the trade name for the companies line of softwood, which is manufactured from plantation Slash Pine (pinus elliottii) and Loblolly Pine (pinus taeda) logs between 18 and 30 years old, being most of the raw material coming from **FSC** certified plantations.

The use of special production techniques such as grading for veneer density and strict control over the limitation of defects allowed in the outer layers of the panels, enables the structural grades of **AI !A9L** to meet the most demanding requirements for load-bearing applications.

By combining strict control over the grading of veneers and the use of specially skilled labour to repair the plies using both solid wood and synthetic patches, enables the higher grades of **AI !A9L** to be marketed with a range of surface veneers that will provide a solid face for concrete shuttering right up to a defect free face suitable for a clear finish.

No matter what surface grade of plywood you order, all are manufactured using phenolic resins to provide a 100% waterproof glue line suitable for permanent exposure to the elements and for use in steamy atmospheres such as kitchens and bathrooms.

In the following pages more detailed information is given on the panel types, grades, thicknesses and glue bond etc. which will assist the reader in selecting the correct **AI !A9L** plywood. So, no matter what the end use application, whether it be purely decorative or load bearing, there is a **AI !A9L** pine plywood panel to match your requirements.

Product Line Overview

Grade name	Surface appearance		Typical applications	Certified
	Face	Back		
Structural grades				
FORM	Phenolic surface film (PSF) overlaid panels on both sides.		Concrete formwork	PS-1 CE 2+ BS 5268-2
MDO	Medium density overlay covered panels in one or 2 sides			
B-B O&ES	Improved faces and backs with wood patches, mill oiled and edge sealed.			
A-C	Sanded clear face with wood patches	Sanded, knots and knotholes up to 40mm	Panneling, furniture	BS 5268-2 BFU 100
B-C	Sanded face with wood patches			
Cp-C	Sanded, knots and repairs up to 40mm		Floor decking	
Flooring	Touch sanded, knots up to 60mm, repairs up to 40mm	Knots and knotholes up to 75mm	Roof decking, floor decking, wall sheathing, shelving, crating, packing	PS-1 CE 2+ BS 5268-2
Sheathing	Unfinished, knots and knotholes up to 75mm			
Frameply	Unfinished, very high density veneers, composed core			
Non structural grades				
C+/C+ O&ES	Touch sanded, two sides repaired, mill oiled and edge sealed		Light weight concrete formwork	TECO Tested Gluelines CE 4
C+/C	Touch sanded, repaired	Unfinished	Shelving, site hoarding, pallets, crates, temporary protections, packing and other applications where structural performance is not a key factor	

FORM

Structural CE 2+ BFU 100 BS 5268-2 PS 1-07

Solid phenolic bonded structural plywood overlaid with phenolic surface films (PSF) to provide long lasting shuttering boards for concrete forming with minimal deflections.

Panels can be delivered with several combinations of overlay weights to provide a number of options in terms of number of pours (reuses) and finished concrete appearance.



Product code	Overlay type		Maximum No. of pours	
	Face	Back	Architectural finish	Regular concrete
FORM 120	120 g/m2 brown PSF	120 g/m2 brown PSF	4	20
FORM 180	167 g/m2 brown PSF	167 g/m2 brown PSF	6	30
FORM 220	220 g/m2 brown PSF	220 g/m2 brown PSF	8	40
FORM 500	220g/m2 brown PSF + 290g/m2 MDO	120 g/m2 brown PSF	20	100

MDO

Structural CE 2+ BFU 100 BS 5268-2 PS 1-07

Panels overlaid with a medium density overlay (MDO) to provide a smooth surface, ideal to be used as concrete form shuttering boards. These panels will last twice longer than regular mill oiled panels and also give a much smoother concrete surface.

Face Exemple



Back Exemple



Defects	Face	Back
Wood patches	Permitted	Permitted
Sound knots	Unnoticeable	Up to 40mm
Unsound knots	Unnoticeable	Up to 40mm
Splits	Unnoticeable	Up to 15mm

B-B O&ES

Structural CE 2+ BFU 100 BS 5268-2 PS 1-07

With wood patches and any one knot limited to a maximum diameter of 6mm, both sides repaired and mill oiled, this edge seales product is perfect for concrete forming, providing superior performance and very limited deflections in the most demanding applications.

Face Exemple



Back Exemple



Defects	Face	Back
Wood patches	Up to 20 of 40mm	Up to 20 of 40mm
Sound knots	Up to 6mm	Up to 6mm
Unsound knots	Up to 6mm, repaired	Up to 6mm, repaired
Splits	Up to 3 of 5mm, repaired	Up to 3 of 5mm, repaired

A-C

Structural CE 2+ BFU 100 BS 5268-2 PS 1-07

A structural panel with a majority solid wood face. All repairs wider than 3mm are made using all wood patches. This panel is a perfect option for several uses where strength and a solid substrate for painting or veneering is required.

Face Exemple



Back Exemple



Defects	Face	Back
Wood patches	Up to 15 of 40mm	Not usually
Sound knots	Not permitted	Up to 40mm
Unsound knots	Not permitted	Up to 40mm
Splits	Up to 3 of 2mm, repaired	Up to 3 of 15mm

B-C

Structural CE 2+ BFU 100 BS 5268-2 PS 1-07

With knots wood patches and small repaired knots limited to a maximum diameter of 6mm on the face, this panel provides an excellent surface to be painted for all structural, industrial or paneling applications.

Face Exemple



Back Exemple



Defects	Face	Back
Wood patches	Up to 20 of 40mm	Not usually
Sound knots	Up to 6mm	Up to 40mm
Unsound knots	Up to 6mm, repaired	Up to 40mm
Splits	Up to 3 of 5mm, repaired	Up to 3 of 15mm

CP-C

Structural CE 2+ BFU 100 BS 5268-2 PS 1-07

Combined subfloor and underlayment panel, designed specifically for single-layer floor construction, with a solid surface to be used beneath carpet and pad or when other finish floor products are used. Also excellent for industrial applications.

Face Exemple



Back Exemple



Defects	Face	Back
Wood patches	Not usually	Not usually
Sound knots	Up to 40mm	Up to 40mm
Unsound knots	Up to 40mm, repaired	Up to 40mm
Splits	Up to 3 of 10mm, repaired	Up to 3 of 15mm

FLOORING

Structural CE 2+ BS 5268-2 PS 1-07

Developed specially for floor decking and industrial applications where thickness accuracy is critical, these panels may also be used as concrete shuttering panels, roof decking, and wall sheathing. A very versatile product at a very competitive price.

Face Exemple



Back Exemple



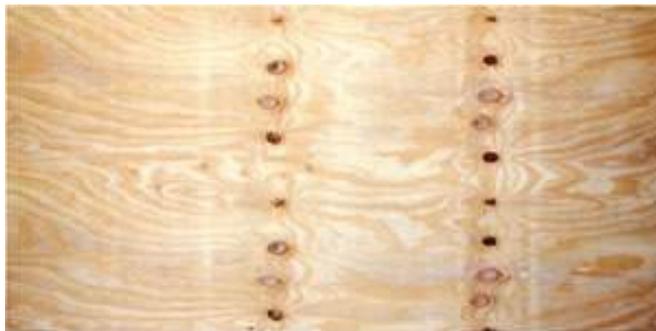
Defects	Face	Back
Sound knots	Up to 60mm	Up to 75mm
Unsound knots	Up to 40mm, repaired	Up to 75mm
Splits	Up to 3 of 15mm, repaired	Up to 3 of 15mm

SHEATING

Structural CE 2+ BS 5268-2 PS 1-07

Delivering a very high structural performance, these panels are not repaired and may have composed faces and backs. They offer a perfect solution for applications such as roof sheathing, sidewalls, subflooring, crating, packing, pallet components, etc.

Face Exemple



Back Exemple



Defects	Face	Back
Sound knots	Up to 60mm	Up to 75mm
Unsound knots	Up to 40mm	Up to 75mm
Splits	Up to 3 of 25mm, repaired	Up to 3 of 25mm

FRAMEPLY

Structural CE 2+ BS 5268-2 PS 1-07

Created to offer the highest structural performance, these panels are not repaired and often have composed faces, backs and high grade inner plies made of the higher density veneers available to provide the best solution for upholstered furniture frame components.

Face Exemple



Back Exemple



Defects	Face	Back
Sound knots	Up to 60mm	Up to 75mm
Unsound knots	Up to 40mm	Up to 75mm
Splits	Up to 3 of 25mm, repaired	Up to 3 of 25mm

C+/C+ O&ES

CE 4 TECO Tested Glue Lines

Non structural panel made with face and back veneers of lower density and strength values. A water proof glue line and an edge protective sealing together with both sides repaired and touch sanded and coated in both sides with diesel or vegetable oil (mill oiled). Make of these panels an economic option for concrete forming.

Face Exemple



Back Exemple



Defects	Face	Back
Sound knots	Up to 75mm	Up to 75mm
Unsound knots	Up to 75mm, repaired	Up to 75mm, repaired
Splits	Up to 3 of 25mm, repaired	Up to 3 of 25mm, repaired

C+/C

CE 4 TECO Tested Glue Lines

Non structural panel made with face and back veneers of lower density and strength values. A water proof glue line together with one side repaired and touch sanded make these panels ideal for non structural uses where a solid surface is required .

Face Exemple



Back Exemple



Defects	Face	Back
Sound knots	Up to 75mm	Up to 75mm
Unsound knots	Up to 75mm, repaired	Up to 75mm, repaired
Splits	Up to 3 of 25mm, repaired	Up to 3 of 25mm, repaired

Tongue and grooved (T&G) panels

Upon request, **AI !A9L** panels of 15mm, 18mm and 21mm of all available grades may be delivered with T&G (tongue and grooved) machined profiles on the long edges.

T&G panels are especially recommended for floor and roof decking applications to obtain an increased point load resistance on panel joints. They may also be a good option for wall paneling, offering very well matched joints.

T&G profiling is a sizing operation so panels have a net face width of 1.205mm +0 / -3mm.

A specially designed gap is left on the back of the T&G joints so that panels can expand slightly when in contact with water, avoiding undesired buckling problems.

Tongue and grooved (T&G) panels

Below are examples of T&G profiles



**European
Profile**



**American
Profile**

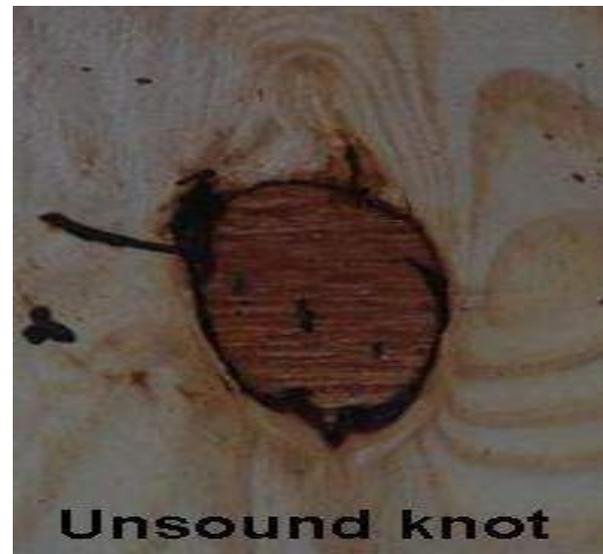
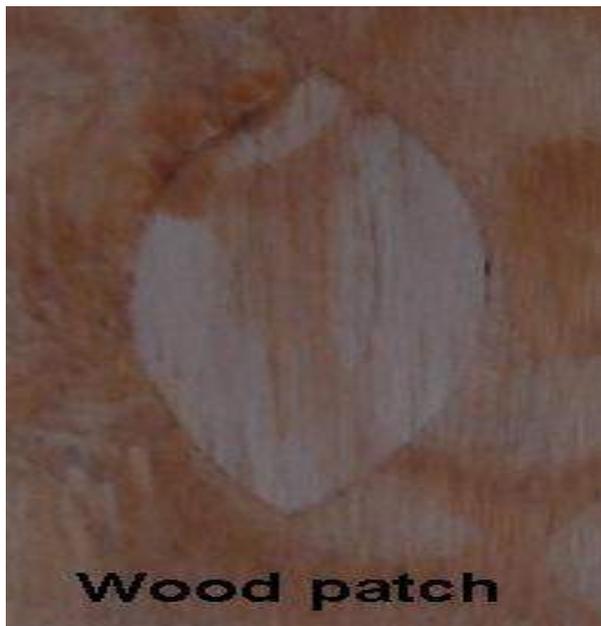
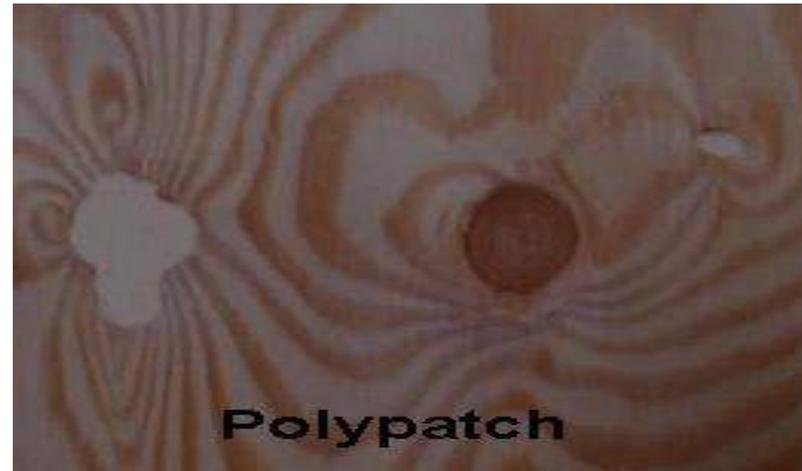
Defects and repairs

The quality of the veneers is governed by the natural growth characteristics of the logs from which the veneers are peeled. As a consequence, knots, knot holes, splits and discolouration are just a few of the natural defects that occur.

The grade of the face and back veneers of **AI !A9L** panels are selected so that the occurrence of these natural defects are within acceptable limits for the panels intended end use. In addition to the appropriate selection of veneer grade, repairs such as wood patches and polyurethane fillers are used to improve the surface quality of the veneer for applications where a solid wood surface is desirable.

Defects and repairs

Below are some examples of natural defects and repairs.



Core gaps and Workmanship

Good workmanship in laying up the inner plies is essential in ensuring that the structural plywood maximises its full strength potential across the whole panel by minimising the number of undesirable core gaps.

AI !A9L of grades **A-C**, **B-C**, **Cp-C** and **Frameply** are made with full sheets of veneers (natural or composed). This greatly reduces the occurrence of laps and core gaps. Those that do appear are limited to a maximum of 10mm in width. See an example below.



Core gaps and Workmanship

AI !A9L grades **B-B O&ES, Flooring and Sheathing** also offer structurally sound inner plies with laps and gaps limited to a maximum width of 15mm. See a typical example below.



Core gaps and Workmanship

AI !A9L non structural grades **C+/C+ O&ES, C+/C** which are not intended for structural use may have bigger and more frequent layup defects. See a worst case scenario example below.



Structural performance

To ensure **AI !A9L** will consistently deliver the highest mechanical properties, its veneers are subjected to stringent visual and electronic grading enabling only the best veneer sheets to be selected for use as face and back plies as per the criteria shown below.

Veneer density is a key factor affecting plywood strength. Lower density veneers are used for core material in **structural** grades of **AI !A9L**, while the higher density veneers are used for faces and backs. Examples of this are shown below...



A high density veneer good for LVL and also excellent for structural plywood faces and backs



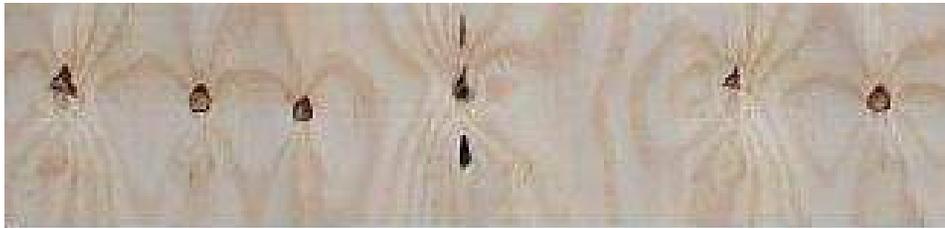
A medium density Veneer good for Structural plywood faces and backs



A low density veneer good for structural plywood core only

Structural performance

Aggregating the width of defects within a veneer section is another key factor that influences the strength of a plywood panel. Veneers with critical sections are used for inner plies only in structural grades of AWB ØY. See below.....



Desirable situation with very few defects across the veneer section



Nearly critical section with almost 1/4 of the veneer width covered by defects



Critical section with more than 1/3 of the veneer surface covered by defects

More details on the structural performance of AWB ØY can be obtained directly from the several Technical Files, Data Sheets, Declarations of Conformity of each producing mill and Certificates from the Third Parties certifying the products.

Structural performance

The use of phenolic resins provides a 100% waterproof glue line suitable for direct contact with cold or hot water and steam. Constant quality control monitoring ensures that appropriate test procedures are carried out to verify the acceptability of the glue bond for such extreme conditions.

AI !A9L plywoods meet or exceed the bonding requirements of all the following standards: EN 314 Bonding Class 3, DIN 68705-3 AW 100, BS 1088 Marine Plywood, NF-Extérieur CTB-X, PS1-07, KOMO and others.

Knife test

Besides the standard laboratory tests required under EN 314, each press load of ~~EN 314~~ is also subjected to a "knife test" where 3 holes of circa 40 x 150mm are made in the back of the panel most susceptible to bonding problems (usually the panel which has been assembled for the longest time for each press load).

Only if this intensive tests indicate that the panels meet the required minimum level of wood fibre retention, is that particular press load passed as being acceptable for release.

Examples of knife tests can be seen below....

A good knife test example...
A desirable situation, normally found.



A marginally acceptable knife test example...
Not seen very often on AWĚ ÒÝ.



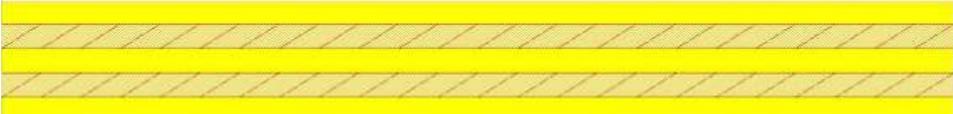
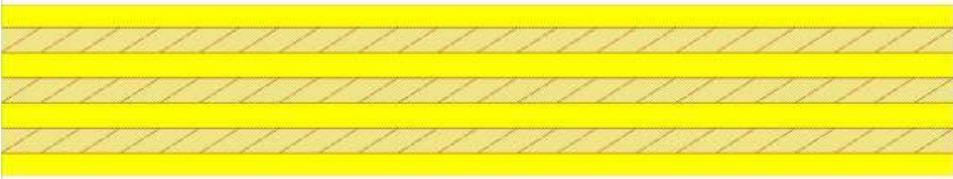
An unacceptable knife test example,
with a large area with no fiber retention.



Panels like this are always downgraded.

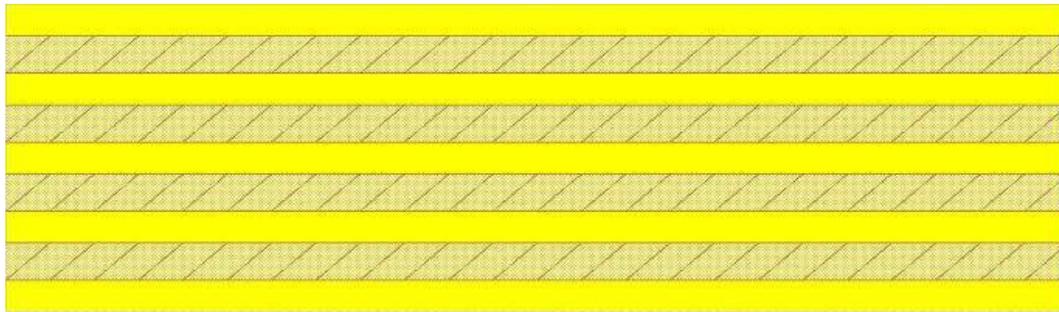
Panel layups

A combination of 2,7mm long layers with 2,7mm, 3,1mm, 3,7mm and 3,9mm crossbands is used to produce several thickness arrangements, as shown below:

	2,7 3,9 2,7	9mm 3 ply 3/8", 11/32"
	2,7 3,7 3,7 2,7	12mm 4 ply 15/32"
	2,7 2,7 2,7 2,7 2,7	12,5mm 5 ply 1/2"
	2,7 3,9 2,7 3,9 2,7	15mm 5 ply 19/32"
	2,7 2,7 2,7 2,7 2,7 2,7 2,7	18mm 7 ply 23/32"
	2,7 3,9 2,7 3,9 2,7 3,9 2,7	21mm 7 ply 7/8"

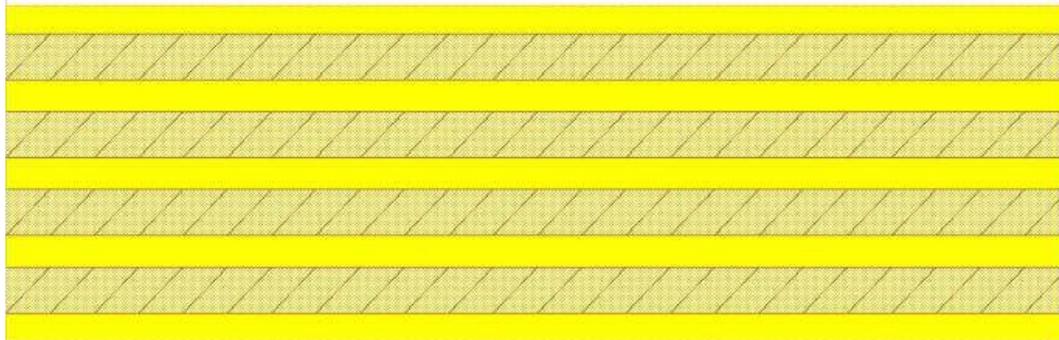
Panel layups

Below mores examples:



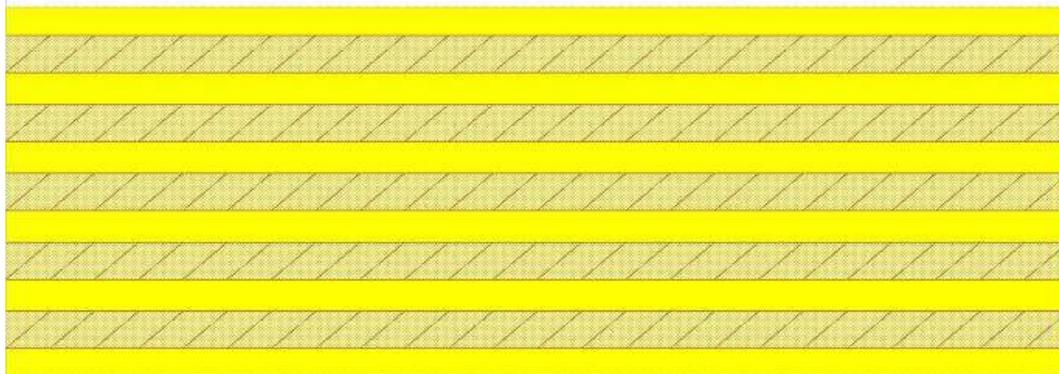
2,7
3,1
2,7
3,1
2,7
3,1
2,7
3,1
2,7

24mm - 9 ply
1", 31/32"



2,7
3,9
2,7
3,9
2,7
3,9
2,7
3,9
2,7

27mm 9 ply
1-1/8", 1-1/16"



2,7
3,1
2,7
3,1
2,7
3,1
2,7
3,1
2,7
3,1
2,7

30mm 11 ply
1-1/4", 1-3/16"

Dimensional tolerances

Structural grades are manufactured to meet the tolerances of all the following standards:

PS 1-07	Structural Plywood
EN 315	Plywood. Tolerances for dimensions
EN 12871	Wood-based panels. Performance specifications and requirements for load bearing boards for use in floors, walls and roofs
DIN 68705-3	Sperrholz; Bau-Furniersperrholz

Non structural grades are manufactured to meet the tolerances of the following standard:

EN 315	Plywood. Tolerances for dimensions
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Size tolerances are given below:

Length and width: **+0 / -3,0mm**

Straightness: **± 1,0mm/m** of panel length.

Squareness: **± 1,0mm/m** of panel length.

Thickness tolerances for the standard panel types are given below:

Dimensional tolerances

Panel finish	Unsanded or touch sanded (calibrated)						Sanded			
Panel grades	C+/C+ O&ES, C+/C O&ES, C+/C+, C+/C, C/C		Flooring, Sheathing, Frameply				B-B O&ES, A-C, B-C, Cp-C			
Nominal thickness (mm)	Min. (mm)	Max. (mm)	Customary thickness	Min. (mm)	Max. (mm)	Within one panel (mm)	Customary thickness	Min. (mm)	Max. (mm)	Within one panel (mm)
9mm	8,3	10,1	3/8"	8,7	9,5	1,0	11/32"	8,6	9,1	0,6
12mm	11,2	13,2	15/32"	11,2	12,8		15/32"	11,6	12,4	
12,5mm	11,7	13,7	1/2"	11,9	13,3		1/2"	12,3	12,9	
15mm	14,2	16,3	19/32"	14,3	15,8	1,5	19/32"	14,7	15,4	
18mm	17,1	19,3	23/32"	17,5	18,8		23/32"	17,9	18,4	
21mm	20,0	22,4	7/8"	21,1	21,8		27/32"	20,8	21,4	
24mm	22,9	25,5	1"	24,1	24,8		31/32"	23,9	24,4	
27mm	25,8	28,6	1-1/8"	27,1	27,8	1-1/16"	26,6	27,4	0,8	
30mm	28,7	31,7	1-1/4"	30,1	30,8	1-3/16"	29,6	30,4		

Note: Thickness shall be verified at 10±2% of panel moisture content.

Most common panel sizes are **2440x1220mm**, 2400x1200mm and 1250x2500mm.

Other panel thicknesses and sizes may also be available upon request.

Packing

CEMENT BOARD is normally packed in open bundles over 3 wooden skids and tied with 5 steel straps. Units of T&G panels have side plywood protections.

Typical unit weight is 1500Kg to 1600Kg.

More details on packing are given below...

Quantity of panels per unit				
Nominal thickness	Customary units		2440mm X 1220mm	2500mm X 1250mm
	Unsanded	Sanded		
9mm	3/8"	11/32"	100	100
12mm	15/32"		75	75
12,5mm	1/2"		75	75
15mm	19/32"		60	60
18mm	23/32"		50	50
21mm	7/8"	27/32"	43	43
24mm	1"	31/32"	37	37
27mm	1-1/8"	1-1/16"	33	33
30mm	1-1/4"	1-3/16"	30	30

More details...

Packing

Net volume per unit (m3)				
Thick. (mm)	Customary units		2440x1220mm	2500x1250mm
	Unsanded	Sanded		
9mm	3/8"	11/32"	2,679 m3	2,813 m3
12mm	15/32"		2,679 m3	2,813 m3
12,5mm	1/2"		2,791 m3	2,930 m3
15mm	19/32"		2,679 m3	2,813 m3
18mm	23/32"		2,679 m3	2,813 m3
21mm	7/8"	27/32"	2,688 m3	2,822 m3
24mm	1"	31/32"	2,643 m3	2,775 m3
27mm	1-1/8"	1-1/16"	2,652 m3	2,784 m3
30mm	1-1/4"	1-3/16"	2,679 m3	2,813 m3

Other especial packing arrangements may be available upon request.

Technical certifications

Made to have excellent performance in all kinds of applications, AU-MEX plywoods bear the necessary quality marks and approvals to be used in all kinds of structural or non structural applications.

Below is a brief description of the marks found on the panel surfaces.



CE 1034-CPD-12981/1/07

Panels with this mark are CE Marked in accordance to EN 13986 and are accepted to be used in construction as load bearing boards in most European Countries.

Main guarantees are structural performance, bond durability, low formaldehyde gas emissions, tight size tolerances and durability of the wood itself.



CE

Panels with this mark are CE Marked in accordance to EN 13986 to be used in construction as non structural elements in Europe.

Main guarantees are bond durability, low formaldehyde gas emissions and wood decay durability.

Technical certifications



BFU 100 (DIN 68705-3)

Panels with this mark are approved to be used in construction within Germany in load bearing applications.

Main guarantees are structural performance, bond durability, low formaldehyde gas emissions, tight size tolerances and the mandatory testing of products by the Certification Agency.



BBA (BS 5268-2)

Panels with this mark meet the requirements of BS 5268-2 to be used in the UK in construction for all sorts of load bearing applications.

Main guarantees are structural performance, bond durability, low formaldehyde gas emissions and tight size tolerances.



TECO TESTED (PS 1-07)

Panels with this mark indicates that they have been certified according to the United States building code requirements for industrial and structural applications. Therefore, architects, engineers, and builders can be assured that when panels are stamped by Teco agency, they meet the requirements for the appropriated standard.

FSC certification

AU-MEX is made solely of Slash and Loblolly Pine (*pinus elliottii* and *taeda*) trees from plantations located in the highlands of Southern Brazil.

Wood is sourced from own forests and from selected suppliers which are encouraged to keep the best logging and forest management practices and to adopt FSC and/or PEFC forest management certifications.

The Palmas mill has its production FSC certified as per certificate SW-COC-002832 and the Santa Cecília mill as per certificate SW-COC-002683.

Currently most of the wood comes from FSC certified forests, however still a minor part of the raw material comes from non certified forests. Consequently, as of January 2008 AU-MEX is still supplied in 2 possible status regarding the origin of its raw material:

100% of the wood from FSC certified forests
Non FSC certified

You are kindly asked to let us know of your preference for a FSC certified product.



Responsible Forest Management

SW-COC-002832

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