



EVOLUTION cladding

March 2008



www.boral.com.au/plywood

EVOLUTION plywood cladding collection

Australian house design is going through a period of evolution.

Architects, project builders and home owners are all questioning the type of homes we live in.

For some the availability of flat land may be an issue, for others it could be the environmental impact of building materials that influences their decision for selecting a house design.

However no matter what the reason, the style of building known as *lightweight construction* is on the increase.

With principles that have evolved from architect designed beach houses, this new form of construction is associated with many principles.

The move away from traditional brick and roof tile construction takes into consideration such elements as:-

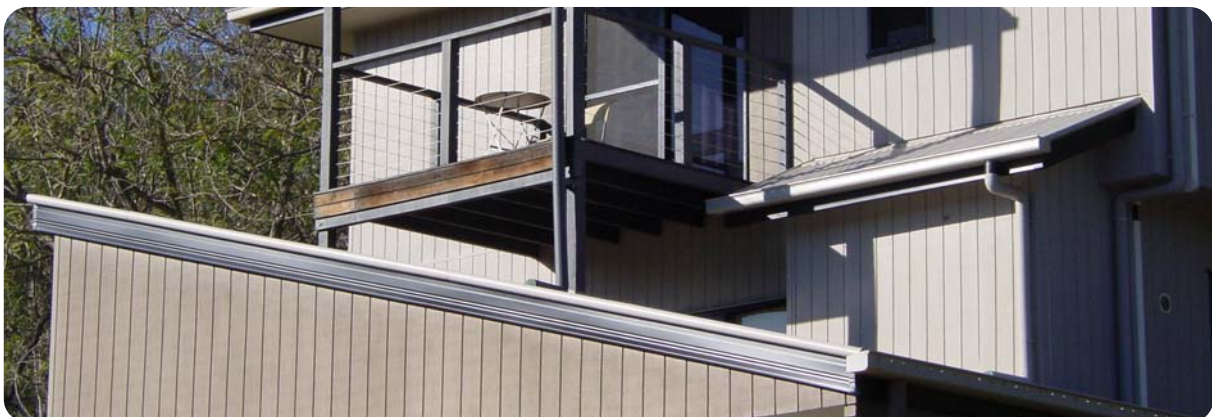
- 🌿 passive solar design
- 🌿 embodied energy
- 🌿 thermal mass issues
- 🌿 site orientation
- 🌿 environmental impact
- 🌿 carbon storage of timber



Boral Hancock Plywood's EVOLUTION cladding range is an ideal product when selecting an external cladding material.

Manufactured from renewable plantation pine, EVOLUTION cladding is not only lightweight, but it offers a strength/weight ratio comparable to steel.

With the largest range of plywood cladding available in the Australian market, EVOLUTION cladding is designed to withstand the harsh Australian climate, from tropical to temperate, beach to alpine, city to rural – all areas of Australia are suited to the EVOLUTION cladding range.



What is Evolution cladding?

The EVOLUTION cladding range is manufactured from a renewable and sustainable pine plantation resource. The growth cycle of these plantations contributes to a healthier environment by removing carbon dioxide (CO₂) from the atmosphere and storing it in the cell structure of the wood fibre (Table1). Veneer is peeled from the log on a rotary lathe, dried, treated and manufactured into plywood by placing veneers perpendicular to each other, which gives the panel its two-dimensional structural properties. The sheets are bonded with a permanent phenolic resin which is commonly referred to as an 'A' Bond. This is the same resin that is used to manufacture Marine plywood. The bond will not breakdown under heat, wet or cold conditions. Part of our rigorous testing regime requires that the bonds are tested in boiling water for 72 hours to ensure a solid bond has been made. The resulting sheet whilst lightweight is very strong. The 12mm thick sheets are then machined: rough sawn, grooved and shiplapped.

Table 1: Carbon released in the manufacture of building materials compared with carbon stored

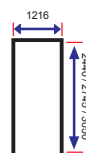
Material	Carbon released (kg/m ³)	Carbon stored (kg/m ³)
Timber based products	15	250
Steel	5320	0
Concrete	120	0
Aluminium	22000	0

Forest & Wood Products Research and Development Corporation (1997)

Specification Table

	ROUGH SAWN		
	SOLID	GROOVED	V-GROOVE
CHANNEL DIMENSIONS	-	12mm wide* 6mm deep	3mm V-groove
	-	150mm centres	150mm centres
EDGE PROFILE	shiplap		
SURFACE FINISH	band sawn		
SHEET LENGTH (mm)	2440/2745/3050 ⁺		
SHEET WIDTH/COVER	1216 / 1200		
SHEET THICKNESS	12mm		
FACE/BACK GRADE	SD		
VENEER SPECIES	PLANTATION PINE		
APPROX. WEIGHT	2440mm - 23kg / 2745mm - 26kg / 3050 ⁺ - 29kg		
PRESERVATIVE TREATMENT	H3 level by Individual Veneer (ACQ – golden brown toned finish)		
PRIMED OPTION	PRIMING AVAILABLE (eliminates need for undercoat)		
BOND TYPE	"A" MARINE BOND (Phenol formaldehyde)		
EWPA CERTIFIED	YES		
DURABILITY	40 years - bond & treatment warranty		
MANUFACTURING STANDARD	AS/NZS 2269:2004		

specifications



* Top of groove is 12mm wide; bottom of groove is 9mm wide ⁺ Scarf joined (Visible join - Paint finish only recommended)

Rough sawn solid
Rough sawn face
no grooves

Rough sawn grooved
Rough sawn face
grooves at 150mm centres

Rough sawn V-grooved
Rough sawn face
V-grooves at 150mm centres

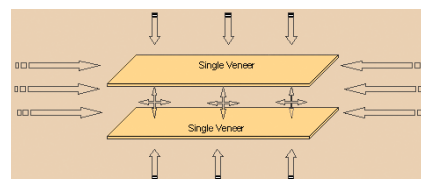
cladding profiles (panels are sold raw or primed only)

Durability

To ensure the long term performance of timber products such as plywood, it is important that the material is treated against fungal and insect attack (H3*).

EVOLUTION cladding is treated to level H3 using an individual veneer treatment process prior to plywood fabrication. The H3 treatment is designed for outside above ground use. Plywood can be treated using two systems; panel (envelope) or individual veneer treatment. Whilst the process for both is similar, the results are markedly different.

When veneer treating, each individual sheet of veneer is treated prior to the plywood being manufactured. This method, often referred to as '**100% penetration**', is commonly recognised as the most effective treatment process currently available. The chemical used in our veneer treatment process is **ACQ**. The advantage of the individual veneer treatment process is that cut edges do not require any further treatment on site.



Veneer treatment injection method

The **envelope** process is performed after the plywood sheet has been manufactured. In this process the sheets are chemically impregnated with Light Organic Solvent Preservative (LOSP) in a sealed chamber. However, it is important that all cut, drilled or routed edges be **chemically re-treated** to maintain the integrity of the protection as 100% penetration is not guaranteed. Neither treatment process pose any environmental risk.

EVOLUTION cladding is ACQ veneer treated however LOSP treatment can ordered to meet specifications.

ACQ (Ammoniacal Copper Quaternary)



Copper, a naturally occurring material, is an effective and widely used fungicide and quaternary compounds are commonly used in household disinfectants and cleaners. ACQ treated plywood takes on a golden brown colour which is not unpleasant and will be unnoticeable if the sheet is painted.

LOSP (Light Organic Solvent Preservative)



A non-aqueous, colourless, organic based (metal-free) wood preservative containing the active ingredients, Propiconazole, Tebuconazole and Permethrin. Propiconazole and Tebuconazole are EPA approved systematic fungicides, used widely to control mould and mildew in agricultural and horticultural applications. Permethrin is used to protect wood against termites and borers; commonly used in sprays and animal dips.

Can I specify ACQ in any application? – ACQ can be specified in any application however aluminium / zincalume flashings, battens or fittings cannot be used in direct contact with ACQ (Refer page 11). Evolution cladding treated with ACQ or LOSP is available in both standard and pre-primed surfaces. The primed surface negates the need to undercoat the sheet, thereby reducing the total cost of painting and removing an extra process for the installer. If staining ACQ treated cladding we recommended test sampling be carried out to ensure you are satisfied with the end result. Alternatively LOSP treated panels need to acclimatised for seven (7) days before painting.

Does ACQ contain solvents? - No, ACQ treatment **does not** contain solvents and therefore does not require time for the solvents to evaporate and nor does it have any odour associated with it. Alternatively LOSP does contain solvents and has a strong solvent odour.

Should ACQ veneer treated sheets be chemically edge sealed after cutting? - No, unlike LOSP treated sheets which are "panel" treated, ACQ treated sheets do not need to be chemically sealed as the veneer process provides 100% penetration of the panel.

What protection are these treatments covering? -

The H3* level is protecting the cladding from fungi and insects attacking the structural parts of the wood. The cladding could still be subjected to mould attack; however moulds are surface organisms and they will not cause any structural damage to the plywood. Whilst mould attack is unsightly, it will not cause permanent damage. To prevent mould attack the plywood should be coated as soon as possible after installation (pre-primed sheets will assist and paints that contain a mouldicide are recommended).



Veneer treatment process

*H3 - Outside above ground, moderate wetting and leaching, moderate decay, borers and termites.



Paints & Stains

As EVOLUTION cladding is natural timber it will perform like all other timbers in the open environment and be subject to mechanical breakdown (surface checking) which will cause small cracks to appear with the weathering process.

Like all timber products, to ensure that EVOLUTION cladding remains visually appealing and structurally intact for many years it should be coated to protect the timber surface from the effects of weathering and to protect your investment. We recommend the application of three coats of paint (primer and two (2) coats) or stain to ensure the

Paint 100% acrylic (self priming)

As most premium paints are 'self priming' – that is, they contain a priming element in the paint – they only require 2 top coats. As EVOLUTION cladding is available in both standard and pre-primed sheets, both versions are suitable for this painting system. Whilst acrylic paint systems offer excellent longevity, they also tend to 'block-up' the natural beauty of the timber grain.

Penetrating Oil Stain

Penetrating Oils are water based products that usually require an initial 'flooding' which allows the coating to penetrate deep into the wood fibre. These products should not crack or craze, but simply fade over time. The deep penetration is designed to prevent shrinking and swelling of the timber surface. They can be easily re-coated with no need for sanding prior to applying.

Semi-transparent Stain

As timber can expand and contract, these products are designed to allow flexibility within the coating so that the material will not crack or peel. As they are semi-transparent, they allow the natural characteristics of the timber grain to be highlighted as a feature of the building.

As with paint, some systems can be applied without a primer, others require a primed coat before applying 2 top coats. It is our recommendation that only reputable brands be used (see list page 8) and that the manufacturers instructions are followed. Spending a bit of extra time and money at the outset can often produce considerable savings over time.



How long can I expect my coating to last? – The answer to this question depends on several conditions; environment, paint quality and paint thickness. Obviously the main contributor to the length of time between re-coats is sunlight. The more sunlight the cladding is exposed to, the quicker the fading process. As an example, a western facing wall will be exposed to more sunlight than a southern facing wall. Larger overhangs (900mm) will help as they reduce the amount of direct sunlight on the wall during the hottest part of the day. As a general rule the expectations for a 100% acrylic paint system is 8-10 years, whilst a water based stain should last between 4-7 years, however **please consult** your coating manufacturer for more detailed information.

Do water based coatings crack or craze over time? – No, **good** quality water based coatings will fade over time, but **should not** peel or crack. It is our recommendation not to use Alkyd or solvent based stains for external cladding applications due to their tendency to crack and craze.

Can I paint EVOLUTION cladding straight away? – Yes and No; ACQ treated cladding can be painted straight away as it **does not** have to be left for the solvents to evaporate (Approx. 3 weeks; LOSP). There is also no need to fillet stack the pack (spread the sheets out) to "off gas" which is not always practicable on a building site. LOSP treated panels **need** to be left to "off gas" for seven (7) days before painting.

How will the surface profiles perform over time?

When timber is exposed to the elements, the weathering process can cause a breakdown of the surface known as 'checking'. To minimise this as much as possible the surface needs to receive sufficient layers of the applied coating (a minimum of 2 top coats and possibly 3 in very harsh environments). The Rough Sawn profile of the EVOLUTION range is suitable for all exposed walls as it offers the best protection and helps disguise the effects of weathering.

* Painting information is of a generic nature and individual companies should be contacted for detailed information

** Whilst ACQ treated sheets can be stained we recommend test samples be produced to ensure you are satisfied with the end result.



Painting & Maintenance Tips

- Use a reputable brand; spending a bit more upfront can save money in the long term.
- Ensure the surface is clean; remove all dirt, surface mould and dust etc.
- Avoid painting on extremely hot or cold days; ideally a range of 10C to 30C is sufficient
- In humid areas it is strongly recommended to use a mouldicide to prevent mould growth
- Whilst the rough sawn surface requires more paint than a smooth surface, this offers higher protection from UV rays as the roughness diffuses the rays. More paint usually relates to a longer period between re-coats.
- The cladding is required to be a minimum of 150mm above the ground surface. This minimises splashing from rain and dirt to the surface. It is important to maintain this level during the life of the building. Do not allow gardens and mulch to encroach on this distance
- Although not mandatory, it is **strongly recommended** to seal the edges and shiplap joints. This reduces the risk of moisture uptake which could distort the panel.
- We strongly recommend that individual paint and stain manufacturers be contacted in regards to specific application information. Some products require primer coats whilst many of the 100% acrylic systems have inbuilt primers. See list below.
- Inspect on a regular basis (at least annually). Remove surface dirt by washing.
- Repaint only as required eg, a south facing wall will require less maintenance than a western wall.
- **Avoid** coatings that are **too dark** as heat in the panel will exaggerate any checking that may occur. A coating with **light reflectance value no less than 40%** is highly recommended.



rough sawn grooved

150mm above the ground surface



Paint and Stain Specialists

	PRODUCT	DESCRIPTION	WEB SITE	PHONE
WOOD-MANS	CLADCOAT	Semi-transparent Stain	www.wood-mans.com.au	1300 139 669
INTERGRAIN	NATURALSTAIN	Semi-transparent Stain	www.woodart.com.au	1800 630 285
RESENE PAINTS LTD	WOODSMAN	Penetrating Oil Stain	www.resene.com	1800 738 383
RESENE PAINTS LTD	LUMBERSIDER	All purpose acrylic paint	www.resene.com	1800 738 383
QUANTUM FINISHES	AQUAOIL	Penetrating Oil Stain	www.qtf.com.au	1800 053 018
DULUX	WEATHERSHIELD	All purpose acrylic paint	www.dulux.com.au	13 25 25



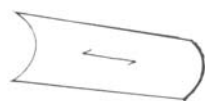
rough sawn solid

Curved Walls

EVOLUTION cladding can be used in curved walls. The amount of force and the need for increased tighter radius.



Bending along the face



Bending across the face



Recommended minimum bending radii for cladding

Thickness (mm)	Along face (m)	Across face (m)
12	3.6	2.4

Thermal Performance

The real advantage of lightweight timber construction is the ability to provide very liveable buildings with wall systems having low thermal mass.

Thus in the cool of the evening following a hot day, the wall will cool rapidly and not keep heating the interior. Walls with high thermal mass (eg. brick) hold substantially more heat and continue to radiate heat in the evening.

In cooler climates, or if the building is to be air-conditioned, the addition of insulation to the timber

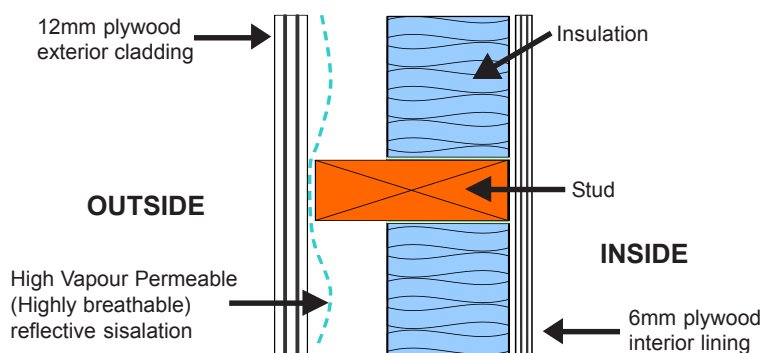
structure can provide equivalent thermal insulation to solid construction. For example the addition of R1.5 batts into a plywood clad wall with reflective sisalation on 90mm studs will result in a wall with an average R value exceeding 2.3 (see Table 3). Therefore, in winter a lightweight timber

Table: 3 Thermal resistance of timber framed plywood clad walls

	Through Insulated Zone	Through Stud
Outdoor air film	0.04	0.04
12mm EVOLUTION cladding	0.08	0.08
20mm Reflective air gap	0.58	
R 1.5 Insulation	1.50	
90mm Timber stud		0.62
6mm Plywood Internal Lining	0.04	0.04
Indoor Air Film	0.12	0.12
Total R Value	2.36	0.90

Note: As a non-reflective 20mm air gap has an R value of 0.15, an Insulated wall system without sisalation would reduce the total R value from 2.36 to 1.93 in the above table.

Plan section through insulated wall system



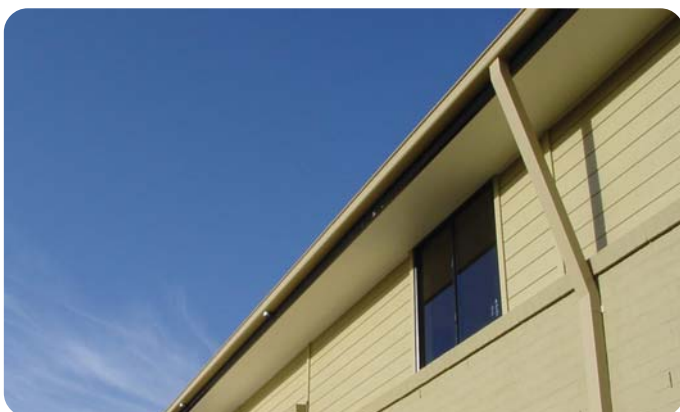
Sisalation (Building Paper)

It is Boral Plywood's recommendation to use sisalation when installing EVOLUTION cladding however for several applications it is essential; horizontal applications and steel framed houses. Sisalation must be of the High Vapour Permeable (Highly breathable) type (Please reference local building codes).

When using sisalation, adhesives should not be used as they offer no advantage in holding the cladding to the frame.



sisalation



Horizontal Applications

EVOLUTION cladding is normally installed vertically, however it can be used in a horizontal application provided some extra framing is installed. Nogging is required along the horizontal join and sisalation must be installed to prevent any moisture ingress behind the cladding during extreme weather conditions. The vertical join (butt-joined) must also be carefully protect to prevent moisture ingress.

horizontal applications

Battens

To batten or not to batten – that is the question

The issue of whether to cover joins in the sheets with an exposed batten is purely one of appearance. Some builders and architects have introduced a 'style' where sheet joins are covered by battens, however this is not a performance requirement.

Does Evolution Cladding require battens?

No. All sheets in the Evolution range are joined by a method known as ship-lap.

(See photo - Page 12)

The ship-lap join provides adequate protection from moisture.



battens



"The use of battens is optional - in some cases they merely cover the join, in others they are used as a feature highlight."

Framing & Fixing Details

EVOLUTION cladding can be fixed to both timber and metal framing. The minimum recommendation for timber framing is 70mm x 35mm whilst 75mm x 38mm is recommended for steel framed construction (for bracing purposes 45mm is recommended). We recommend that the moisture content of timber framed houses be within a range of 12-16%. EVOLUTION cladding is commonly used on a stud spacing of 600mm. This applies to both timber and steel framed construction. EVOLUTION cladding cannot be used in direct contact with Aluminium framing (See page 11). The **TOP LAP** should never be nailed.

Table 2 – Recommended Fasteners

Frame Type (Domestic)	Fastener size	Type
Nails into timber	40 x 2.8mm	Hot dipped galvanized (HDG) flat head
Screws into timber	#8 x 40mm	Counter sunk HDG self drilling
Screws into steel	10–16–45	Counter sunk HDG self drilling
Areas exposed to sea air require Stainless Steel type 316 fasteners		

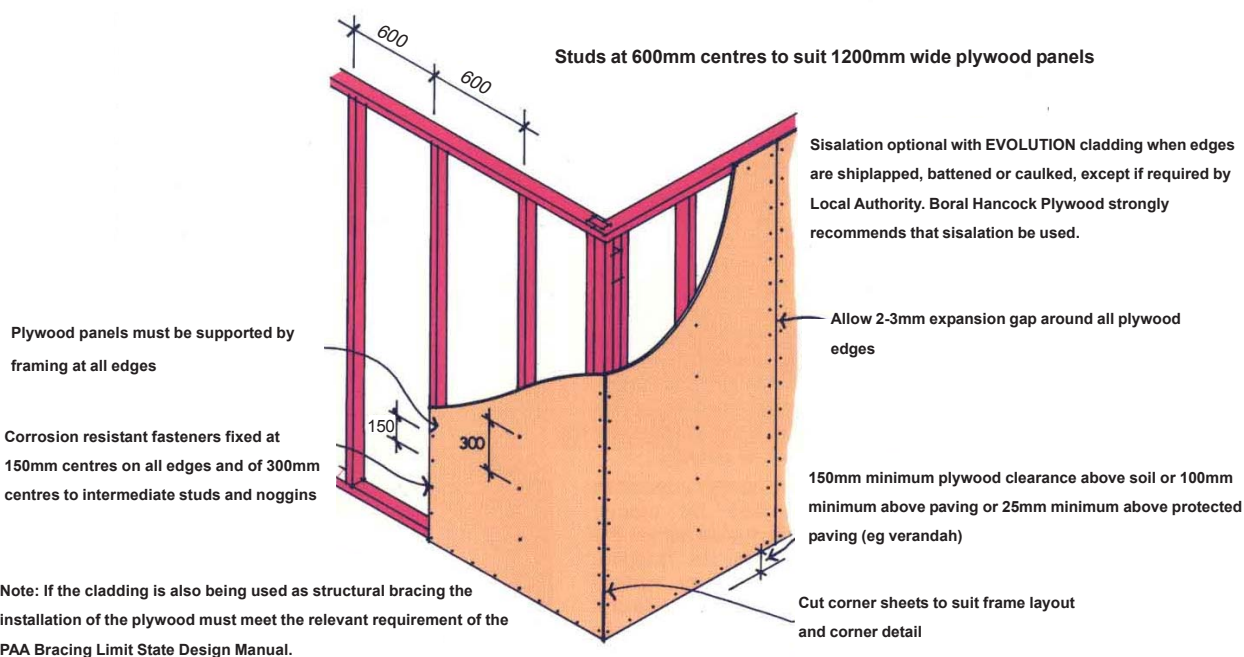
Note: fasteners must be non-staining and corrosion protected

What type of fasteners should I use if the cladding is used near the ocean?

It depends on the 'type' of ocean. Calmer waters as those found near a bay, lake or river do not usually require stainless steel fixings, however it is recommended to use stainless steel for more 'aggressive' conditions as would be found close to an ocean beach. It is our recommendation to consult a fastener manufacturer for more detailed information.

Can Evolution Cladding act as bracing?

Yes, provided the appropriate nailing pattern has been used in accordance with the requirements set out in the PAA Structural Plywood Wall Bracing – Limit State Design Manual. As specified in this design manual, depending on the type and spacing of fasteners and connection to subfloor, up to 6.4kN/m bracing resistance can be achieved. For the normal nailing of 150mm centres around the edges and 300mm centres at intermediate fixings 3.4kN/m bracing resistance is achieved.



Recommended Installation of EVOLUTION cladding

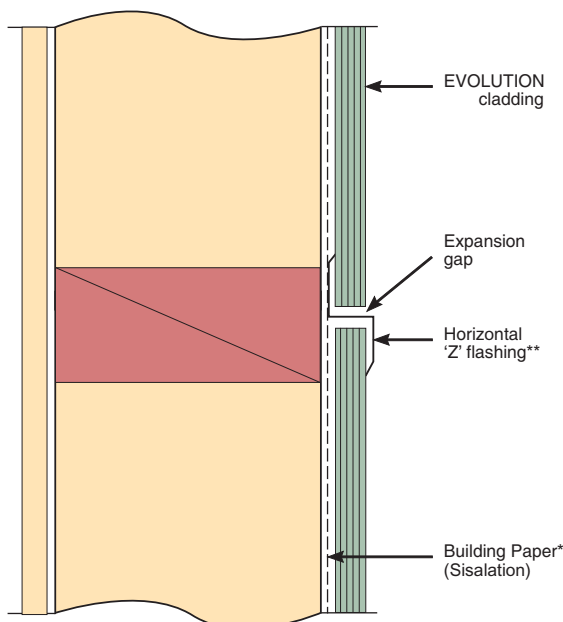
Flashings

Z-Flashings are used when joining sheets of cladding horizontally to prevent moisture seeping between the joints and behind the panel. External box flashings, internal and external corner flashings are also available. Galvanised steel, UV rated PVC or rubber flashings are suitable*.



'Z' Flashing

Horizontal Joints (View - Top down)



Aluminum/Zincalume flashings cannot be used in direct contact with EVOLUTION cladding



* Use of Aluminum flashings with ACQ treated cladding

ACQ treatment utilises copper as an active ingredient; this is corrosive to aluminum. The manufacturer of ACQ recommends the following when using aluminum:

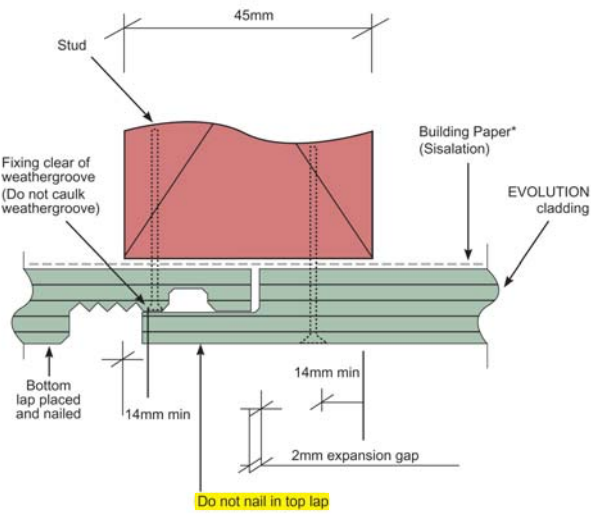
"Aluminum should not be used in direct contact with ACQ treated wood. Spacer materials or other physical barriers are recommended to prevent direct contact of ACQ treated wood and aluminum products. When using ACQ preserved wood in close proximity to aluminum products, such as aluminum cladding, flashing, furniture, and door and window frames, a 6mm minimum spacing must be allowed for between the ACQ and the aluminum products. Another option is to use a polyethylene barrier, with a minimum thickness of 0.25mm between the ACQ preserved wood and the aluminum product to prevent direct contact of the wood and the aluminum."



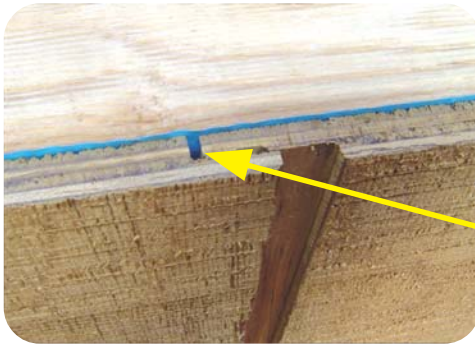
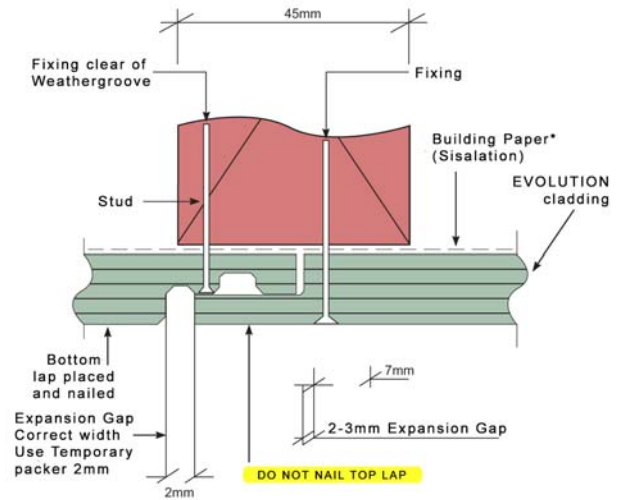
Suggested Fixing details

Typical Stud Fixing Details (vertical fixing)

Grooved profile



Solid Profile

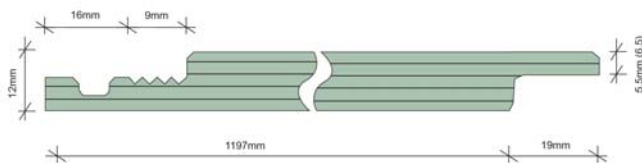


* **Building paper** (sisalation) must be of the High Vapour Permeable (Highly breathable) type (Please reference local building codes).

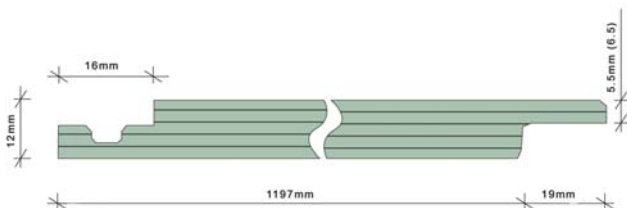
Shi lap

Allow at least 2mm gap to accomodate panel movement due to moisture changes. **(Do not nail TOP LAP)**
Do not put caulking in the weathergroove.

RS Grooved sheet dimensions

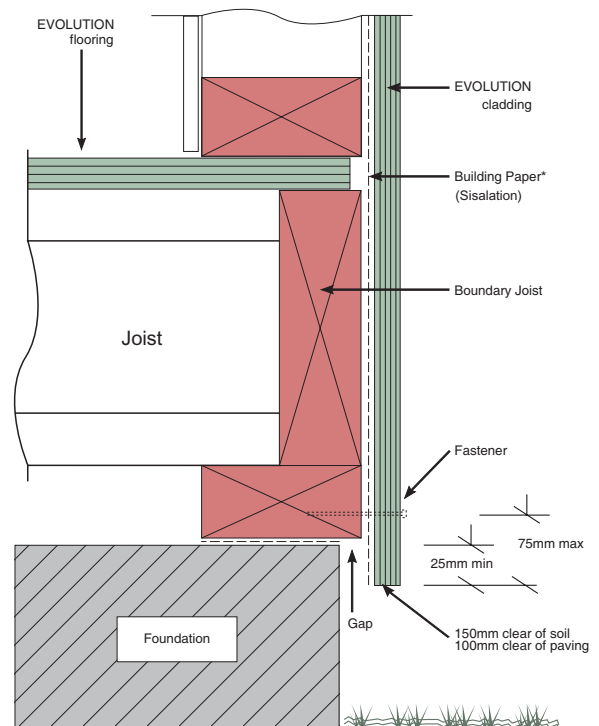


RS Solid sheet dimensions



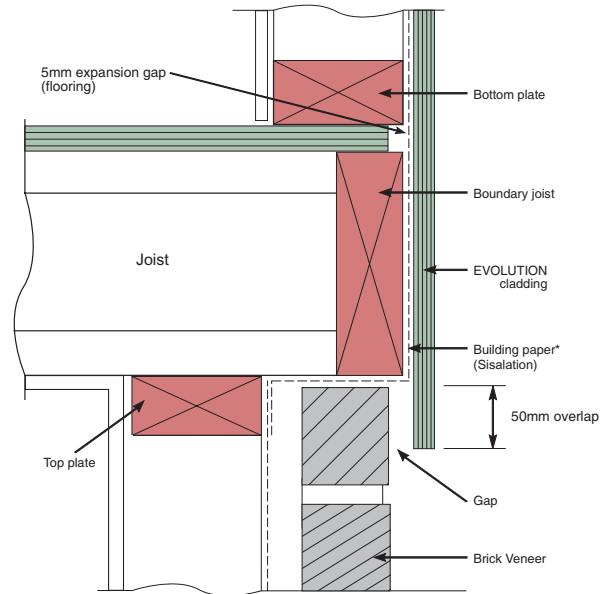
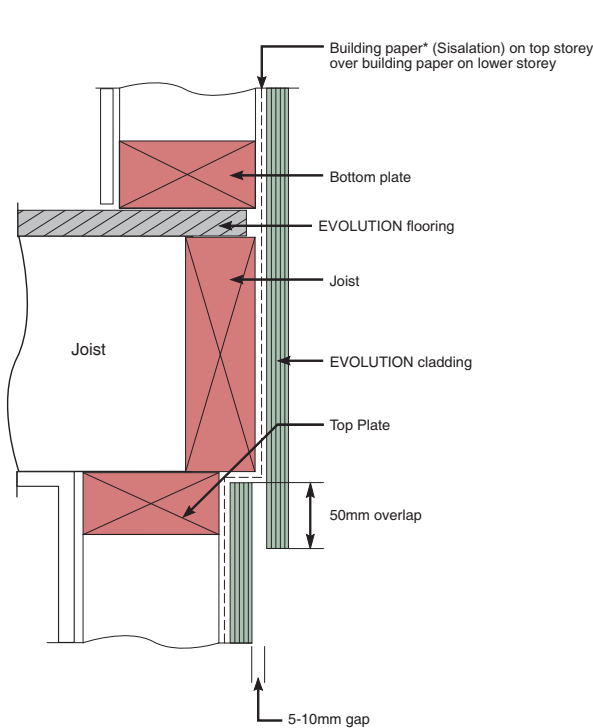
EVOLUTION cladding Rough Sawn Solid panels require a 2-3 mm expansion gap on all shi lap edges

Overhangs and ground clearances

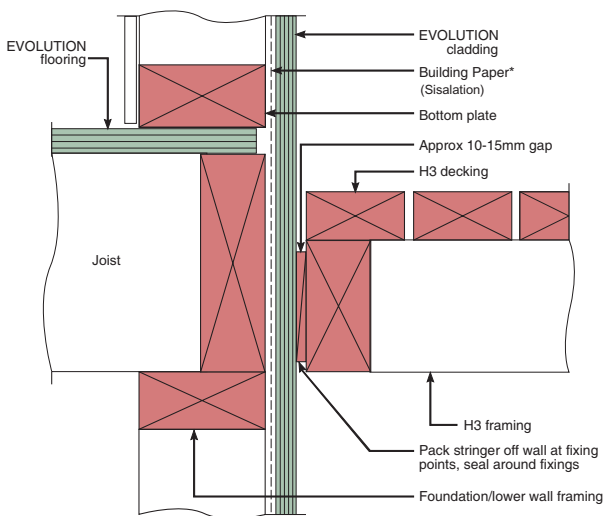


Suggested Fixing details (cont)

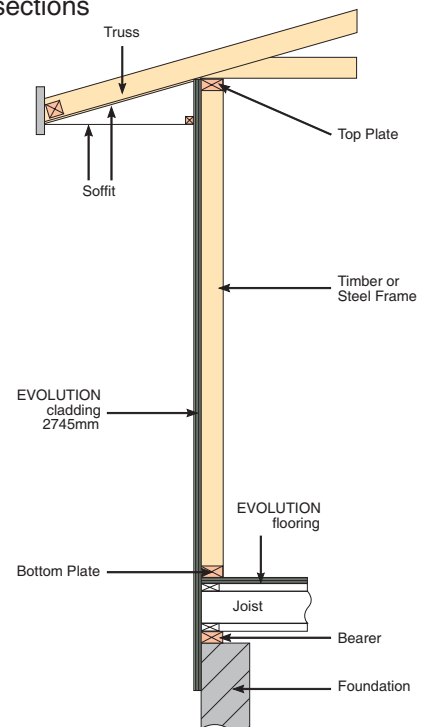
Mid Floor Level



Protecting Cladding from Moisture and Soil Entrapment



Wall sections



(A) 2745mm SHEET

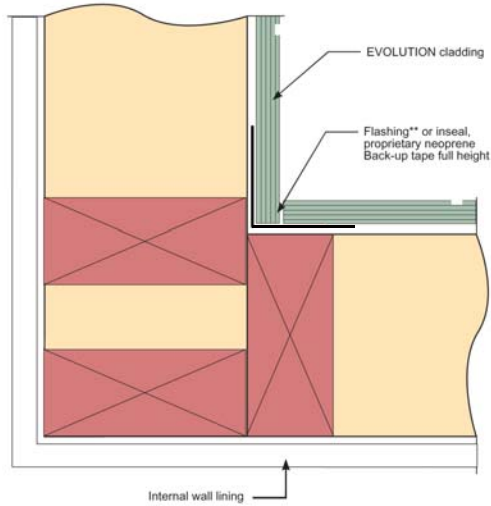
* Building paper (sisalation) must be of the High Vapour Permeable (Highly breathable) type (Please reference local building codes).

** Aluminium/Zincalume flashings cannot be used in direct contact with EVOLUTION cladding

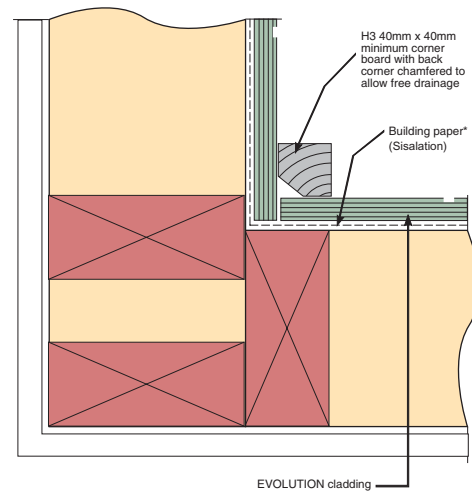


fixing details

Vertical joints

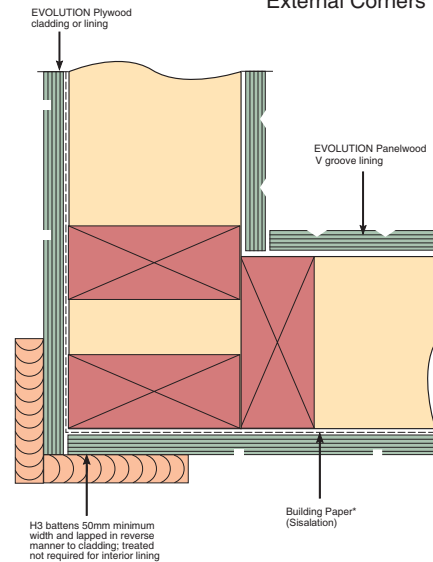


Internal Corner Board



Internal corner

External Corners



PVC Moulding



L moulding
Porta moulding rec-30* (www.porta.com.au)



Battens

* Building paper (sisalation) must be of the High Vapour Permeable (Highly breathable) type (Please reference local building codes).
** Aluminium/Zincalume flashings cannot be used in direct contact with EVOLUTION cladding

Do's and Don'ts

- Paint / Stain all edges and shiplap joints.
- Follow the painting and maintenance tips.
- Consult a paint manufacturer regarding suitable coatings, number of coats and paint thickness.
- Do not nail through the TOP shiplap.
- Re-treat any cut edges of LOSP treated cladding.
- Allow LOSP cladding one (1) week to "off gas" on site before painting.
- Test sample paints and stains before deciding on the final colour.
- Use the recommended Sisalation (Building paper).
- Do not use ACQ treated cladding in direct contact with aluminium framing / fixings.
- Follow the nailing pattern instructions.
- Ensure cladding is 150mm clear of soil / paving.



“Looking to a sustainable future”

What are the environmental advantages of using EVOLUTION Cladding?

- + As only 100% sustainable pine plantation resource is utilised, this reduces the demand on the world's diminishing rainforest stock.
- + This is a fully renewable process with a re-planting regime following harvest.
- + EVOLUTION cladding has low embodied energy which is the amount of energy required to manufacture a product.
- + As a comparison, a 12mm sheet of plywood has 10 times less embodied energy than a common house brick.
- + All waste is either converted into energy or transformed into other products. As an example, bark becomes garden mulch, whilst peeler cores are machined into pallets. The ability to be able to turn waste into energy results in less electricity being used thereby resulting in less greenhouse gas emissions.

This brochure is printed on chlorine free paper produced from a tree regeneration program.

EVOLUTION plywood

The EVOLUTION plywood range boasts a wide variety of different plywoods:

structuralply mariner ply formply internal panelling sound barriers bridge decking **external cladding**

Boral
Plywood



Quality Assurance

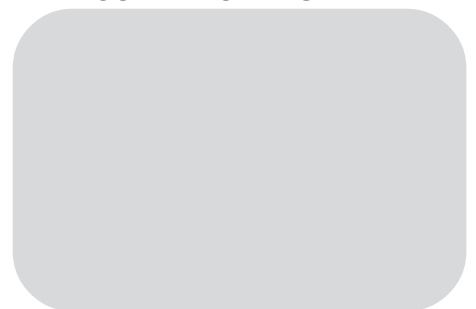
All Boral Plywood products are manufactured to strict Quality Assurance Standards which are based upon the requirements of the Standards Association of Australia in conjunction with the Plywood Association of Australia.

<http://www.paa.asn.au/>



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Limitations

All products and relative statements within this document are subject to the applicable panels being installed, removed, stored and handled in accordance with information mentioned, and subject to the governing codes of practice.

Boral Hancock retains the right to change specifications without notice in accordance with its policy of continued product development. Every care has been taken in preparing the information contained within this publication, however, the company cannot accept responsibility for any inaccuracies that may have arisen, and cannot accept liability for loss or damage either direct or consequential arising out of or in relation to use or application of the said information. Certain species are supplied on the basis of availability.