BGC Fibre Cement

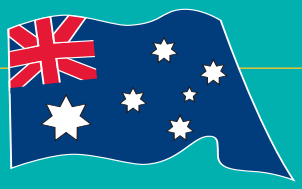
Duraliner™

Technical Information

BGCDL 102 APRIL 2007

DURALINER™

General Purpose Internal Lining Board



BGC Build it better with BGC

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Product Description

Duraliner™ is a general-purpose fibre cement building board intended for flush jointing. It has been specially formulated and prepared to meet the requirements for use in Wet Areas, Internal Linings, Ceilings, a Substrate for Ceramic Wall Tiles and Fire & Acoustically Rated Internal Walls.

In heavy duty commercial applications for wall tiling, fibre cement sheets are to have a minimum thickness of 9.0mm as per the Australian Standard AS 3958.1-1991 “Ceramic Tiles - Guide to Installation”.

Duraliner™ can also be used on external applications, such as soffits, where it will not be subject to the direct actions of the weather.

Product Information

Duraliner™ is manufactured from Portland cement, finely ground silica, cellulose fibres and water. It is cured in a high-pressure steam autoclave to create a durable, dimensionally stable product.

Duraliner™ is manufactured to comply with the requirements of AS 2908.2 Cellulose Cement Products. It is classified as a Type B Category 3 sheet and is suitable for internal uses.

Appearance

Duraliner™ is available with factory machined recesses on the two long sides and one end, ready for flush jointing.

The sheet face is coated with a green tinted sealant to facilitate jointing and coating.

Mass

The approximate weight of Duraliner™, at equilibrium moisture content, is as tabulated.

Nominal Thickness (mm)	Approx. Weight (kg/m2)
6.0	9.5
9.0	14.2
12.0	19.0

Fire Resistance

Duraliner™ has been tested by the CSIRO (Building, Construction and Engineering Division) in accordance to Australian Standard AS1530.3 – 1989; see report number FNE 7524 (6.0 mm Duraliner™) and FNE 7527 (9.0 mm Duraliner™).

The reports deemed the following Early Fire Hazard Indices:

Ignitability Index	0
Spread of Flame Index	0
Heat Evolved Index	0
Smoke Developed Index	0 ~ 1

Handling and Storage

Duraliner™ sheets must be stacked flat, up off the ground and supported on level bearers.

The sheets must be kept dry, preferably by being stored inside a building. When stored outdoors they must be protected from the weather.

Care should be taken to avoid damage to the ends, edges and surfaces.

Sheets must be dry prior to being fixed, or painted.

Sheets must be carried on edge.

Quality Systems

BGC Fibre Cement manufactures Duraliner™ under the rigorous Quality Management System of the International Standard ISO 9002:1994, and is the holder of Licence Agreement number QEC2955/13.

Sheet Sizes

Duraliner™ is supplied in a variety of sizes and thicknesses to suit its wide range of applications. Duraliner™ is available in the following sizes.

Thickness (mm)	Length (mm)	Sheet Width (mm)		
		Recessed Edge		
		900	1200	1350
6.0	1800		✔	
	2100		✔	✔
	2400	✔	✔	✔
	2700		✔	
	3000	✔	✔	✔
	3600	✔	✔	✔
	4200		✔	✔
9.0	2400		✔	
	2700		✔	
	3000		✔	
	3600		✔	
12.0	3000		✔	

Health and Safety

BGC Duraliner™ is manufactured from cellulose fibre, finely ground sand, Portland cement and additives. As manufactured the product will not release airborne dust, but during drilling, cutting and sanding operations cellulose fibres, silica and calcium silicate dust may be released.

Breathing in fine silica dust is hazardous, prolonged exposure (usually over several years) may cause bronchitis, silicosis or cancer.

Do not breathe dust

When cutting sheets, work in a well-ventilated area and use the methods recommended in this literature to minimise dust generation. If using power tools for cutting, drilling or sanding they must be fitted with appropriate dust collection devices or the operator should wear an approved (P1 or P2) dust mask and safety glasses.

These precautions are not necessary when stacking, unloading or handling fibre cement products.

For further information or a Material Safety Data Sheet contact the nearest BGC Sales Office.

Sheet Cutting and Drilling

Duraliner™ sheets may be cut to size on site.

Suitable cutting methods are:

Score & Snap

Using a straight edge score the sheet face 4 or 5 times with a tungsten tipped 'Score & Snap' knife. While supporting the scored edge with the straight edge, snap the sheet upwards for a clean break.

Hand Guillotine

Cut on the off-cut side of the line to allow for the blade thickness.

Notching

Cut the two sides with a handsaw or guillotine, score along the back edge then snap upwards to remove the notch.

Hand Sawing

Mark out the cut lines on the face side of the sheet. Support the back of the Duraliner™ sheet close to the cut. A fine-toothed saw can be used. A quick jabbing action gives best results.

Drilling

Duraliner™ sheets can be drilled using normal high-speed drill bits. Do not use the drill's hammer function. For small round holes such as tap penetrations, the use of a hole-saw is recommended

Penetrations

Penetrations can be made by drilling a series of small holes around the perimeter of the cut out. Tap waste piece from the sheet face with a hammer. Support the underside of the opening to avoid damage. Clean rough edges with a rasp.

Large Rectangular Openings are formed by deeply scoring the perimeter of the opening with a 'score and snap' knife. Next, form a hole in the centre of the opening (see method above) then saw cut from the hole to the corners of the opening. Snap out the four triangular segments. Clean rough edges with a rasp.

Construction Details

Framing

Duraliner™ is suitable for use with both timber and lightweight steel framing.

General

- Framing must be constructed to comply with the Building Code of Australia.
- The framing must be set to a true plane to ensure a straight finish to the wall.
- Studs must be spaced at a maximum of 600 mm centres
- Noggings must be spaced at a maximum of 1350 mm centres. Noggings must align with the sheet joints see Figure 2.
- Duraliner™ wall sheets must not be joined off the framing.

Metal Framing

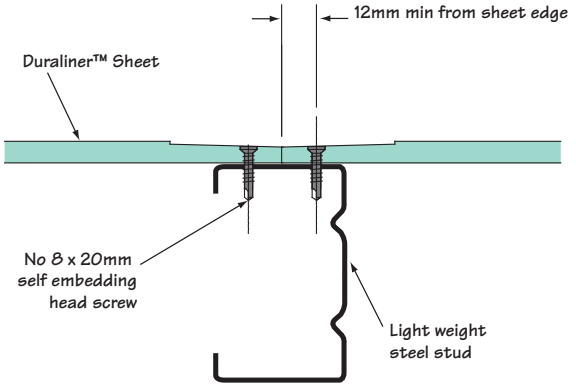
Metal framing must comply with AS 3623 - 1993 Domestic Metal Framing.

Duraliner™ may be fixed directly to lightweight metal framing. The metal framing must not exceed 1.6 mm in thickness and should provide some flexibility to accommodate any differential moisture and thermal movement of the Duraliner™.

If Duraliner™ is used with rigid steel framing, it must be battened out with either timber or lightweight steel battens prior to fixing.

Timber battens must have a minimum thickness of 40 mm to allow adequate nail penetration.

Figure 1 - Sheet Joint Light Weight Steel Framing



Timber Framing

Timber framing must comply with AS 1684 - 1999 National Timber Framing Code.

Duraliner™ must not be fixed to wet framing. It is strongly recommended that kiln dried timber is used for framing.

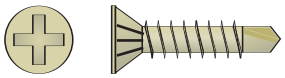
If sheets are fixed to 'wet' framing, problems may occur at a later date due to excessive timber shrinkage.

Fasteners

For fixing 6.0mm and 9.0mm Duraliner™ to timber framing, use 30 x 2.8mm galvanised clouts. For fixing 12.0mm Duraliner™ to timber framing, use 40 x 2.8mm galvanised clouts.

For fixing 6.0mm and 9.0mm Duraliner™ to lightweight framing, use No.8 x 20mm self-embedding head screws.

For fixing 12.0mm Duraliner™ to lightweight framing, use No.8 x 30mm self-embedding head screws.



Do not place fixings closer than 12mm from sheet edges, or closer than 50mm from the sheet corners.

Sheet fixing must commence at the centre of the sheet and work out to the edges to prevent 'druminess'. The sheet must be held firmly against the framing when fixing to ensure breakout does not occur on the back.

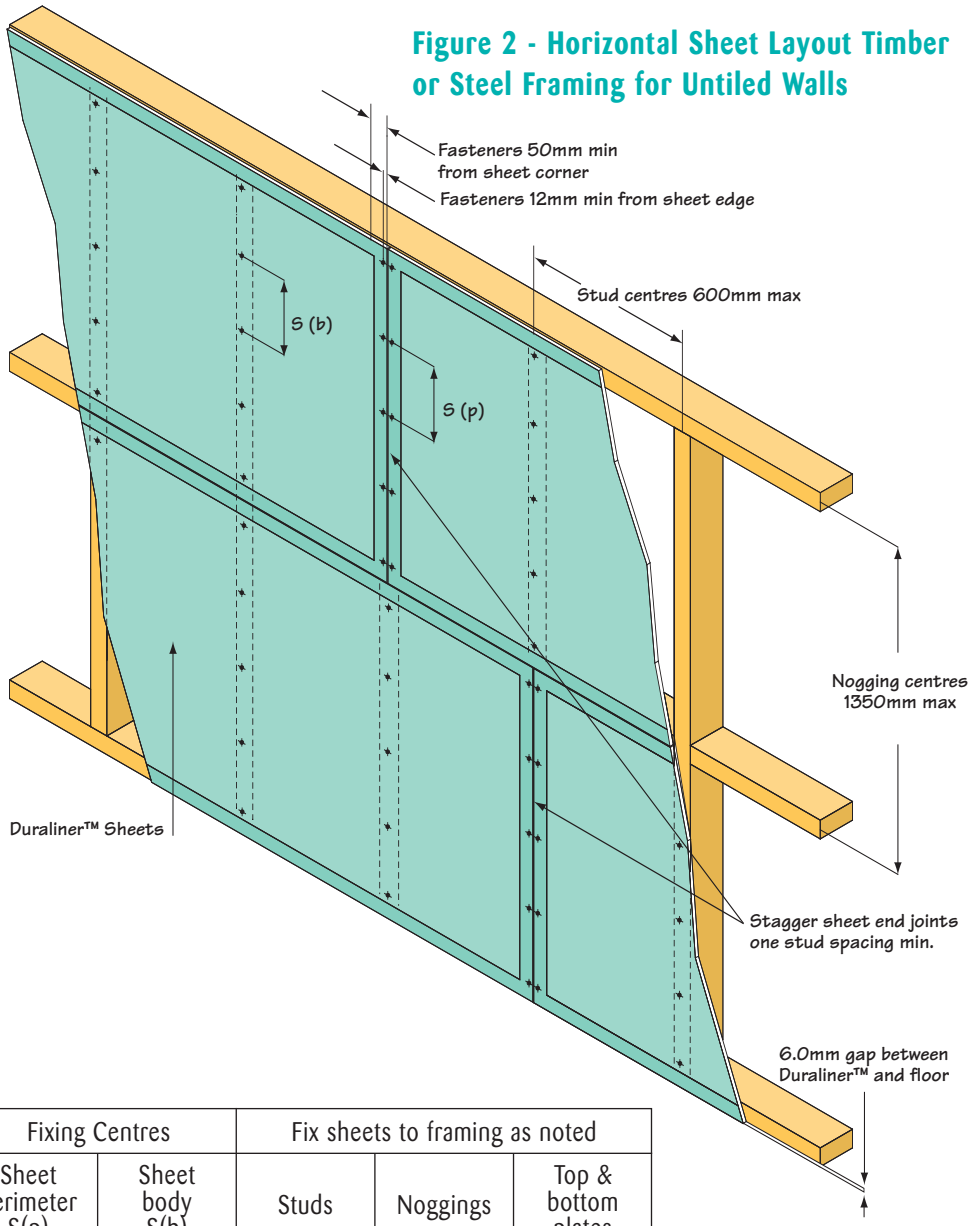
Sheet Layout

Duraliner™ wall sheets may be fixed vertically or horizontally. However, most flush jointed applications suit horizontal fixing.

Nail or Screw Fasteners

Figure 2 depicts a typical Duraliner™ layout using either nail or screw fasteners for un-tiled walls.

Figure 2 - Horizontal Sheet Layout Timber or Steel Framing for Untiled Walls



	Fixing Centres		Fix sheets to framing as noted		
	Sheet perimeter S(p)	Sheet body S(b)	Studs	Noggings	Top & bottom plates
Tiled	200mm	200mm	4	4	4
Un-tiled	200mm	300mm	4	6	6

Notes Figure 2:

Framing must support all sheet joints when fixed horizontally.
Install bottom sheets first then work upwards.
Set bottom sheet 6 mm clear of floor.
Stagger vertical joints by at least one stud (600 mm typical).
Do not place fixings closer than 12mm from sheet edges, or closer than 50mm from the sheet corners.

Adhesive Fixing (Stud Walls)

Adhesive fixing must not be used where the wall is to be finished with wall tiles. Where the wall is to be tiled, nail or screw fasteners must be used.

For fixing of Duraliner™ to stud walls in un-tiled applications, stud adhesive can be used. Daubs of adhesive are to be applied to the studs at a maximum of 250mm centers. The daubs of adhesive are to be approximately 25mm diameter.

Nail or screw fasteners are still required at 200 mm centres on the sheet ends. These are concealed within the flush finishing.

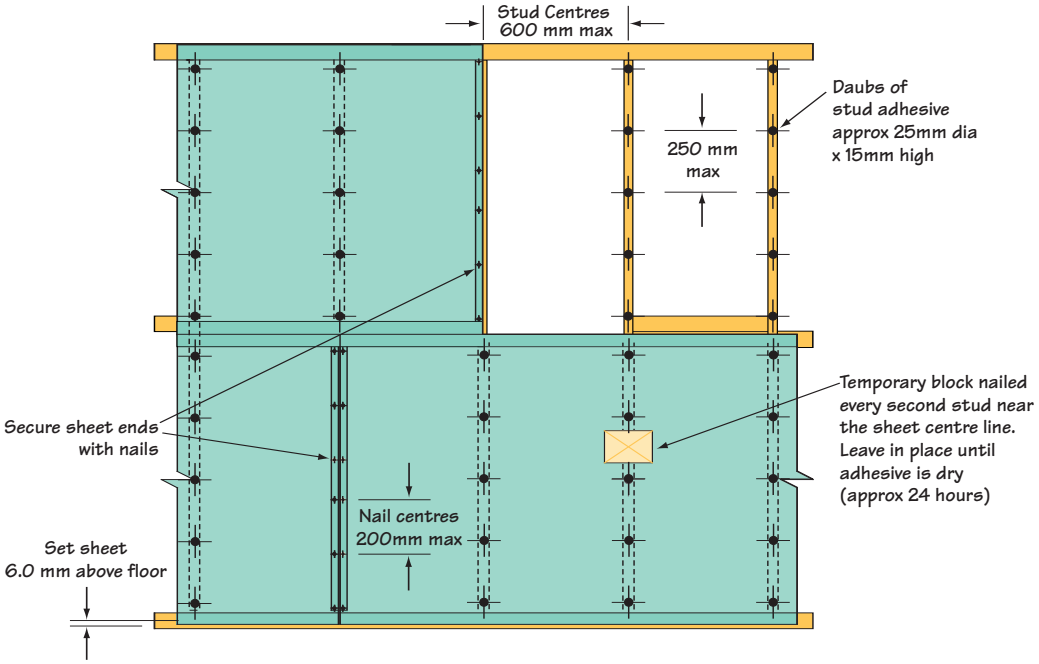
Figure 3 depicts the typical construction detail.

The Duraliner™ sheet must be pressed onto the adhesive until it sits flat. Temporary blocking or props must support the centre of the sheet until the adhesive is dry (normally 24 hours).

Adhesive daubs must never coincide with fasteners.

Adhesive fixing must not be used in fire rated construction.

Figure 3 - Duraliner™ Installation Adhesive Fixing - Stud Construction

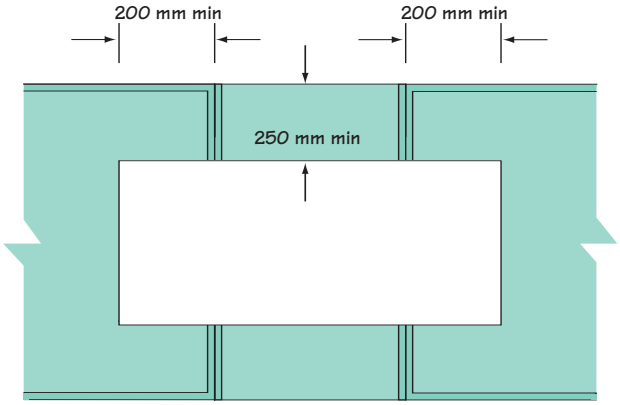


Window and Door Openings

To reduce the incidence of cracks appearing in the jointing, flush jointed sheets should be cut in, 200 mm minimum, around window and door openings as depicted in Figure 4.

If a sheet joint must coincide with the corner of an opening BGC Fibre Cement recommend installation of a relief joint to control cracking. See Figure 5 on page 7.

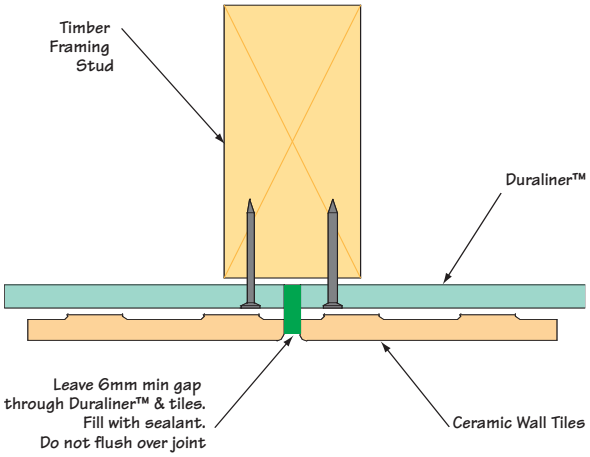
Figure 4 - Cut in Around Openings



Relief Control Joints

The use of relief joints is to control cracking at locations such as window or door openings, when cutting sheets in around the opening is impractical.

Figure 5 - Relief Joint (Tiled)



Movement Control Joints

If a continuous run of sheeting exceeds 4.2 m for tiled areas, or 5.4 m for un-tiled areas, then it must be broken with a movement control (expansion) joint. BGC Fibre Cement recommend the provision of a control joint every 4.2 m in case tiling is undertaken at a later date.

For tiled areas the control joint must carry through the framing, sheeting and tiling, see Figure 6.

For un-tiled areas the use of a Rondo P35 or MBS - P45 jointing kit is recommended, see Figure 7.

Figure 6 - Tiled Control Joint

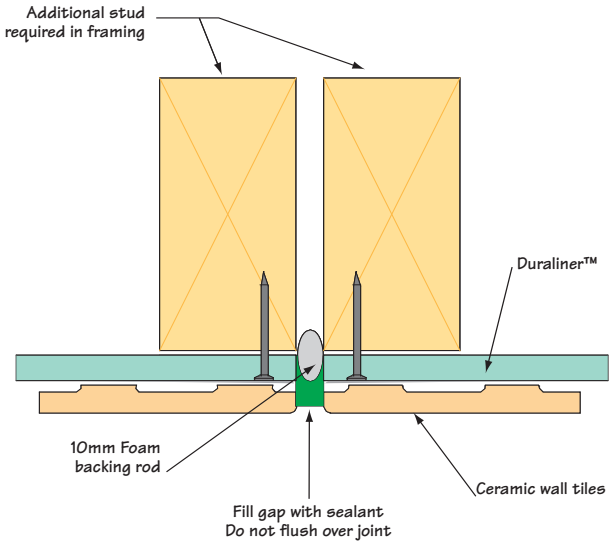
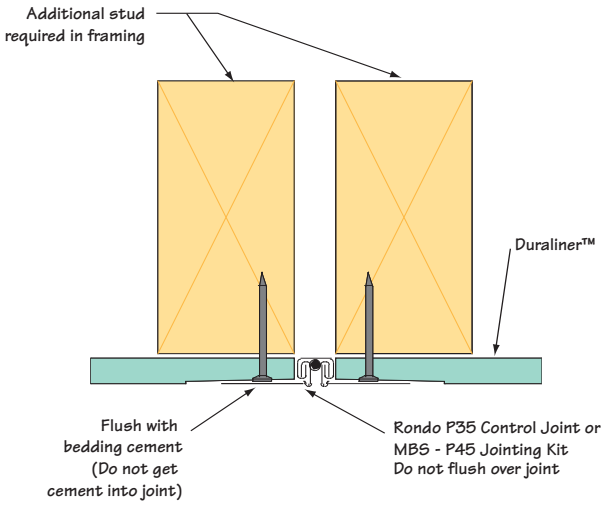


Figure 7 - Un-tiled Control Joint



Wet Areas

Wet areas are walls in shower alcoves or surrounding a bath that include a shower. Duraliner™ provides a suitable substrate for ceramic tiles in these applications.

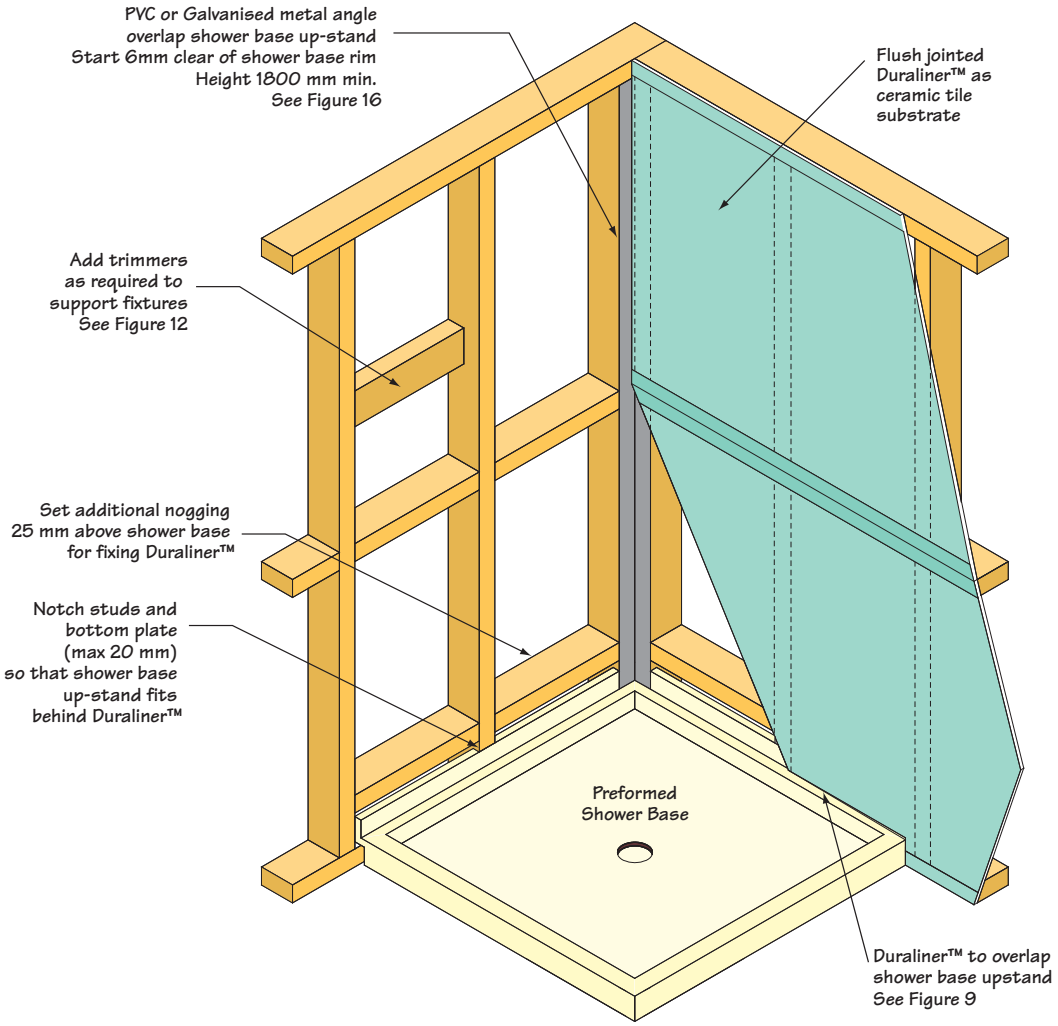
Semi-wet areas are walls adjacent to sanitary fittings such as baths or basins. Duraliner™ is a suitable substrate for ceramic-tiles, paint, wall-paper or vinyl finishes in these applications.

Satisfactory performance of wet area systems depends on strict adherence to the Building Code of Australia.

Shower Recess

Table 1 summarises construction details for use with different sub-floor materials.

Figure 8 - Shower Recess



Notes Figure 8:

The inside edge of the shower base up-stand must fit in behind the Duraliner™ without distorting it.
To achieve this the studs and bottom plate can be notched out, maximum 20 mm, or alternatively battens can be used to set the Duraliner™ clear of the framing.

A PVC angle or waterproof lining (membrane) should be fixed in the internal corner behind the Duraliner™. This angle must project inside the shower base up-stand. It should start 6 mm above the shower base rim and extend to a minimum height of 1800 mm. Both flanges of the angles should be nailed to the framing at a maximum 600 mm centres.

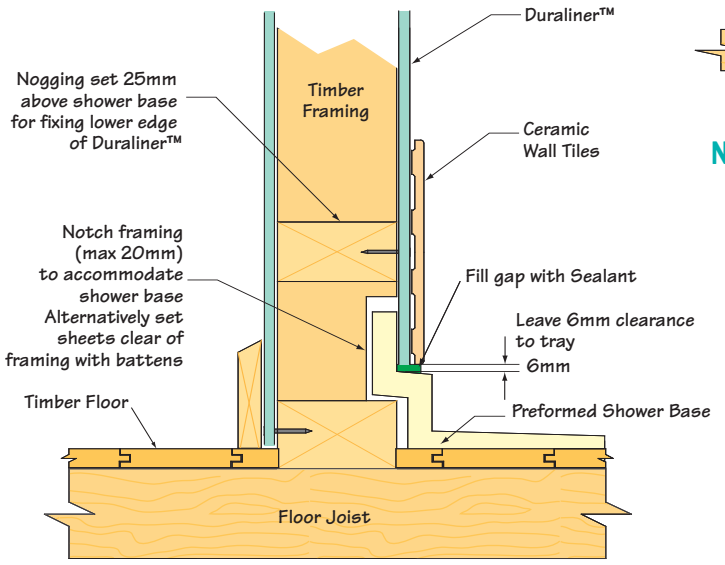
Shower Recesses

Table 1 summarises appropriate construction details for use with different sub-floor materials.

Table 1

Sub Flooring	Pre-formed Shower Base See Figures 8 & 9	Full Insitu Waterproof Membrane See Figure 10	Perimeter Flashing Only See Figure 11
Timber Flooring	4	4	
Panel Flooring such as Plywood or Particleboard	4	4	
Compressed Fibre Cement	4	4	4
Concrete Slab	4	4	4

Figure 9 - Pre-formed Shower Base



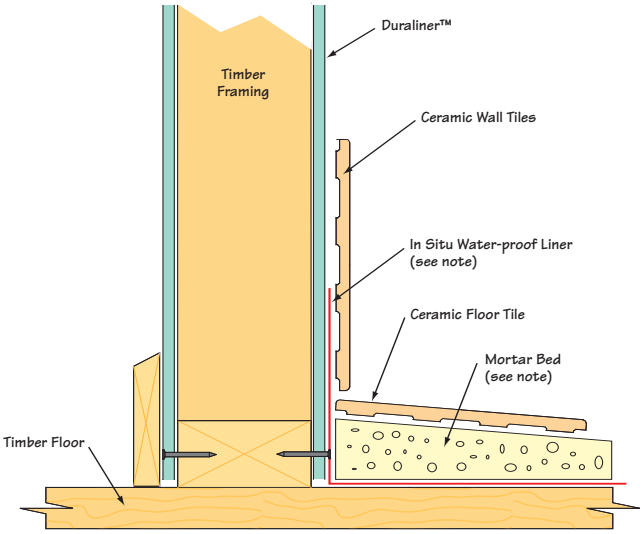
Notes Figure 9:

The Duraliner™ must project inside the vertical lip of the shower base up-stand. A 6 mm gap must be left between the Duraliner™ and the shower base rim. This gap must be filled with a bead of mould resisting flexible sealant.

The Duraliner™ must be flush jointed.

Ceramic wall tiles must be installed over the Duraliner.™ The wall tiles must finish 6 mm above the shower base rim. This gap must be filled with a mould resisting flexible sealant.

Figure 10 - Shower Base Details (In situ Waterproof Liner)



Notes Figure 10

The waterproof lining must be installed to the manufactures specification.

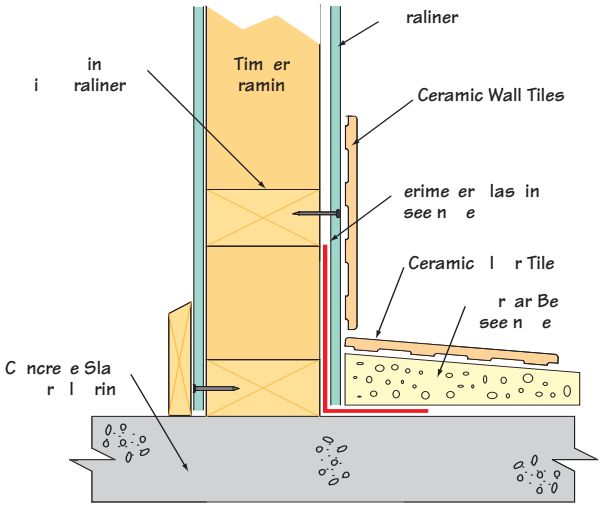
The waterproof lining must extend 150 mm up the walls or 25 mm above any hobs (whichever is greatest).

Internal corners in the shower recess must be sealed to a height of 1800 mm minimum with the waterproof lining or an equivalent treatment.

Mortar Bed: The shower base must have a minimum fall of 1:60 to a floor waste drain.

The Duraliner™ sheets must be flush jointed and Tiled over.

Figure 11 - Shower Base Details (Perimeter Flashing)



Notes Figure 11

Perimeter flashing may be preformed PVC angles or a waterproof flashing strip such as Hypalon.

The flashing should extend 80 mm min up the wall and 50 mm min across the floor. The corner detail must be waterproof.

The flashing must be bonded to the floor with a two-part flexible epoxy resin designed for this application.

The flashing must not be bonded to the Duraliner™ wall sheets.

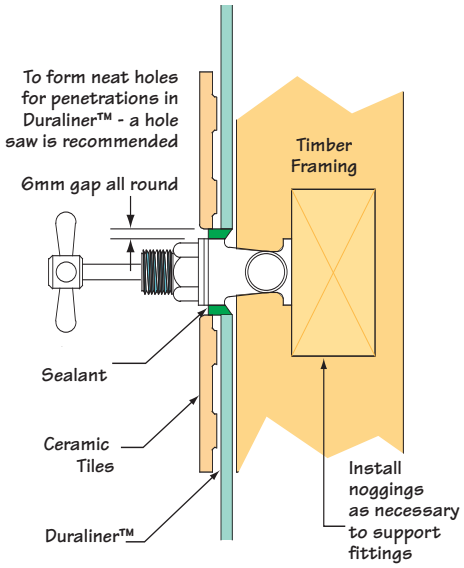
An additional nogging must be installed so that the bottom fixing of the Duraliner™ sheet is above the flashing.

Internal corners of the shower recess must be sealed with a bonded PVC angle or flashing to a minimum height to 1800 mm.

Mortar Bed: The shower base must have a minimum fall of 1:60 to a floor waste drain

The Duraliner™ sheets must be flush jointed and tiled over.

Figure 12 - Sealing Preparations



Notes Figure 12

The Duraliner™ should be cut out to leave a 6 mm gap all round the fixture. This gap should be filled with a mould resistant flexible sealant.

BGC recommend using a hole saw to make a neat cut out for fittings such as taps, shower roses etc.

Additional framing must be installed as required to properly support all fixtures.

Figure 13 - Bath Rim Installation Detail

Figure 13 depicts the typical sealing detail of a bath installation.

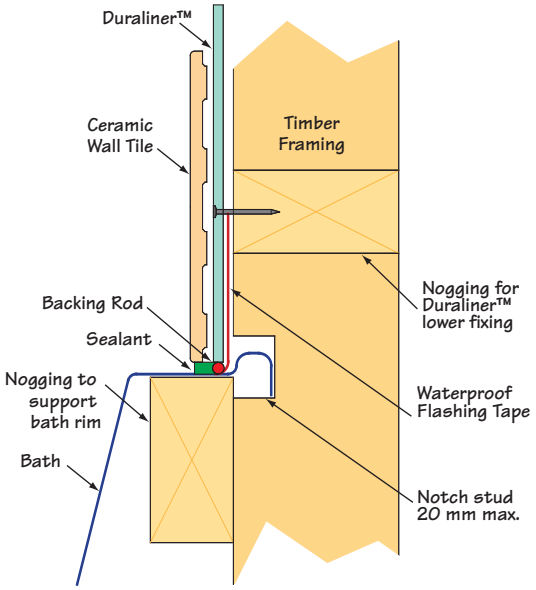
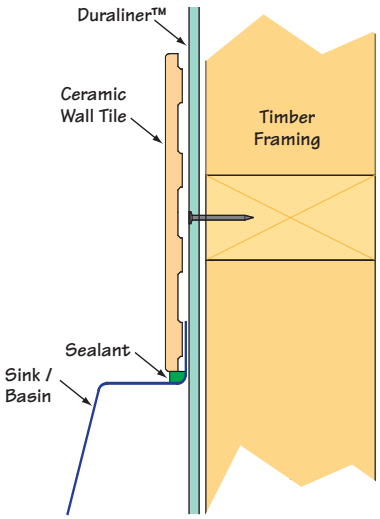


Figure 14 - Sink/Basin Flange Details

Figure 14 depicts the typical sealing detail of a sink or basin installation.



Flush Jointing

The edges to be joined must be recessed.

Before jointing sheets that have been cut on site, or the un-recessed end of Duraliner™ sheets must be recessed. The recess should be a nominal 40 mm wide by 1.5 mm deep. The Hitachi 'Easy Bevel' (Model EB100) is specifically designed for this purpose. The recessed surfaces must be sealed using a PVA or Acrylic sealant, such as Cemstick, Lokcrete or Bondcrete.

In shower recesses a wet area jointing compound must be used as per the Australian Standard AS3740-1994 "Waterproofing of Wet Areas within Residential Buildings".

First Coat: Fill the recess evenly with bedding cement. For flat joints and internal corners install a perforated paper tape over the centre of the joint. **Self adhesive tape is not to be used.** Always use a perforated paper tape. Additional bedding cement is then applied to cover the paper tape and the joint edges feathered out to produce a joint that is about 100 mm wide (50 mm each side of the centre line). Figure 15.

Internal corners should be prepared and flushed as shown in Figure 16.

For external corners an external angle bead should be fitted prior to filling. The paper tape is not used for external corners. Figure 17.

Apply a layer of bedding cement over all fastener heads.

Second Coat: After allowing at least one hour for the first coat to dry, a second coat of bedding cement is applied. This coat should overlap the first coat by about 40 mm each side (total width 180 mm) and be feathered out to produce an unobtrusive joint.

Apply a second layer of bedding cement over all fastener heads.

Topping Coat: (for un-tiled areas only): After the bedding cement has dried thoroughly, a layer of topping cement can be applied. This layer should overlap the preceding layer by 45 to 50 mm each side of the joint and be feathered out to produce an unobtrusive finish.

Allow 24 hours for the topping cement to dry.

Sand with 150 grit paper to match the finish of the Duraliner™.

Topping cement must not be used on joints that are to be tiled.

Figure 15

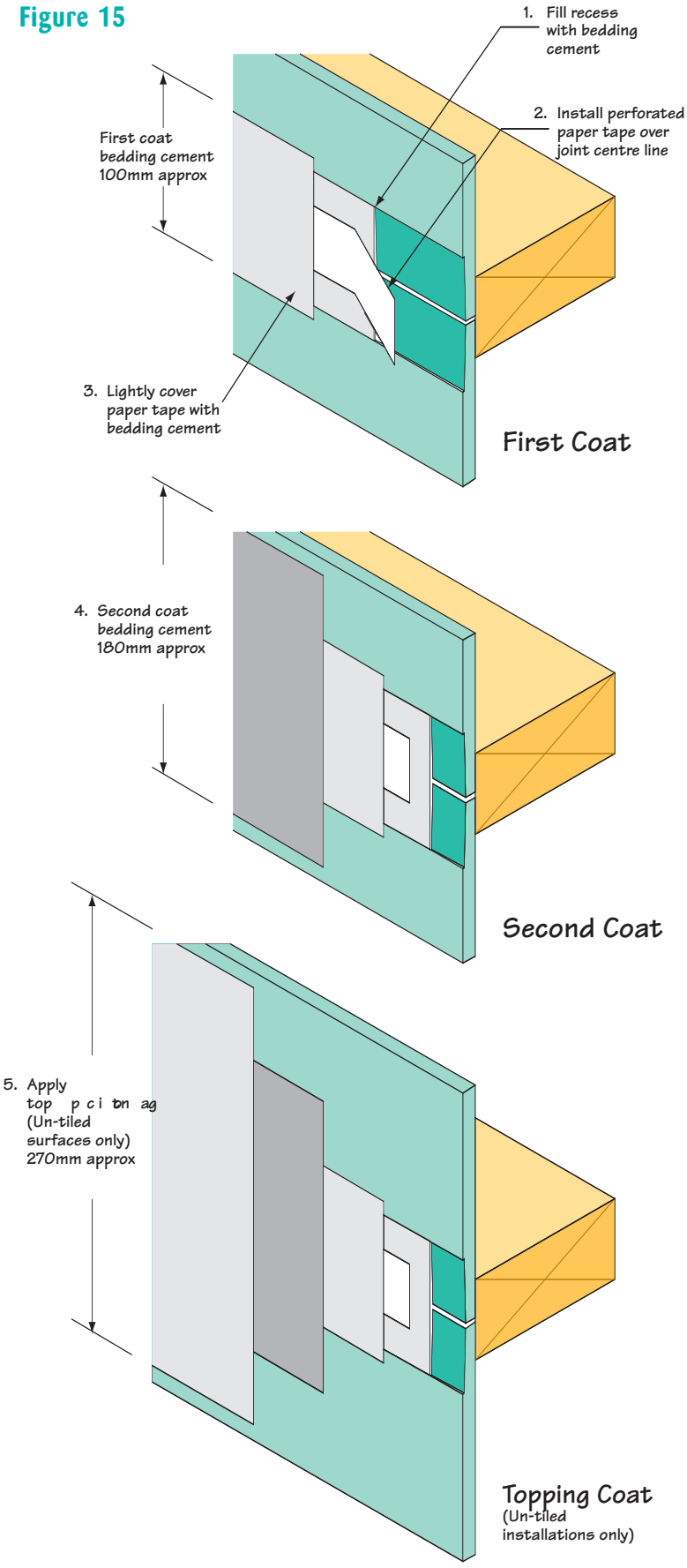


Figure 16 - Flush Jointing Internal Corner

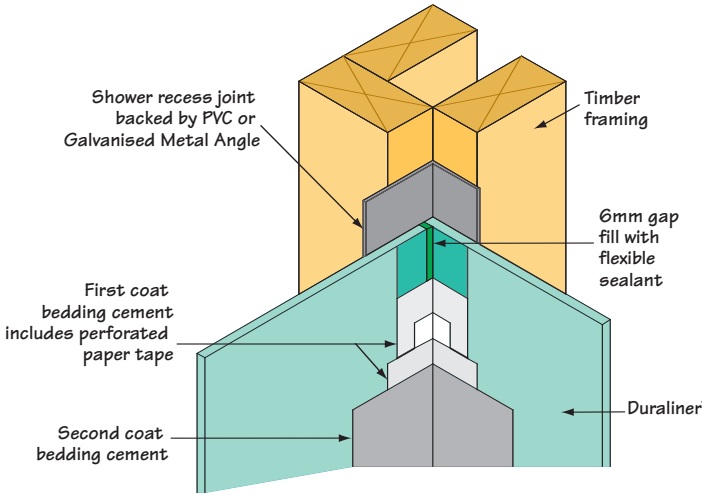
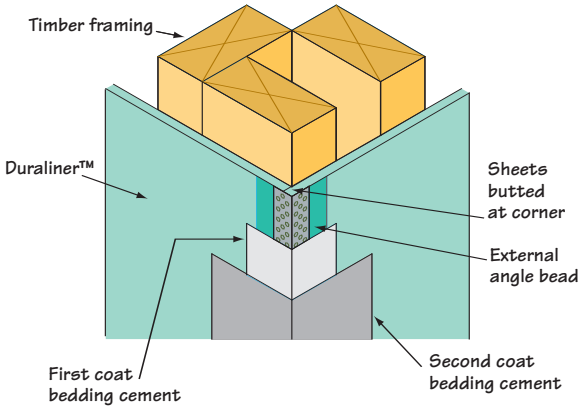


Figure 17 - Flush Jointing External Corner



Dry Clad Masonry Walls

Duraliner™ can be used to cover brick and masonry construction to obtain a smooth flat finish for subsequent decoration or tiling.

Table 2 summarises the various methods recommended, their applications and limitations.

Table 2

Summary of recommended methods, applications and limitations.

Method	Clay Brick Concrete Blocks Concrete	AAC	Figure	Remarks
Direct Adhesive	4	7	18	1 Not suitable for tiled walls 1 Not suitable for use with Thermalite AAC base wall 1 Base wall must be flat and true 1 Base wall must provide good adhesion – not flaking or contaminated with dust, oil or grease. 1 Do not use externally or in areas subject to moisture penetration
Timber Batten	4	4	19	1 Recommended for use with tile applications 1 Suitable for uneven and misaligned walls 1 May be used over flaking walls and drummy render 1 Provides a cavity for services if required
Steel Batten or Furring	4	4	19	
Furring & Clip Systems	4	4	20	
Plastic Nails	7	4	21	1 For use with Thermalite AAC 1 Suitable for tile applications

Direct Adhesive Fixing

Sheets may be installed horizontally or vertically.

Ensure wall is:

- Clean and dry
- Free from contaminants such as dust, oil or grease which will prevent good bonding

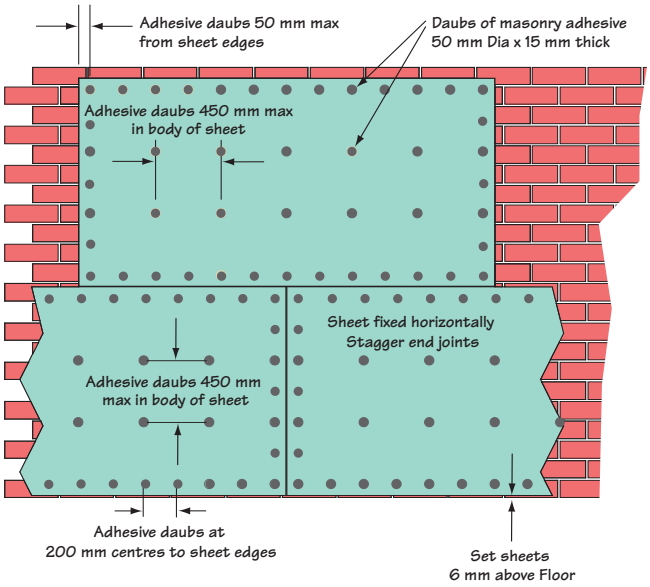
Using a good quality plaster based masonry adhesive, apply 50 mm x 15 mm high daubs of adhesive to the wall. Daubs must be applied at a maximum spacing of 450 mm throughout the body of the sheet and less than 50 mm from all sheet edges. It is recommended that the daubs be spaced at 200 mm centres around the sheet edges, particularly if cornices or architraves are to be fitted.

Position the Duraliner™ sheets so that they are 6.0 mm clear of the floor.

Press the Duraliner™ lining into the adhesive, ensuring the sheet finishes flat and true; use of a straight edge is recommended.

Apply temporary restraints, either props or nails into the base wall mortar joints until the adhesive is dry – normally 24 hours. Nail the temporary restraints about 600 mm centres around the sheet perimeter and at about 1200 mm centres in the body of the Duraliner™.

Figure 18 - Duraliner™ Installation to Masonry Wall Direct Adhesive Fixing

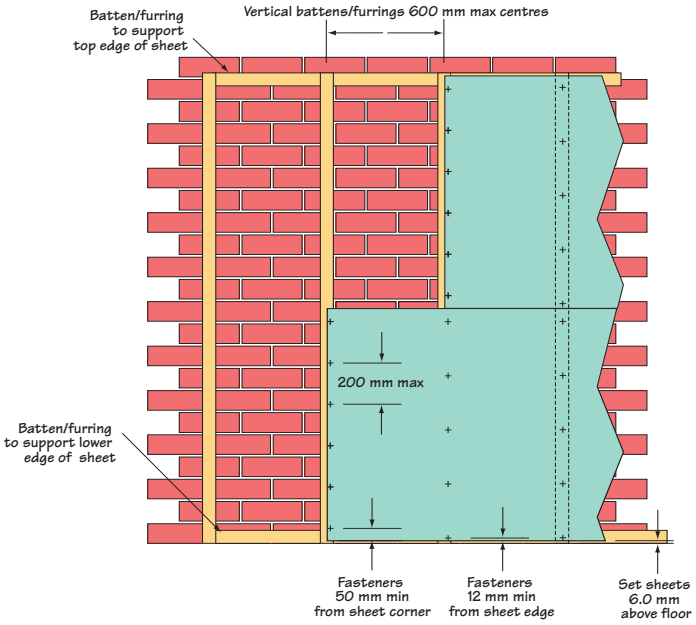


Control joints should be installed:

- To coincide with any movement control (expansion) joints in the structure.
- At the junction of any dissimilar base wall type or construction.
- To break any continuous run of Duraliner™ greater than 5.4 m.

Battens and Furrings

Figure 19 - Typical Duraliner™ Installation to Masonry Wall Battens/Furrings



Install services before installing Duraliner™.

Install Duraliner™ in accordance with Figure 2.

Sheet ends to be joined centrally over a batten or furring channel. For untiled walls fix at a maximum of 200 mm centres on sheet ends and at 300 mm maximum centres in the body of the sheet.

For tiled walls, fixings are to be at a maximum of 200 mm centres on the sheet ends and also in the body of the sheet. Where the wall is to be tiled, it is recommended that noggings be installed under all sheet joints to alleviate any sheet deflection upon impact.

Control joints should be installed:

1. To coincide with any movement control (expansion) joints in the structure.
1. At the junction of any dissimilar base wall type or construction.
1. To break any continuous run of Duraliner™ greater than 4.2 m tiled applications or 5.4 m un-tiled applications.

Timber and Steel Battens

Sheets may be installed horizontally or vertically.

The wall should be battened out generally in a accordance with Figure 19.

Timber battens should have a minimum thickness of 40 mm to allow adequate nail penetration and holding. Timber battens that support sheet joints should have a minimum face width of 45 mm. All other battens should have a minimum face width of 35 mm.

Steel battens/furrings that support sheet joints should have a minimum face width of 38 mm. All other steel battens/furrings should have a minimum face width of 30 mm.

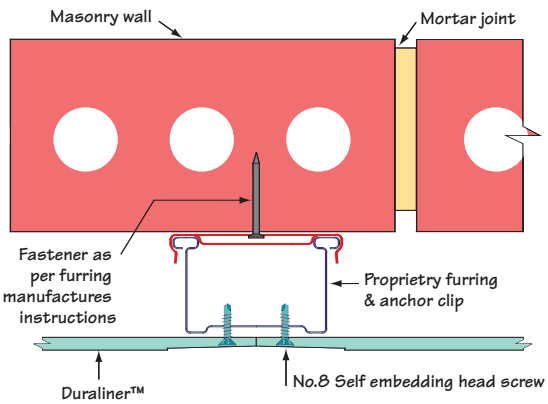
Typical steel batten systems are Rondo Part No 129 or 308 furring channels with Rondo Part No 237 clips, or MBS FC18/FC28 channels with C37 clips.
See Figure 20.

Vertical battens must be provided at a maximum of 600 mm centres to suit sheet joints.

The battens should be packed to correct any misalignment or unevenness in the base wall.

Fix the battens to the base wall using suitable masonry nails or wall anchors.

Figure 20 - Typical Steel Batten Systems



Plastic Nails

This system is only suitable for use with standard density (500 kg / m3) – Autoclaved Aerated Concrete (AAC) block walls. For higher density AAC use the furring channel system.

The base wall should be flat and true (maximum variation must not exceed 15 mm).

Sheets may be installed horizontally or vertically.

The sheet layout should be generally in accordance with Figure 18.

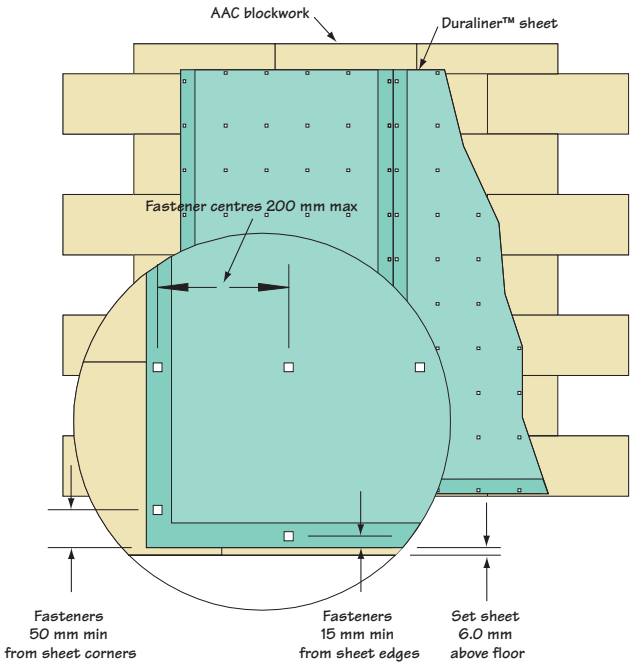
Chase the walls and install any services before installing Duraliner™.

Using an 8 mm hole punch, indent the Duraliner™ lining at all fastening points to locate and assist penetration of the plastic nails. See Figure 21.

Install the Duraliner™ sheets, and fix by hammering the plastic nails flush with the sheet surface.

Note the plastic nails must not be installed closer than 50 mm to sheet corners or closer than 15 mm to sheet edges.

Figure 21 - Duraliner™ Installation to AAC With Plastic Nails



Control joints should be installed:

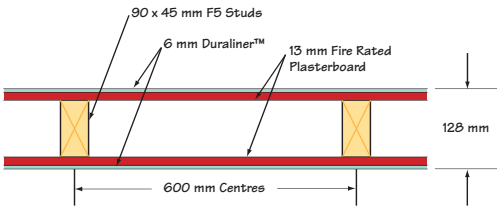
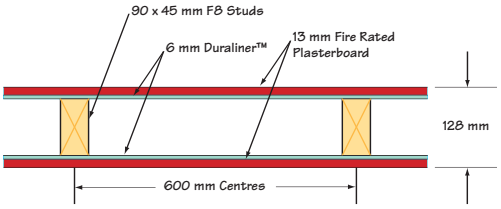
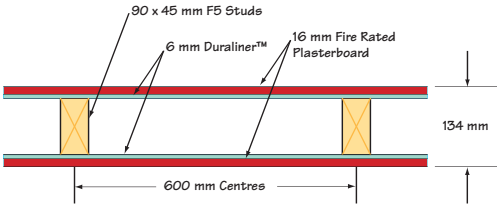
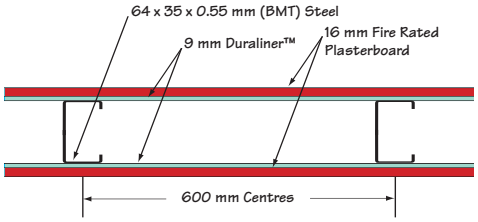
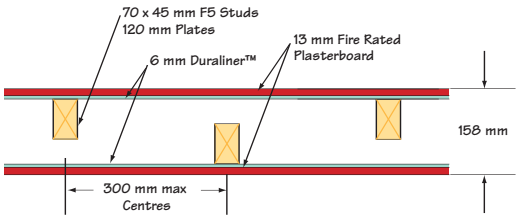
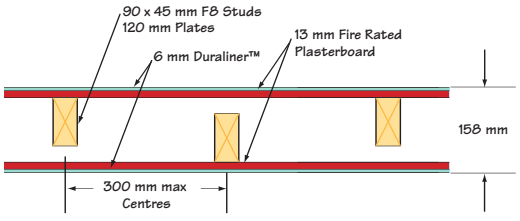
- To coincide with any movement control (expansion) joints in the structure.
- At the junction of any dissimilar base wall type or construction.
- To break any continuous run of Duraliner™ greater than 4.2 m tiled applications or 5.4 m un-tiled applications.

Fire and Acoustic Rated Internal Walls

Duraliner™ is suitable for internal wall applications where fire and acoustic ratings are required.

Some typical construction details and their performance characteristics are depicted in Table 3.

Table 3
Single and Staggered Stud Construction

FRL	Weighted Sound Reduction Index (Rw)	Cavity Infill	Construction Detail
60/60/60 BRANZ Test No. FR 2752-1	46	Nil	
	51	50mm Fibreglass insulation 12kg/m³	
	50	50mm Polyester Fibre insulation 12kg/m³	
60/60/60 BRANZ Test No. FR 2753-1	46	Nil	
	51	50mm Fibreglass insulation 12kg/m³	
	50	50mm Polyester Fibre insulation 12kg/m³	
90/90/90 BRANZ Test No. FR 2754-1	47	Nil	
	50	50mm Fibreglass insulation 12kg/m³	
	48	50mm Polyester Fibre insulation 12kg/m³	
120/120/120 BRANZ Test No. FR 2755-1	47	Nil	
	52*	50mm Fibreglass insulation 12kg/m³	
	52	50mm Polyester Fibre insulation 12kg/m³	
60/60/60 BRANZ OPINION No. FAR 1542-1	50	Nil	
	57*	50mm Fibreglass insulation 12kg/m³	
	55	50mm Polyester Fibre insulation 12kg/m³	
60/60/60 BRANZ OPINION No. FAR 1542-1	48	Nil	
	57	50mm Fibreglass insulation 12kg/m³	
	54	50mm Polyester Fibre insulation 12kg/m³	

The Rw Values are opinions based on tests conducted by Acoustic Laboratories Australia.
*Denotes actual test carried out by ALA (Acoustic Laboratories Australia) Pty Ltd.

Bracing

BGC Duraliner™ can be used to provide bracing to resist racking loads due to wind loadings when installed vertically.

The use of Duraliner™ to provide bracing on timber dwellings are those built to the Australian Standard for "Residential timber-framed construction".

AS1684.2-1999 (Non-cyclonic areas)
AS1684.3-1999 (Cyclonic areas)

Racking forces due to wind loading shall be calculated as per these Australian Standards.

For bracing data on other construction methods and applications, contact your BGC Fibre Cement Sales Office.

Nominal Wall Bracing

Up to 50% of the total bracing requirements can be supplied by BGC Duraliner™ sheeting installed normally. To be eligible for inclusion in calculations as nominal wall bracing:

- The minimum length of each nominal bracing panel shall be 450mm.
- Nominal bracing shall be distributed evenly throughout the building.

The Bracing Capacity for nominal bracing is given in the following table.

Nominal Sheet Bracing Walls

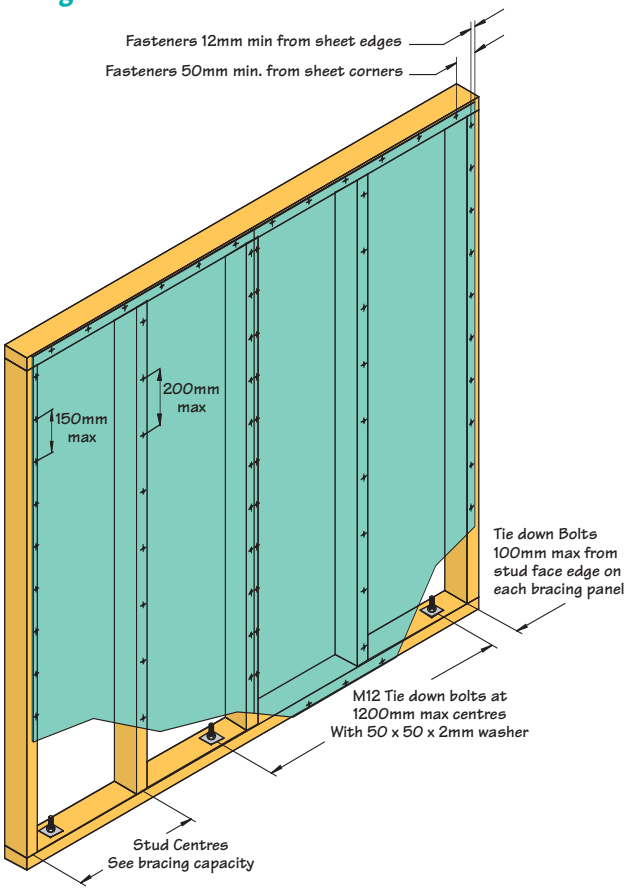
Method	Bracing Capacity (kN/m)
Sheeted one side only	0.45
Sheeted two sides	0.75

Structural Wall Bracing

The use of Duraliner™ is not limited to the provision of nominal wall bracing.

Figure 22 gives the design bracing capacity for panels secured with tie down bolts. This table can be considered to be an addition to Table 8.18, AS1684.2-1999/AS1684.3 - 1999.

Figure 22 - Duraliner™ Bracing Capacity Using Tie Down Bolts



Fastener Spacing

When using tie down bolts, fasteners are to be fixed at 150 mm max around sheet perimeter and 200 mm max in the body of the sheet.

Stud Centre (mm)	Cladding	Bracing Capacity (kN/m)ULS*
600	One Face Only	2.40
450	One Face Only	2.70
600	Both Faces	3.40+
450	Both Faces	3.80+

*Ultimate Limit State design.

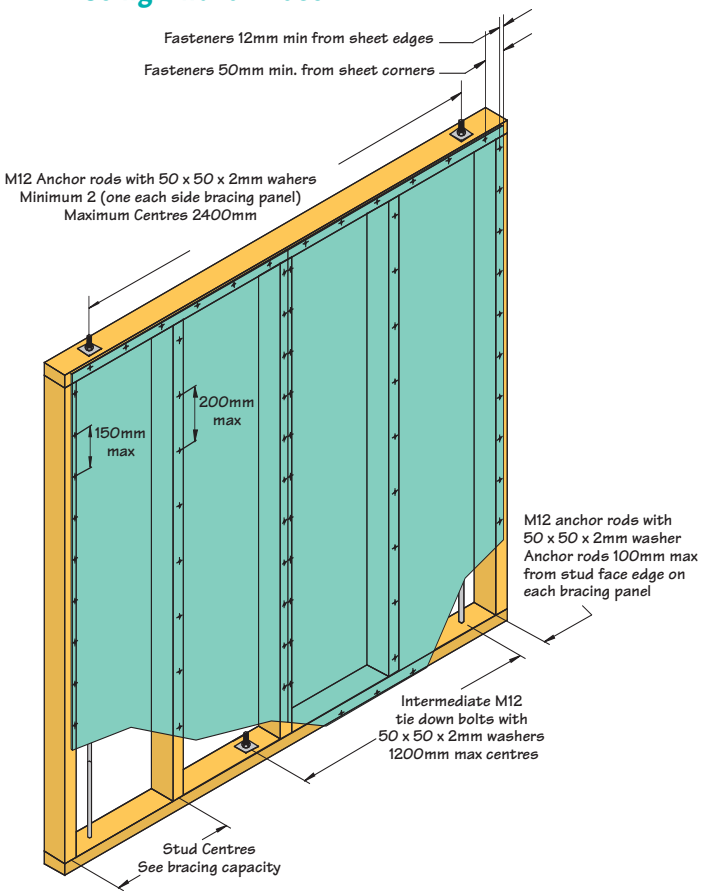
These results are from testing on JD5 Grade timber. If hardwood frames (JD2) are used, the ULS will increase by 12.5%.

Permisable Stress Design (PSD) = $\frac{\text{Ultimate Limit State (ULS)}}{1.5}$

+Calculated through interpolation.

Figure 23 gives the design bracing capacity for panels secured with anchor rods. This table can be considered to be an addition to Table 8.18, AS1684.2-1999/AS1684.3 - 1999.

Figure 23 - Duraliner™ Bracing Capacity Using Anchor Rods



Fastener Spacing

When using anchor rods, fasteners are to be fixed at 150 mm max around sheet perimeter and 200 mm max in the body of the sheet.

Stud Centre (mm)	Cladding	Bracing Capacity (kN/m)ULS*
600	One Face Only	4.95
600	Both Faces	5.10

*Ultimate Limit State design.

These results are from testing on JD5 Grade timber. If hardwood frames (JD2) are used, the ULS will increase by 12.5%.

Permisable Stress Design (PSD) = $\frac{\text{Ultimate Limit State (ULS)}}{1.5}$

Panels Height Greater Than 2700mm

The bracing capabilities, Figure 22 and 23 are applicable to a maximum panel height of 2700mm.

For panel heights greater than 2700mm the bracing capacity shall be reduced using the panel height multipler given in the below table.

Bracing Capacity - Panel Height Multiplier

Wall Height (mm)	Multiplier
3000	0.9
3300	0.8
3600	0.75
3900	0.7
4200	0.64

Panel Length Less Than 900mm

The bracing capabilities, Figure 22 and 23 are applicable to a minimum panel length of 900mm. Effective bracing is achievable with panel lengths down to 450mm. Reduce the bracing capacity for panel between 450mm and 900mm long, using panel length multiplier given in the below table.

Bracing Capacity - Panel Length Multiplier

Panel Length (mm)	Multiplier
850	0.92
800	0.83
750	0.75
700	0.66
650	0.58
600	0.50
550	0.42
500	0.33
450	0.25

Ceramic Tiling

Duraliner™ sheets used as a substrate for Ceramic tiles must be fixed to the framing with either screws or nails (adhesive fixing of sheeting is not acceptable for tiled applications). Framing must support all sheet edges.

For fixing of tiles follow the tile manufactures instructions. BGC recommend the use of a flexible tile adhesive complying with Part 1 of Australian Standard AS 2358 – 1980 "Adhesives - For Fixing Ceramic Tiles". In some tropical regions flexible adhesives may not be suitable – check with tile merchant or adhesive manufacturer for recommendations.

Lighting

It is important to understand how the overall wall or ceiling appearance is affected by glancing light (light that shines obliquely across the surface of the wall or ceiling) and the choice of decoration.

Lighting design is very much a matter of cause and effect. The Australian Standard AS2589-1997 details six levels of finish. It is recommended designers give consideration to the level of finish required and eliminate potential problems due to critical lighting.

Painting

BGC recommend that at least two coats of paint be applied. The choice of decoration is dependent upon the level of finish required. The paint manufacturer's recommendation on application and maintenance of the paint system must be followed.

Maintenance

Duraliner™ when used in accordance with this literature requires no direct maintenance. However in wet areas, regular checks (at least annually) must be made of the tiling system to ensure it remains watertight. Any cracked or damaged tiles, tile grout, or sealants must be replaced or repaired immediately as for new work. Any grout or sealant likely to allow leakage must be raked out and restored to original condition.

Damaged sheets should be replaced as originally installed as for new work.

Eaves and Soffits

Movement Control (Expansion) Joints

BGC Fibre Cement 6mm Duraliner™ sheets are suitable as a soffit lining in both commercial and residential building applications, where large smooth soffits or coffered ceiling areas are required.

For long runs of sheets and or large sheet areas, with set-joints, movement control (expansion) joints must occur at maximum proscribed distances, within the context of the architectural details, climate and loading conditions.

General Installation

Generally, set joint areas should not exceed 20m2, with a maximum distance of 3.6m across the sheets and a maximum of 5.4m along the sheets, as shown in Figure 1.

Other configurations may be used, dependent on the architectural details, climate and wind load conditions, providing that they do not exceed the maximum allowable area of 20m2.

Before fixing out, check the support spacing, sheet length to width layout, with the architect, to minimize number of set-joints.

For information of support spacing in high wind regions refer to the next section; Wind Loading.

Install and fix Duraliner™ sheets across the support framing, with appropriate movement control joints, see Figure 1.

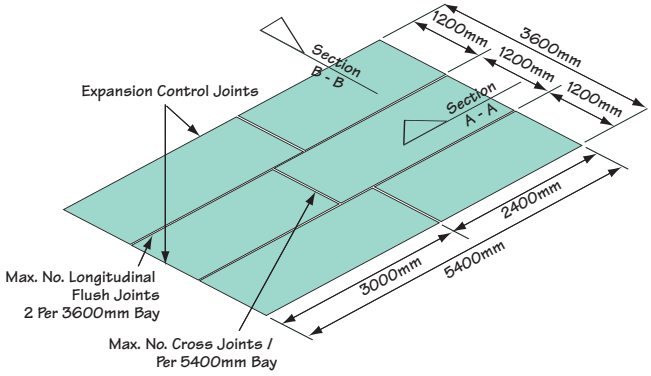
Sheets must be fixed in staggered pattern with adjacent butt set-joints on alternate support members, as shown in Figure1.

To prevent drummy sheets, Duraliner™ sheet should be firmly fixed from the centre outward.

Do not use adhesives.

Eaves and Soffits

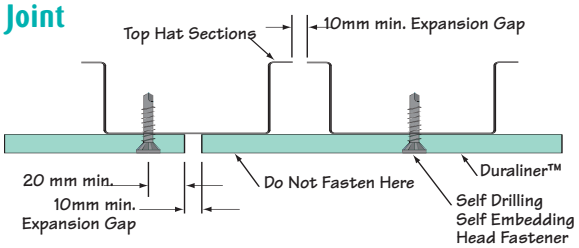
Figure 1 - Duraliner™ Movement Control Bay Layout, General Configuration.



The configuration shown may vary dependent on the architectural details, climatic and wind load conditions.

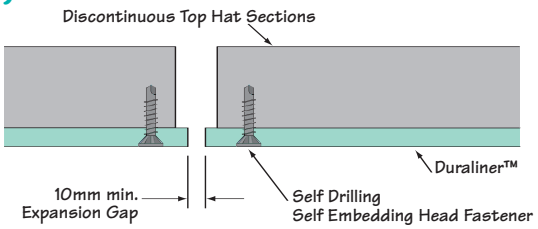
Duraliner™ soffit sheet supporting members must be discontinuous across the movement control joints, as shown in Figure 2 and 3.

Figure 2 - Longitudinal Movement Control Joint



One sheet edge must be free to move across the adjacent supporting member.

Figure 3 - Transverse Movement Control Joint



Supporting members must be discontinuous across the joint.

It is preferable to fix set-joint sheets to an independent support system, such clip-fixed CFS galvanized steel furring channels, designed to allow for ventilation of the ceiling space and hence obviate heat build-up and consequent adverse thermal movements.

Where, for severe climatic, design and or other reasons, this is not possible and or practical, an alternative is to set out the Duraliner™ sheets with movement control joints, at a maximum spacing of 2.4 m; for 1200mm wide sheets or 1.8m; for 900mm wide sheets.

Where the ceiling space is less than 300mm deep, adverse thermal conditions may prevail; therefore provision should be made for ventilation slots at the eave's or soffit's outer and inner edges, to ventilate the ceiling space.

Duraliner™ sheets must not be fixed directly to CFS Cee section galvanized steel or hot-rolled steel purlins, under insulated or un-insulated metal deck roofing.

For external weather protected ceiling areas, setting and jointing compound systems must be of the water resistant type, in accordance with AS3740-1994.

Wind Loading

The following supportive information is to assist in the design and fixing 6mm Duraliner™ in high wind areas.

Prior to fixing sheets in place, ensure that the supporting structural systems comply with the BCA and have been certified by a professional engineer.

Design to AS 4055-1992

AS 4055-1992 is applicable for residential applications and the tabulated data is suitable for both timber and lightweight CFS steel framing systems.

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Warranty

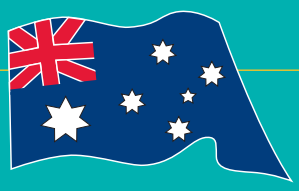
BGC warrants its products to be free from defects caused by faulty manufacture or materials. If any of its products are so defective the Company will at its option, repair or replace them, supply equivalent replacement products or reimburse the purchase price.

This warranty shall not apply to any loss or consequential loss suffered through or resulting from defects caused by faulty manufacture or materials.

Fittings or accessories supplied by third parties is beyond the control of BGC and as such is not warranted by BGC.

ISO 9002
QEC 2955/13

Supersedes all previous publications.



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