

Internal lining

Installation guide

Villaboard® lining



James Hardie
A smarter way to build

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WE VALUE YOUR FEEDBACK

To continuously improve the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

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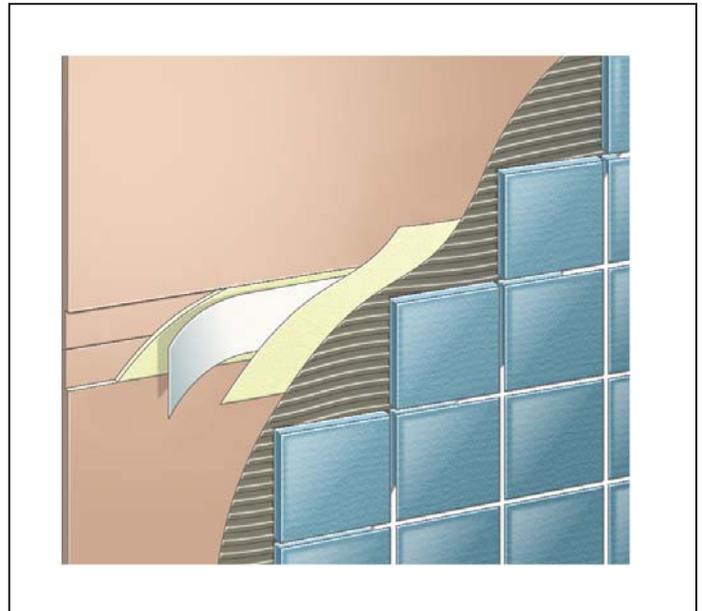
1 INTRODUCTION

James Hardie Villaboard® lining is a premium sanded fibre cement sheet with recessed edges for flush jointing. Villaboard lining is an ideal internal lining for bathrooms, laundries, kitchens and high traffic abuse areas. It is not suitable as an external wall cladding.

6mm - Residential applications
9mm - Commercial applications
12mm - Heavy duty applications

The main features of Villaboard lining are:

- Durable wet area lining sheet.
- Creates suitable surface for tiles, paint or wallpaper.
- Long edges recessed for easy flush-jointing.
- Reliable impact resistant lining. Ideal for wall lining in commercial applications where walls are prone to damage.
- Suitable for use in fire and acoustically rated systems.



This manual covers the use of Villaboard lining in internal wall and ceiling applications. Further technical literature relating to Villaboard lining is available from James Hardie in the following manuals:

- Eaves and soffits Technical Specification.
- Wet area construction Design Manual.
- Fire and acoustically rated walls technical manuals.

The specifier or other responsible party for the project must ensure the information and details in this guide are appropriate for the intended application and that specific design and detailing is undertaken for areas which fall outside the scope of this documentation.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.com.au or Ask James Hardie™ on 13 11 03.

TABLE 1

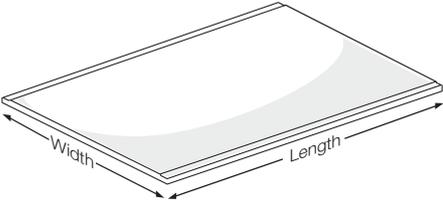
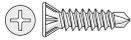
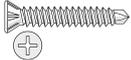
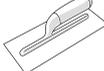
VILLABOARD LINING SHEET SIZES				
PRODUCT	LENGTH	WIDTH		
		900	1200	1350
Smooth recessed edge fibre cement internal lining sheet for tiled and untiled applications. Recommended applications are: 6mm - Residential applications 9mm - Commercial applications 12mm - Heavy duty applications 	6mm thickness			
	1800		✓	
	2400	✓	✓	✓
	2700		✓	
	3000	✓	✓	✓
	3600		✓	✓
	4200		✓	✓
	9mm thickness			
	2400		✓	
	2700		✓	
	3000		✓	✓
	3600		✓	
	12mm thickness			
	3000		✓	

TABLE 2

PRODUCT / ACCESSORIES / TOOLS			
COMPONENTS SUPPLIED BY JAMES HARDIE			
ACCESSORIES	DESCRIPTION	ACCESSORIES	DESCRIPTION
	HardiBlade® saw blade Ø 185mm poly diamond blade, for fast, clean cutting of James Hardie fibre cement.		James Hardie base coat Water resistant base coat used in the setting of Villaboard joints.
	HardiDrive® screw For fastening to 0.8mm - 1.6mm BMT steel frames. Length: 22mm and 32mm Quantity: 1000		James Hardie top coat Water resistant top coat which is used over James Hardie base coat.
	JH score and snap knife Scoring tool for easy cutting.		James Hardie joint sealant Paintable polyurethane joint sealant for use in movement joints. Volume: 300ml
	Fibreshear Electric cutting tool.		
COMPONENTS NOT SUPPLIED BY JAMES HARDIE			
James Hardie recommends the following products for use in conjunction with its Villaboard lining. James Hardie does not supply these products and does not provide a warranty for their use. Please contact the component manufacturer for information on their warranties and further information on their products.			
ACCESSORIES	DESCRIPTION	ACCESSORIES	DESCRIPTION
	Galvanised fibre cement nails 30mm x 2.8 fibre cement nails.		Broadknife For setting of joints on Villaboard lining.
	Buildex FibreZIPS® For fastening 6mm Villaboard lining to 0.55mm to 0.75mm BMT steel frames. Length: 20mm ® denotes a registered mark of Buildex		Second coat trowel 200mm For installing second coats on set joints.
	Buildex FibreZIPS For fastening 9 and 12mm Villaboard lining to 0.55mm to 0.75mm BMT steel frames. Length: 30mm		Finishing coat trowel For installing top coats on set joints.
	Backing rod Backing to sealant in movement joints.		Corner tool For setting of internal corners.
	Perforated paper tape Joint reinforcing tape.		Hawk To assist in the application of finishing compounds especially with the use of trowels.
	Level/straight edge For checking straightness of frame.		Hand sander For sanding set joints.
	Hand guillotine Guillotine for cutting fibre cement.		Notched trowel For applying tile adhesive to face of Villaboard lining.
			Stud adhesive For fastener/adhesive fixing to timber and steel studs. Must be suitable for fibre cement.

2 SAFE WORKING PRACTICES

WARNING - DO NOT BREATHE DUST AND CUT ONLY IN WELL VENTILATED AREA

James Hardie products contain sand, a source of respirable crystalline silica which is considered by some international authorities to be a cause of cancer from some occupational sources. Breathing excessive amounts of respirable silica dust can also cause a disabling and potentially fatal lung disease called silicosis, and has been linked with other diseases. Some studies suggest smoking may increase these risks. During installation or handling: (1) work in outdoor areas with ample ventilation; (2) minimise dust when cutting by using either 'score and snap' knife, fibre cement shears or, where not feasible, use a HardiBlade® saw blade and dust-reducing circular saw attached to a HEPA vacuum; (3) warn others in the immediate area to avoid breathing dust; (4) wear a properly-fitted, approved dust mask or respirator (e.g. P1 or P2) in accordance with applicable government regulations and manufacturer instructions to further limit respirable silica exposures. During clean-up, use HEPA vacuums or wet cleanup methods - never dry sweep. For further information, refer to our installation instructions and Material Safety Data Sheets available at www.jameshardie.com.au. FAILURE TO ADHERE TO OUR WARNINGS, MATERIAL SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

JAMES HARDIE RECOMMENDED SAFE WORKING PRACTICES

CUTTING OUTDOORS

1. Position cutting station so wind will blow dust away from the user or others in working area.
2. Use one of the following methods based on the required cutting rate:
 - Best**
 - Score and snap
 - Hand guillotine
 - Fibreshear
 - Good**
 - Dust reducing circular saw equipped with HardiBlade® saw blade and HEPA vacuum extraction.

CUTTING INDOORS

- Cut only using score and snap, hand guillotine or fibreshears (manual, electric or pneumatic).
- Position cutting station in a well-ventilated area.

REBATING/SANDING/DRILLING/OTHER MACHINING

When rebating, sanding, drilling or machining you should always wear a P1 or P2 dust mask and warn others in the immediate area.

IMPORTANT NOTES

1. For maximum protection (lowest respirable dust production), James Hardie recommends always using "Best" - level cutting methods where feasible.
2. NEVER use a power saw indoors.
3. NEVER use a circular saw blade that does not carry the HardiBlade® logo.
4. NEVER dry sweep - Use wet suppression or HEPA vacuum.
5. NEVER use grinders.
6. ALWAYS follow tool manufacturers' safety recommendations.

P1 or P2 respirators should be used in conjunction with above cutting practices to further reduce dust exposures. Additional exposure information is available at www.jameshardie.com.au to help you determine the most appropriate cutting method for your job requirements. If concern still exists about exposure levels or you do not comply with the above practices, you should always consult a qualified industrial hygienist or contact James Hardie for further information.

WORKING INSTRUCTIONS

Refer to recommended safe working practices before starting any cutting or machining of product.

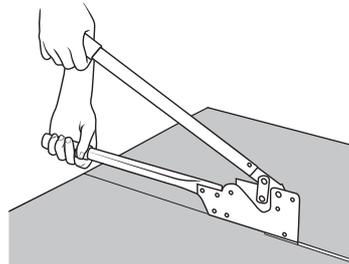
Score and Snap

Score and snap is a fast and efficient method of cutting James Hardie building products using James Hardie's special tungsten tipped score and snap knife.

Preferably score on the face side of the product. Score against a straight edge and repeat the action to obtain adequate depth for clean break – normally one third of sheet thickness. Snap upwards to achieve break. Smooth any rough edges with a rasp.

Hand guillotine

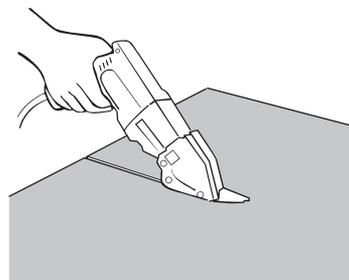
Make guillotine cut on the off-cut side of line to allow for the thickness of



the blade.

Fibreshear

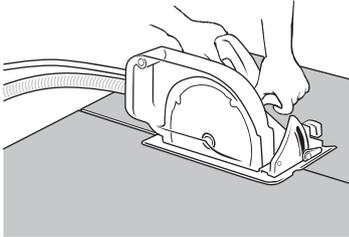
An electrically powered, fast, clean and effortless way of cutting James Hardie building products, especially around curves such as archways. Make fibreshear cut on the 'off-cut' side of the line to allow for the



thickness of the shear.

HardiBlade® saw blade

The HardiBlade® saw blade used with a dust-reducing saw and HEPA vacuum extraction allows for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust deflector or a dust collector which can be connected to a vacuum system. When sawing, clamp a straight-edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.



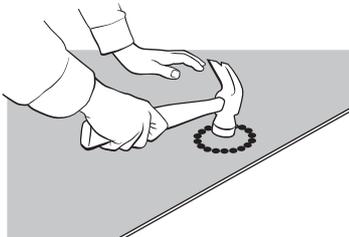
HOLE-FORMING

For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet.
- Pre-drill a pilot hole.
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill.

For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face.
- Tap carefully to avoid damage to sheets, ensuring the sheet edges are properly supported.



STORAGE AND HANDLING

To avoid damage, all James Hardie building products should be stored with edges and corners of the sheets protected from chipping.

James Hardie building products must be installed in a dry state and protected from rain during transport and storage. The product must be laid flat under cover on a smooth level surface clear of the ground to avoid exposure to water, moisture, etc.

QUALITY

James Hardie conducts stringent quality checks to ensure any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

3 FRAMING / SUBSTRATE

GENERAL

Villaboard lining can be fixed to either timber framing, light gauge domestic type steel framing and masonry, concrete or autoclaved aerated concrete (AAC) substrates. The framing and substrate used must comply with the relevant building regulations and standards and the requirements of this manual.

NOTE

Stud spacings restrict the thickness of tiles used to finish Villaboard lining. For more information refer to the Finishes and Maintenance section on page 16.

TIMBER

Use only seasoned timber. Unseasoned timber must not be used as it is prone to shrinkage and can cause Villaboard lining and frames to move. Studs must not be less than 38mm wide at joints.

'Timber used for house construction must have the level of durability appropriate for the relevant climate and expected service life and conditions including exposure to insect attacks or to moisture, which could cause decay.'

Reference AS1684.2 - 1999 'Residential Timber Framed Construction'.

STEEL

The minimum size for steel stud framing should be 64mm deep x 0.55mm base metal thickness (BMT).

Steel framing must be designed in accordance with AS/NZS 4600 'Cold Formed Steel Structures'.

Steel sections shall be galvanised or zinc coated of 0.55mm - 1.6mm Base Metal Thickness (BMT). Studs must not be less than 38mm wide at joints.

MASONRY/CONCRETE/AAC

Always ensure the substrate is given adequate time to dry out before installation of Villaboard lining. The wall surface must be clean, dry and free of any material that will reduce an effective bond (e.g. dust, loose paint, oil, drummy render, waterproofing or other agents, etc).

Chase walls, install services and secure to wall prior to fixing Villaboard lining.

FRAME TOLERANCES

Ensure frame is square and work from a central datum line. Frames must be straight and true to provide a flush face to receive the sheeting.



FIGURE 1 FRAME STRAIGHTNESS

A suggested maximum tolerance of between 3mm and 4mm in any 3000mm length of frame will give best results. Villaboard lining will not straighten excessively warped or distorted frames and any warping may still be visible after the internal lining is applied.

MASONRY/CONCRETE/AAC TOLERANCES

Cut Villaboard lining approximately 15mm less than floor to ceiling height to allow for building tolerances. Ensure a 5-10mm building tolerance gap is provided at the floor and ceiling junctions with the Villaboard lining. See Page 10 for specific substrate requirements.

CURVED WALLS

Villaboard lining may be bent to accommodate curved walls. The minimum bending radii are shown below.

TABLE 3

CURVED WALL MINIMUM BENDING RADII		
	Along length (mm)	Across width (mm)
6mm Villaboard lining	1800 (1200)	2400
9mm Villaboard lining	3000 (1800)	4000

NOTES

1. The bending radii given above require no special pre-wetting of the sheet and may be used on internal or external curves.
2. With extra care, the sheets can be bent to the values shown in the brackets.

To maintain the smoothness of the curve, studs are generally required at spacings as shown below.

TABLE 4

CURVED LINING - STUD SPACING	
RANGE OF RADII (mm)	STUD SPACING (mm)
1200	150
Above 1200 to 1800	200
Above 1800 to 3000	300
Above 3000 to 20000	*450
Above 20000	*600

*or at one third of the sheet width, whichever is the lesser.

4 SHEET LAYOUT

GENERAL

Install Villaboard lining across the framing, i.e. place the long edges of the sheet at right angles to the framing members. Villaboard lining can be fixed either horizontally or vertically, however horizontal fixing is recommended as the most convenient method in residential applications.

Sheet joints must coincide with the centre line of the framing member. At door and window openings, fix sheets around the opening so sheet edges do not coincide with the side of the door or window by a minimum distance 200mm. See Figure 2.

In areas that require greater joint performance and where glancing light is not an issue, it is recommended that Villaboard lining be installed vertically.

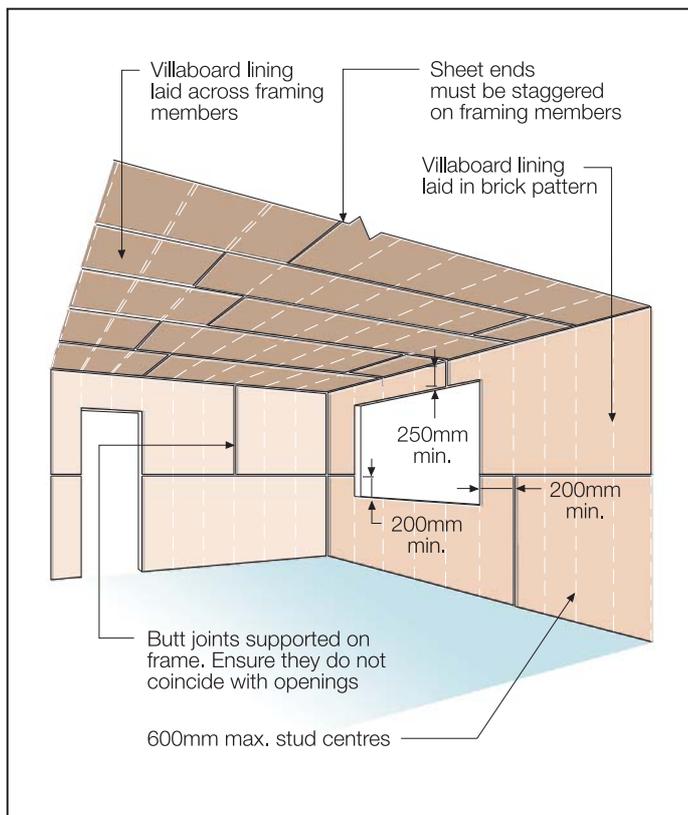


FIGURE 2 SHEET LAYOUT

5 INSTALLATION

GENERAL

- Install sheets after roofing and external cladding have been installed.
- Before setting the Villaboard lining sheet joints, ensure that the wall frames are fully loaded and that the sheets have been allowed to adjust to the internal temperature.

HOT DRY CLIMATES

In hot dry climates, ensure you:

1. Store Villaboard lining sheets and James Hardie joint setting compounds undercover and out of the weather.
2. Dampen all sheet edges with clean cold water before setting of sheet joints
3. Avoid making large amounts of James Hardie base coat to prevent the James Hardie base coat compound becoming dry
4. Always use clean cold water to mix the James Hardie Base Coat

Place 6mm packers along floor as temporary support for sheets. This will allow for any frame movement/shrinkage. Put first sheet in place as shown.



FIGURE 3 FIRST SHEET

Ensuring the sheet is level, fix the first sheet starting from the centre of sheet and working outwards to avoid any drumminess.



FIGURE 4 FIXING FIRST SHEET

Fix remaining sheets in similar sequence.



FIGURE 5 FIXING REMAINING SHEETS

NOTES

1. For fastener selection and spacings see pages 8-11.
2. Do not fix sheets to the bottom chord of roof trusses. Instead, fix to battens or furring channels.

FASTENERS

Fasteners must have the appropriate level of durability required for the intended project.

Fasteners must be fully compatible with all other material that they are in contact with to ensure the durability and integrity of the assembly.

NOTE: Screws are for steel frames and nails are for timber frames. For timber, use 30mm x 2.8mm galvanised fibre cement nails with a minimum head diameter of 6mm for 6 and 9mm thick Villaboard lining and 40mm x 2.8mm galvanised fibre cement nail for 12mm thick Villaboard. Contact fastener manufacturers for more information.

For fixing 6mm Villaboard lining to 0.55 – 0.75mm BMT steel framing, use 20mm Buildex FibreZIP screws (use 30mm screws for 9 and 12mm sheets). For fixing 6mm Villaboard lining to 0.8 – 1.6mm BMT steel framing, use 22mm HardiDrive® screws (use 32mm screws for 9mm and 12mm sheets).

Fasteners should be driven flush as shown in Figure 6. Fasteners should be screwed as close as possible to the stud corners to avoid deflection of the stud flange, see Figure 7.

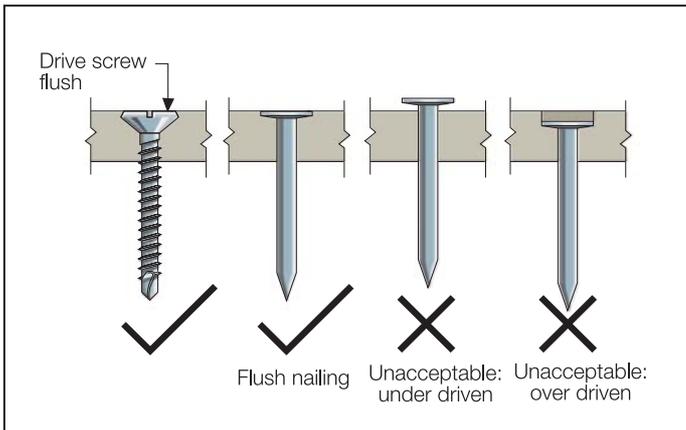


FIGURE 6 FASTENER DEPTH

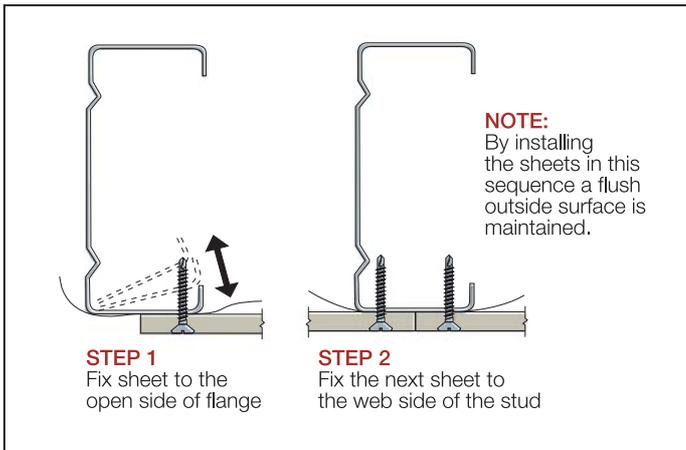


FIGURE 7 SCREW FASTENING

FIXING TO FRAMED WALLS

Untiled walls

Where Villaboard lining is to be left untiled, the sheets can be fixed with fasteners or a combination of fasteners and adhesive, see Figures 8 and 9 respectively.

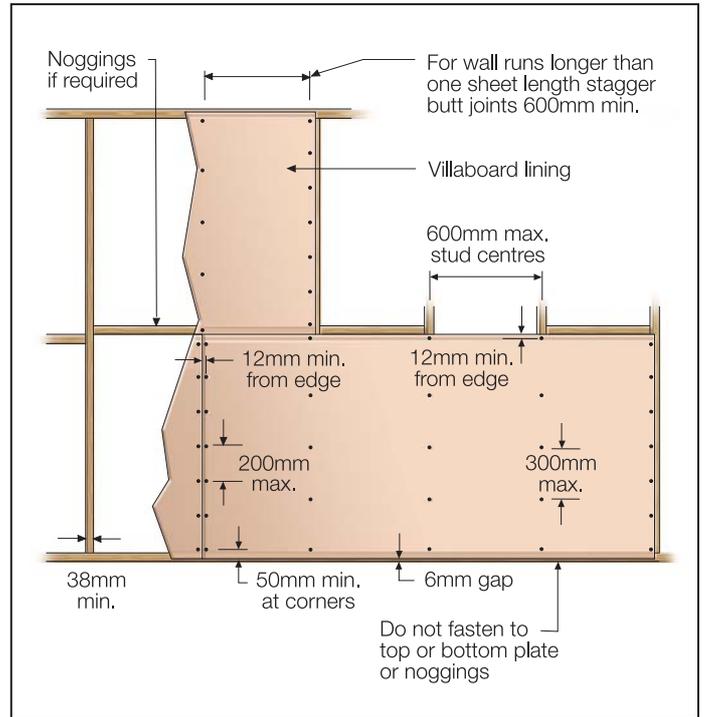


FIGURE 8 UNTILED FASTENING TO WALL FRAMES

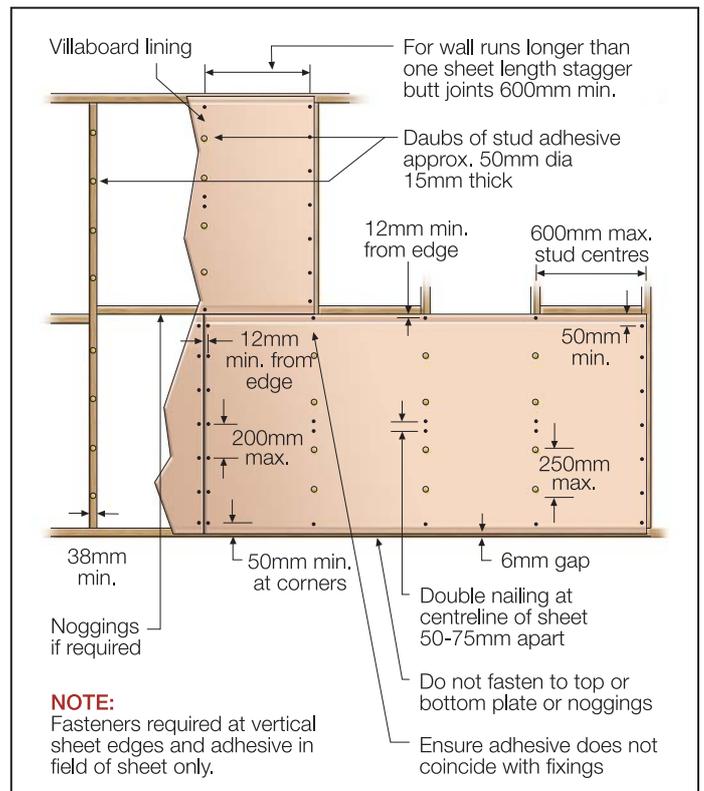


FIGURE 9 FASTENER / ADHESIVE FIXING TO WALL FRAMES

NOTES

1. When installing skirting tiles up to 300mm in height only fasten the bottom of the sheet to the bottom plate at 200mm maximum centres.
2. All surfaces to receive adhesive must be clean, free of dust, oil, etc.
3. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.
4. When fixing cornices it is recommended that Villaboard lining is wetted with a sponge prior to adhesive fixing of cornices.

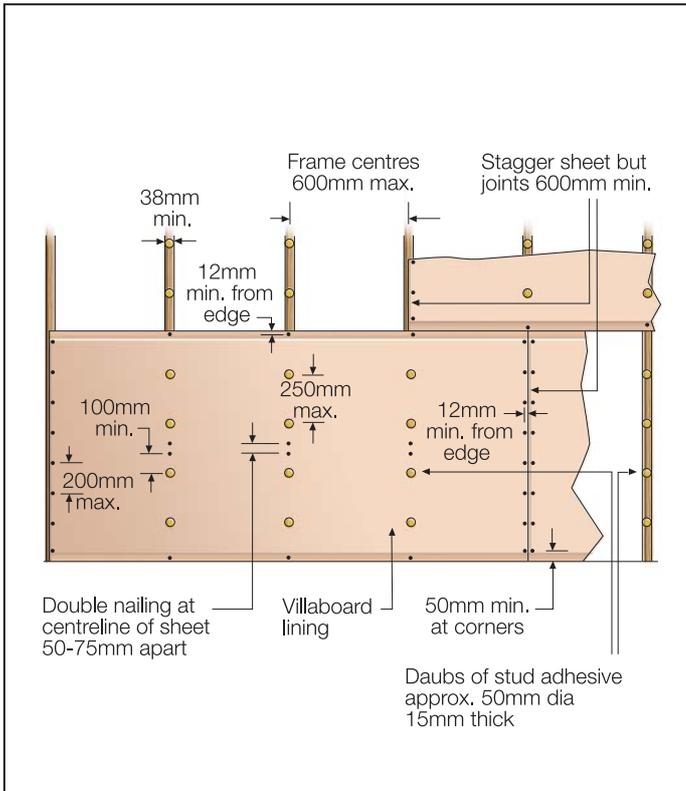


FIGURE 12 FASTENER / ADHESIVE FIXING TO CEILING FRAMES

NOTES

1. Do not use adhesive only. Ensure sheet perimeter is fastened as shown.
2. All surfaces to receive adhesive must be clean, free of dust, oil, etc.
3. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.

FIXING TO MASONRY/CONCRETE/AAC

Villaboard lining can be installed over masonry, concrete and Aerated Autoclaved Cement (AAC) substrates by following the requirements in Table 5 below.

TABLE 5

FIXING METHOD SELECTION		
METHOD	SUBSTRATE	APPLICATION
Batten/furring channels	Masonry/concrete AAC blocks	Tiled/untiled wet/dry areas with flat or uneven substrate.
AAC fixing	AAC	Untiled wet/dry areas.

BATTEN / FURRING CHANNELS

NOTE: Suitable for tiled or untiled applications.

1. Substrate may be uneven and misaligned – allows correction of irregular surfaces; allows packing out to accommodate large surface variations.
2. Recommended where the existing wall surface is not suitable for adhesive fixing due to flaking paint, drummy render, etc.
3. Timber battens are either fixed directly to the walls, or alternatively, metal furring channel anchor clips can be used. These are attached to the wall prior to fitting the metal furring channels.
4. Where services are run over walls, deeper furring channels may be used.
5. Use suitable masonry fasteners to securely fix timber/steel battens or recessed furring channels as shown in figure 14.
6. Pack behind battens as required to achieve a flat surface.
7. Support the Villaboard lining edges along the top and bottom of the wall.

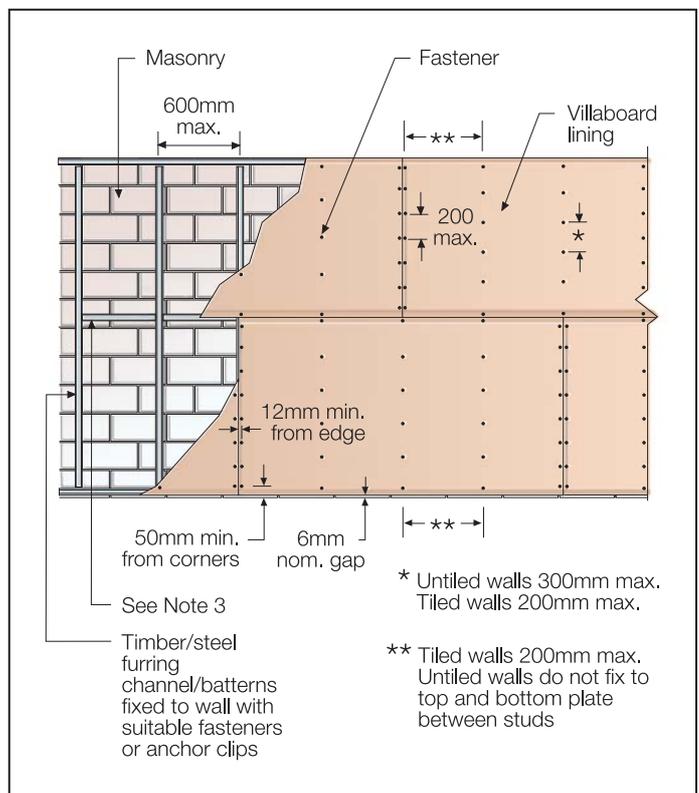


FIGURE 14 BATTEN / FURRING CHANNEL - HORIZONTAL LAYOUT

NOTES

1. Timber battens or proprietary steel battens or furring channel sections may be used. Where space is a major consideration, use recessed furring channels which have the least section depth.
2. The spacing and fixing of anchor clips must be in accordance with the manufacturer's recommendations.
3. Although not mandatory, when noggings are used it is good practice to install the nogging row in-line to enable fixing of abutting sheets.

6 JOINTS

GENERAL

Villaboard lining joints are set with proprietary jointing compounds reinforced with perforated paper tape. Both recessed edge and butt joints require joint setting by using the jointing products outlined.

The performance of joints is the responsibility of the installer, as this is governed by the installation practices and the standard of workmanship applied. However, James Hardie considers that the recommendations provided in Table 6 describe best practice to reduce the risk of joint cracking or other problems.

There are various factors that can affect the performance of jointing compounds on edge recessed fibre cement substrates. These factors include the framing, movement, installation quality, vibrations, moisture, humidity, temperature, etc. To achieve satisfactory joint performance these factors need to be carefully considered and understood by the installer and designer then positioning joints and selecting jointing compounds. Furthermore, it is important that the jointing compound used has the physical attributes required to perform considering these factors.

James Hardie Base Coat has been specifically developed for use with Villaboard lining and offer superior joint strength when compared with the gypsum jointing compound alternatives.

In addition, provision for movement needs to be made by the installation of control joints. See Page 15.

Extreme Hot Climates

Refer to page 7 for additional recommendations when installing Villaboard lining in extreme hot dry climates.

TABLE 6

JOINTING COMPOUND RECOMMENDATIONS			
	APPLICATION	BASE COMPOUND	TOPPING COMPOUND
Dry walls, ceilings and wet areas	Untiled	James Hardie Base Coat	James Hardie Top Coat
	Tiled	James Hardie Base Coat	N/A

SET JOINTS

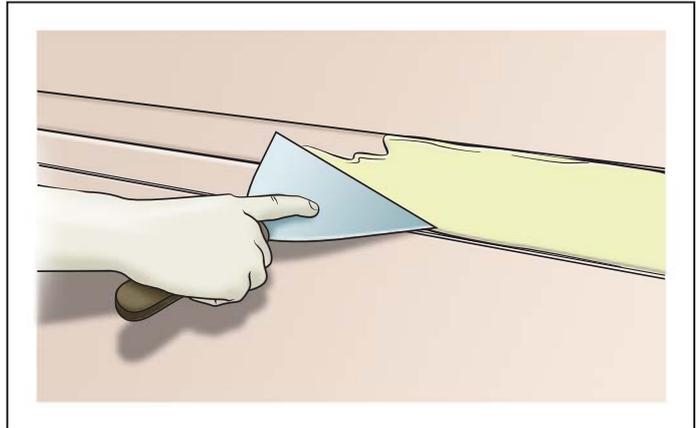
Step 1 - Preparation

Ensure that the recesses are clean and free of dust and contaminants. If working conditions are hot and dry, dampen the area around the joint prior to working.



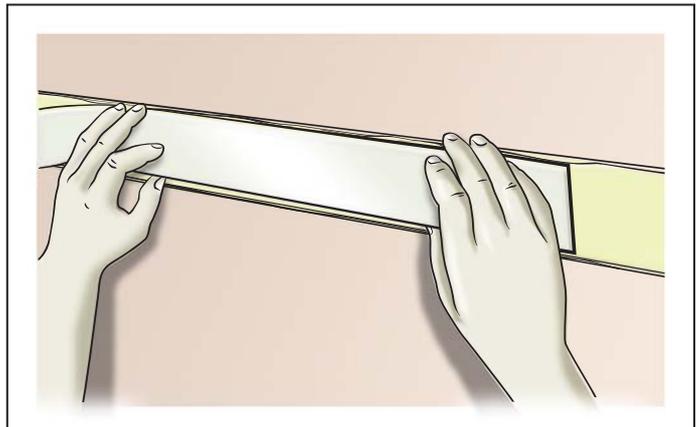
Step 2 - First coat

Apply James Hardie Base Coat to fill the recess with a 150mm broadknife.



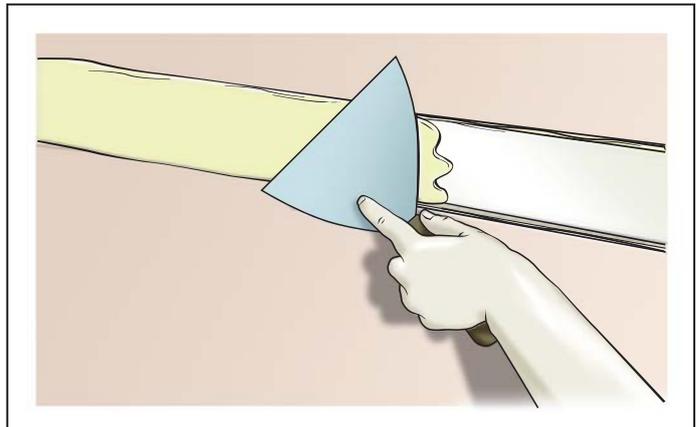
Step 3 - Embed tape

Firmly embed the perforated paper tape centrally into the joint using a 150mm broadknife. Ensure that there are no voids under the tape and remove excess compound.



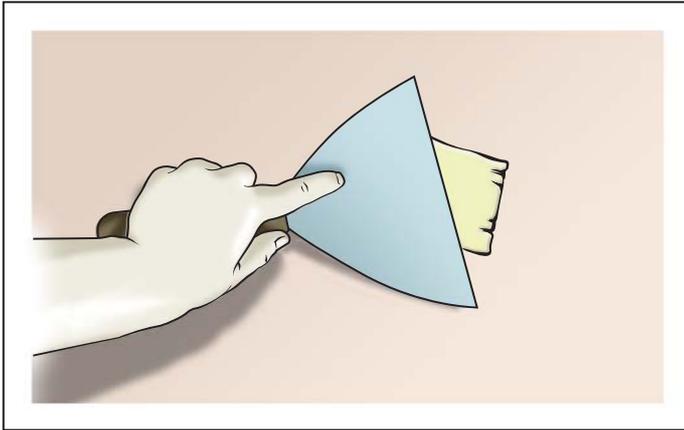
Step 4 - Thin layer

Immediately cover tape with a thin layer of James Hardie Base Coat applied with a 150mm broadknife.



Step 5 – Fastener heads

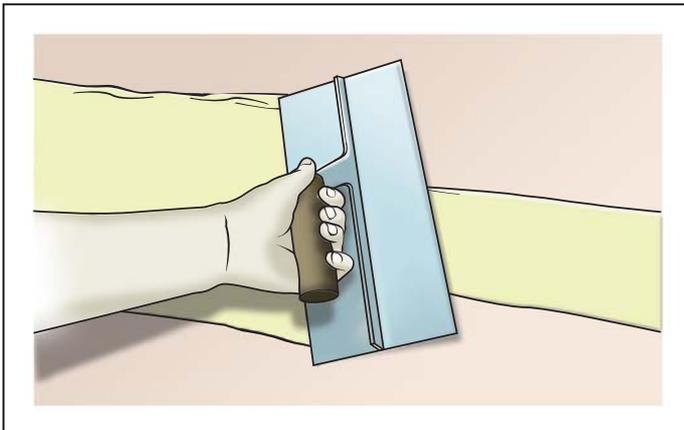
Cover all fastener heads with James Hardie Base Coat. Allow to dry before applying a second coat.



NOTE: Steps 6-9 are not required for tiled walls.

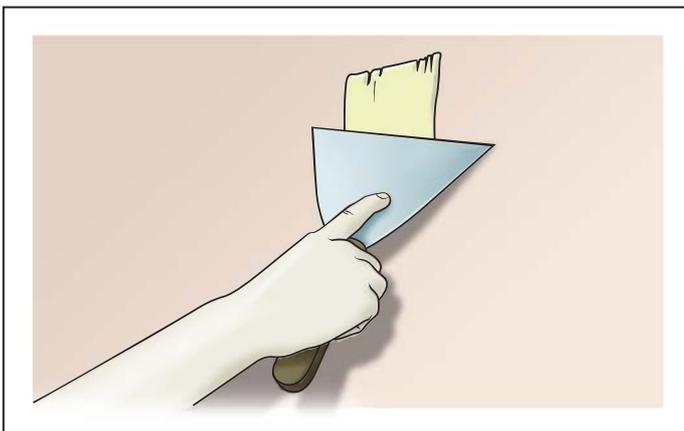
Step 6 – Second coat

When the base coat is fully dry, use a 200mm wide second coat trowel to apply the James Hardie Base Coat. Apply this coat approximately 180mm wide, laid down over the recess and feather the edges.



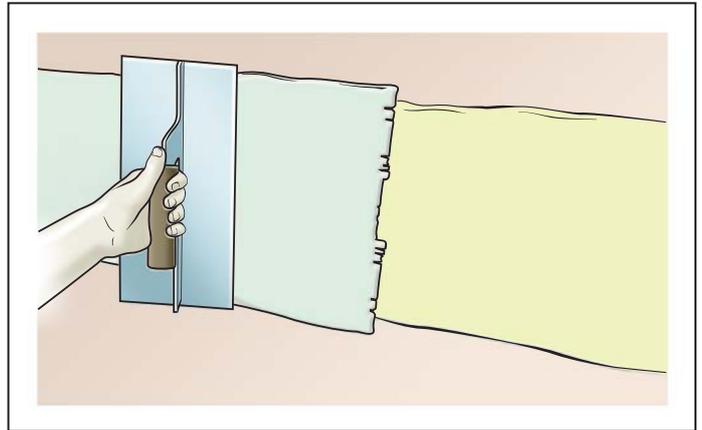
Step 7 – Fastener heads

Ensure the base coat is fully dry. Apply a second coat over fastener heads using the James Hardie Base Coat, overlapping the first by a minimum of 25mm. Allow to dry before applying finishing coat.



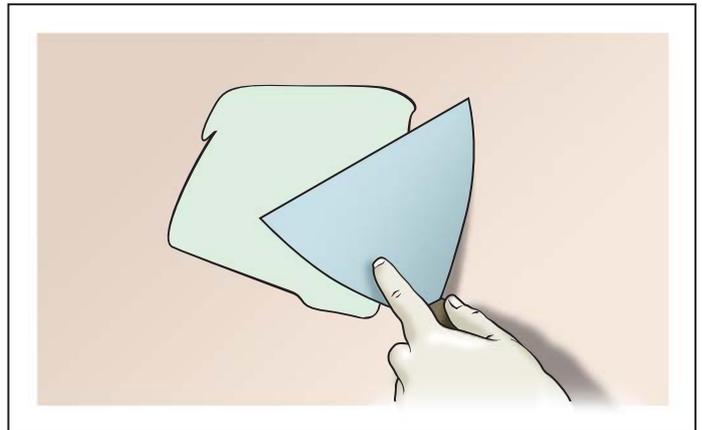
Step 8 - Finishing coat

Ensure the second coat is fully dry. Using a finishing trowel, apply a coat James Hardie Top Coat 280mm wide centrally over the joint and feather out the edges. Allow to dry fully before sanding.



Step 9 – Fastener heads

Ensure the second coat is fully dry. Apply a finishing coat of James Hardie Top Coat over fastener heads,



feathering out the edges. Allow to fully dry before sanding.

BUTT JOINTS

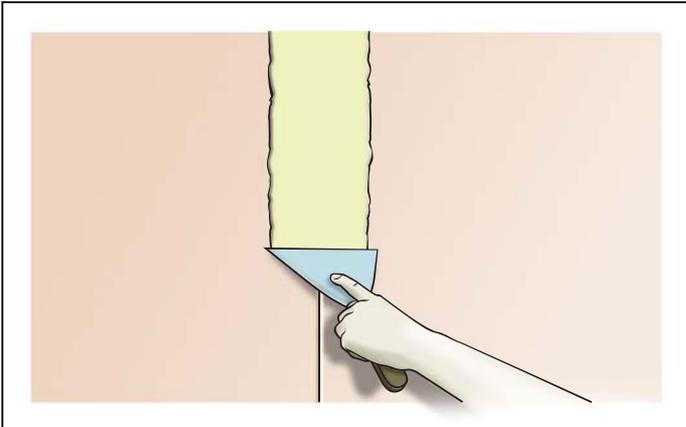
Step 1 - Preparation

When jointing un-recessed sheet joint, ensure that sheet edges are clean and free of dust and contaminants. If working conditions are hot and dry, dampen the area around the joint prior to working.



Step 2 – First Coat

Apply James Hardie Base Coat centrally over butt joint to 200mm wide with a 150mm broadknife.



Step 3 – Embed tape

Firmly embed the perforated paper tape centrally using a 150mm broadknife. Ensure that there are no voids under the tape and remove excess compound.



Step 4 – Thin layer (untiled walls only)

Immediately cover tape with a thin layer of James Hardie Base Coat applied with a 150mm broadknife.



NOTE: Steps 5 and 6 are not required for tiled walls.

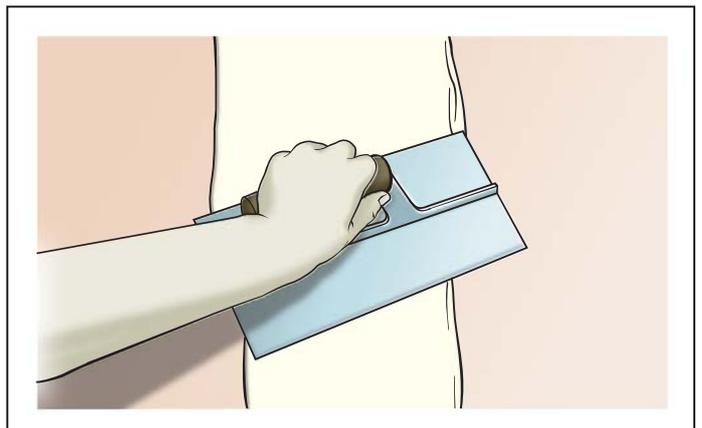
Step 5 – Second Coat

When the first coat is fully dry, use a 200mm wide second coat trowel to apply the James Hardie Top Coat compound. Apply this coat approximately 300mm wide.



Step 6 - Finishing Coat

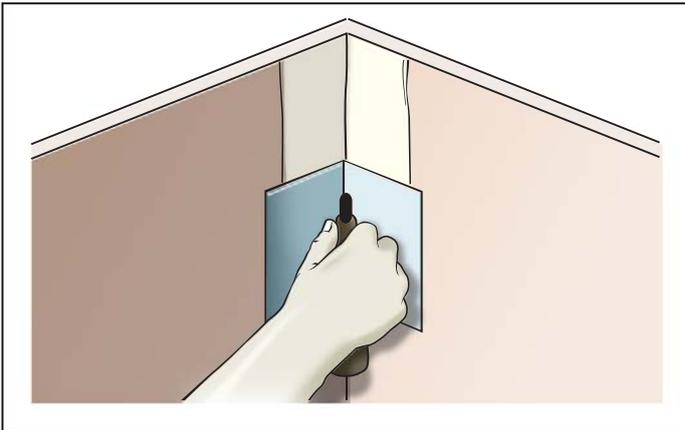
Ensure the second coat is fully dry. Using a finishing trowel, apply a coat of James Hardie Top Coat 500mm wide centrally over the joint and feather out the edges. Allow to fully dry before sanding.



INTERNAL CORNERS

Setting of internal corners are required for untiled applications only as follows:

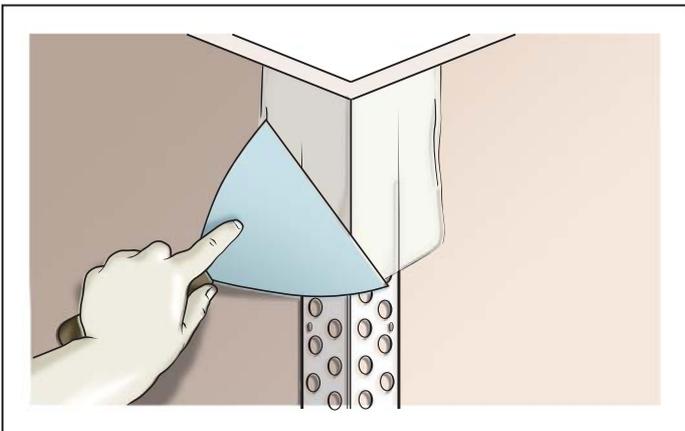
- Apply bedding compound to both sides of the corner using a 70mm broadknife.
- Fold paper tape to form an angle and embed into the corner using a 100mm corner tool and cover with a skim coat.
- Allow tape coat to dry, then apply a thin finishing coat by laying additional compound over the angle and smoothing with the corner tool.
- Allow to fully dry before sanding



EXTERNAL CORNERS

Setting of external corners is required for untiled applications only as follows:

- Fit a perforated corner angle over the external corner angle and ensure straightness before fixing with fibre cement nails at 300mm centres.
- Apply bedding compound to both sides of the corner angle to a width of 150mm using a broadknife. Allow to dry before applying a second coat.
- Using a straight trowel, build up the edges to 250mm from the corner. Allow to dry.
- When dry, use the straight trowel to apply a thin finishing coat, 300mm wide, to both sides of the corner angle, feathering out the edges.
- Allow to fully dry before sanding.



CONTROL JOINTS

Control joints are required in long runs of Villaboard lining walls or ceilings in both directions. These joints are designed to take up the structural movement between the sheets and the building frame. They may also be required in ceilings where they change direction or continue into passage ways. Control joints should also be provided at frame junctions/joints such as wall intersections.

See Table 7 for maximum control joint spacings and Figure 16 for a typical detail.

CEILING'S DIRECTLY UNDER A ROOF/CEILING/DECK

NOTE: Where Villaboard linings are installed to ceilings directly under roof spaces less than 600mm, the control joints must be reduced. In these cases, Versilux lining is recommended. If Villaboard lining is used, control joints must be reduced to 6.0m for insulated ceilings and 3.6m for uninsulated ceilings in both directions.

TABLE 7

MAXIMUM SPACING FOR CONTROL JOINTS (m)			
	STEEL FRAMING		TIMBER FRAMING
	0.55 - 0.75mm BMT	Greater than 0.8 - 1.6mm BMT	
*General	9.0	6.0	7.2
Tiled walls	4.8		4.2

* Refer to note above Table 7 on fixing Villaboard lining to ceilings directly under a roof/ceiling/deck application.

Horizontal control joints in walls are required at 3.6 maximum centres. When sheeting vertically a horizontal control joint is required at the sheet end when using sheets shorter than 3.6m in length.

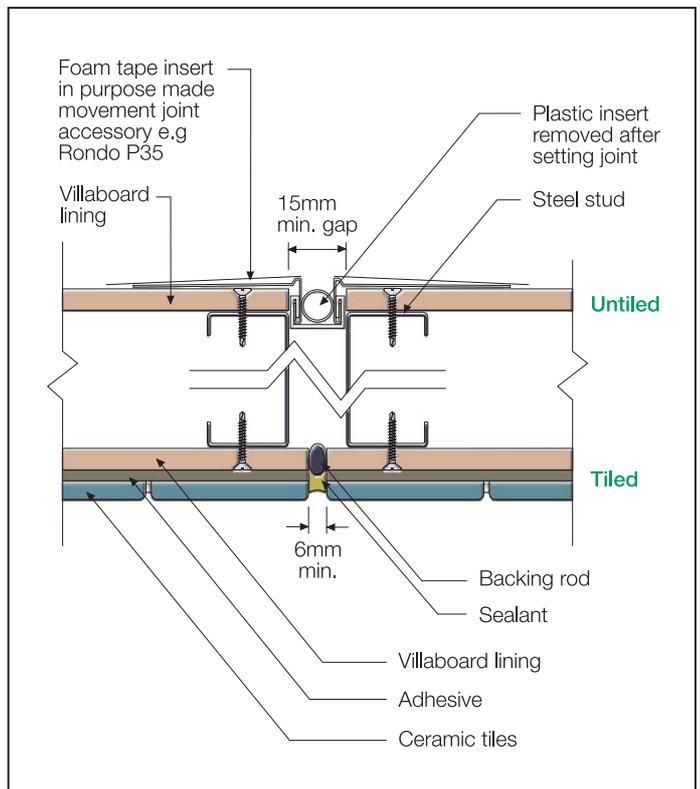


FIGURE 16 CONTROL JOINT

7 FINISHES AND MAINTENANCE

GENERAL

Villaboard lining is finished with either paint, tiles or wallpaper as required. The application and maintenance of these finishes must be in accordance with the manufacturer's specifications.

NOTES

- For wet areas, the waterproofing requirements of all relevant codes, standards and regulations must be met. For more information on wet area construction refer to the James Hardie Wet area construction Design Manual.
- Refer to the manufacturers' specifications on application, compatibility and suitability of waterproofing membranes.

GLANCING LIGHT

In some instances, due to glancing light, set joints may be noticeable in Villaboard lining walls, especially where paint finishes have a high gloss level. Work closely with your builder or designer to minimise this.

Artificial lighting needs to be considered in relation to walls and ceilings (e.g. down-lights in ceilings above set joints in walls). Ceilings and wall joints should run in the direction of the light source (at right angles to windows).

Where glancing light is an issue its effect can be lessened by:

- The use of curtains or blinds.
- Artificial light shading devices.
- The use of light coloured, matt finish paints.

LEVEL OF FINISHES

Different levels of finishes are typically specified for different applications. Higher levels of finishes are used to address the glancing light issues with painted Villaboard lining referred to above. A description of the various levels of finishes and the jointing/coating requirements can be found in Table 8.

TABLE 8

LEVELS OF FINISHES			
LEVEL OF FINISH	DEFINITION*	TYPICAL JOINTING/SETTING	FINISH
0	This level of finish may be useful in temporary construction.	No stopping, taping, finishing or accessories are required. The work is confined to gluing or screwing/nailing sheets in place.	For use in areas where finishing and stopping is not considered necessary.
1	For use in plenum areas above ceilings, in areas where the work would generally be concealed, or in building service corridors and other areas not normally open to public view.	Joints and corner joints will be set with HardiStop bedding compound reinforced with perforated paper tape.	Surface free from excess jointing compound. Tool marks and ridges are generally acceptable.
2	For use in warehouse, storage or other areas where surface appearance is not of primary concern.	Joints and corner joints will be set with HardiStop bedding compound reinforced with perforated paper tape and gypsum topping compounds.	Minor tool marks and ridges are generally acceptable.
3	For use in areas which are to receive heavy or medium texture (spray or hand applied) finishes or where heavy wall coverings paper are to be applied as the final decoration. This level of finish is not generally suitable where smooth painted surfaces or light to medium wall coverings are specified.	Joints and corner joints will be set with HardiStop bedding compound reinforced with perforated paper tape and gypsum topping compounds.	This level of finish must be sufficiently smooth to accept vinyl, tiles or textured coatings without blemishes.
4	This is generally the accepted level of finish for domestic construction. It is used where light textures or wall coverings and smooth textured finishes and satin/flat/low sheen paints are illuminated by non-critical lighting.	Refer to flush jointing recommendations on page 11.	For use where light-texture coatings or wallpaper or other lightweight wall coverings are to be applied. For painted finishes in non-critical lighting areas flat and low-sheen textured paints are to be applied. Gloss and semi-gloss paints are not generally suitable over this level of finish as any minor blemish will show under critical light. The weight, texture and sheen level or wall coverings applied over this level of finish must be carefully evaluated. Joints and fasteners must be adequately concealed if the wall-covering material is lightweight, contains limited pattern, has a gloss finish, or any combination of these features is present. Unbacked vinyl wall coverings are not suitable over this level of finish.
5	This level of finish is for use where gloss or semi-gloss paints are specified or where critical lighting conditions occur on satin, flat or low sheet paints.	Typically all joints and corner joints will have tape embedded in HardiStop bedding compound applied over all joints, angles, fastener heads and accessories. A thin skim coat of finishing compound must be applied to the entire surface to be plastered. The surface must be finished smooth and free of tool marks and ridges and special care must be taken with the application of the finishing compound to achieve a smooth, true surface suitable for these critical finishes.	This level of finish is for use where gloss, semi-gloss, low-sheen or non-textured paints are specified or where critical lighting conditions occur.

*Reference: AS/NZS 2589.1:1997 'Gypsum lining in residential and light commercial construction - Application and finishing. Part 1: Gypsum plasterboard'

8 PRODUCT INFORMATION

PAINT FINISHES

Prior to application of paint finishes, remove any residual sanding dust and ensure the surface is suitable for paint application.

Always follow the paint manufacturer's recommendations for paint suitability, mixing and application.

NOTE

Use of a 'sealer coat' or 'preparation undercoat' is recommended.

CORNICES

It is recommended that Villaboard lining is wetted with a sponge prior to adhesive fixing of cornices.

TILED FINISHES

The thicknesses of tiles used over Villaboard lining are restricted based on stud centres and the thickness of the sheet, see Table 9.

James Hardie only recommends the use of flexible tile adhesive for tile application. Refer to adhesive manufacturer for suitability and application information.

NOTES

1. Do not tile ceilings.
2. Do not tile to walls over 3m in height.

TABLE 9

MAXIMUM TILE THICKNESSES		
VILLABOARD THICKNESS (mm)	MAXIMUM TILE THICKNESS (mm)	
	600mm Stud Cts	450mm Stud Cts
6	9	13
9	13	18
12	18*	>25*

*Support angles are recommended.

The suitability and positioning of support angles is to be determined by a structural engineer. Support angles need to be fixed into the supporting frame and the overall wall mass and stability needs to be considered.

MAINTENANCE

James Hardie recommends that the cleaning and maintenance of all finishes be undertaken regularly as per the recommendations of the manufacturer. Joints must also be maintained and be free of dirt and grime.

GENERAL

Villaboard lining is a cellulose fibre reinforced cement building product. The basic composition is Portland cement, ground sand, cellulose fibre and water.

Villaboard lining is manufactured to AS/NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Sheets' (ISO 8336 'Fibre Cement Flat Sheets').

Villaboard lining is classified Type B, Category 3 in accordance with AS/NZS 2908.2.

For Material Safety Data Sheets (MSDS) visit www.jameshardie.com.au or Ask James Hardie™ on 13 11 03.

PRODUCT MASS

Based on equilibrium moisture content the approximate mass of Villaboard lining is:

- 6mm thick - 8.3kg/m²
- 9mm thick - 12.4kg/m²
- 12mm thick - 16.6kg/m²

DURABILITY

Resistance to moisture/rotting

Villaboard lining has demonstrated resistance to permanent moisture induced deterioration (rotting) by passing the following tests in accordance with AS/NZS 2908.2:

- Water permeability (Clause 8.2.2)
- Warm water (Clause 8.2.4)
- Heat rain (Clause 6.5)
- Soak dry (Clause 8.2.5)

Resistance to Fire

Villaboard lining is suitable where non-combustible materials are required in accordance with C1.12 of the Building Code of Australia.

Villaboard lining has been tested by CSIRO and is classified as a Group 1 material in accordance with Specification C1.10a of the BCA.

Villaboard lining has the following early fire hazard indices (tested to AS 1530 Part 3).

EARLY FIRE HAZARD INDICES	
Ignition index	0
Flame spread index	0
Heat evolved index	0
Smoke developed index	0 - 1

NOTES: Zero is the best possible result. The range is 0 - 10, except Ignition Index which is 0 - 20.

Resistance to termite attack

Based on testing completed by CSIRO Division of Forest Products Report Numbers FP349 and FP274, James Hardie fibre cement has demonstrated resistance to termite attack.

NOTES

9 WARRANTY

James Hardie Australia Pty Limited ("James Hardie") warrants for a period of 10 years from the date of purchase that the Villaboard® lining (the "Product"), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie's relevant published literature current at the time of installation. James Hardie warrants for a period of 12 months from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Trade Practices Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY

The warranty is strictly subject to the following conditions:

- a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation;
- b) this warranty is not transferable;
- c) the Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer's instructions and good trade practice;
- d) the project must be designed and constructed in strict compliance with all relevant provisions of the current BCA, regulations and standards;
- e) the claimant's sole remedy for breach of warranty is (at James Hardie's option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product;
- f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces);
- g) all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;
- h) if meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

DISCLAIMER

The recommendations in James Hardie's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. Further, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (eg quality of workmanship and design) James Hardie shall not be liable for the recommendations in that literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code of Australia ("BCA"), regulations and standards.

Ask James Hardie™
Call 13 11 03
www.jameshardie.com.au