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1 Introduction

James Hardie Villaboard® Lining is a premium sanded fibre cement sheet with recessed edges for flush jointing, or square edge sheet for butt jointing. Villaboard Lining is an ideal lining for bathrooms, laundries, kitchens and other high traffic areas.

The main features of Villaboard Lining are:
- Durable internal lining suitable for wet areas.
- 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 information relating to Villaboard Lining is also available in the following James Hardie manuals:
- Fire and Acoustic Design Manual.
- Bracing Design Manual.

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 specific design and detailing is undertaken for areas which fall outside the scope of this documentation.

Note: James Hardie Villaboard Lining is not suitable for exterior wall applications.

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.co.nz or Ask James Hardie™ on 0800 808 868.

1.1 BRACING
Villaboard Lining can be used to achieve structural bracing. For further information refer to Bracing Design Manual.

For dry area internal applications the standard hot dipped galvanised nails can be used.

For wet area internal application stainless steel nails must be used.

1.2 STRUCTURAL CEILING DIAPHRAGM
Villaboard Lining can be used as structural ceiling diaphragms in accordance with NZS 3604. For further information refer to Bracing Design Manual.

1.3 HEAT SHIELD
9mm Villaboard Lining can be used as a heat shield. For further information refer to Heat Shield - Villaboard Lining 9mm Accel™ Technical Supplement.
Table 1

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth fibre cement internal lining for tiled and untiled applications</td>
<td>1200mm</td>
<td></td>
</tr>
<tr>
<td>4 recessed edges</td>
<td>2 recessed edges (long)</td>
<td>Square edges</td>
</tr>
<tr>
<td>6mm thickness</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2400</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2700</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>9mm thickness</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>2400</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2700</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

Villaboard Lining 6mm has no chamfer on square edge sheet. Villaboard Lining 9mm has small chamfer on square edge sheet.

Table 2

<table>
<thead>
<tr>
<th>Product / accessories / tools</th>
<th>Accessories</th>
<th>Description</th>
<th>Product Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>HardieBlade™ Saw Blade Ø185mm poly crystalline diamond blade, for fast, clean cutting of James</td>
<td>HardieDrive™ Screw S/S 316 30mm x 7g For fastening to timber frames</td>
<td>300660</td>
<td></td>
</tr>
<tr>
<td>HardieDrive™ Screw S/S 316 30mm x 7g For fastening to timber frames</td>
<td>HardieDrive™ Screw S/S 316 30mm x 7g For fastening to timber frames</td>
<td>300993</td>
<td></td>
</tr>
<tr>
<td>James Hardie Base Coat Base compound for flush finished jointing.</td>
<td>James Hardie Base Coat Base compound for flush finished jointing.</td>
<td>4kg - 304490</td>
<td></td>
</tr>
<tr>
<td>James Hardie Top Coat Topping compound for flush finished jointing.</td>
<td>James Hardie Top Coat Topping compound for flush finished jointing.</td>
<td>3kg - 304492</td>
<td></td>
</tr>
<tr>
<td>uPVC Perforated Corner Mould 30mm x 30mm. For finishing internal and external corners.</td>
<td>uPVC Perforated Corner Mould 30mm x 30mm. For finishing internal and external corners.</td>
<td>3000mm - 300669</td>
<td></td>
</tr>
<tr>
<td>HardieJointer™ 6mm</td>
<td>HardieJointer™ 6mm</td>
<td>3000mm - 300734</td>
<td></td>
</tr>
<tr>
<td>HardieJointer™ 9mm (2 piece)</td>
<td>HardieJointer™ 9mm (2 piece)</td>
<td>3000mm - 300736</td>
<td></td>
</tr>
<tr>
<td>HardieFlex™ Cap Mould 6mm Capping edge of Villaboard Lining</td>
<td>HardieFlex™ Cap Mould 6mm Capping edge of Villaboard Lining</td>
<td>2400mm - 300539</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HardieFlex™ Cap Mould 6mm Capping edge of Villaboard Lining</td>
<td>3000mm - 300540</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3

**Components not supplied by James Hardie**

James Hardie recommends the following products for use in conjunction with 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.

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Description</th>
<th>Accessories</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galvanised/Stainless Steel HardieFlex™ nails</td>
<td>40 x 2.8mm fibre cement nails</td>
<td>Second Coat Trowel 200mm</td>
<td>For installing second coats on set joints.</td>
</tr>
<tr>
<td>Backing Rod</td>
<td>Backing to sealant in movement joints.</td>
<td>Finishing Coat Trowel</td>
<td>For installing top coats on set joints.</td>
</tr>
<tr>
<td>Perforated Paper Tape</td>
<td>Joint reinforcing tape. e.g. GIB® paper tape, Strataflex tape or similar.</td>
<td>Corner Tool</td>
<td>For setting of internal corners.</td>
</tr>
<tr>
<td>Level/Straight Edge</td>
<td>For checking straightness of frame.</td>
<td>Hawk</td>
<td>To assist in the application of compounds especially with the use of trowels.</td>
</tr>
<tr>
<td>Broadknife 150mm</td>
<td>For setting of joints on Villaboard Lining.</td>
<td>Notched Trowel</td>
<td>For applying tile adhesive to face of Villaboard Lining.</td>
</tr>
<tr>
<td>Collated Screw Gun</td>
<td>For speedy installation of Villaboard Lining.</td>
<td>Electric Shear/Fibreshear</td>
<td>For cutting of James Hardie fibre Cement.</td>
</tr>
<tr>
<td>Hole Saw</td>
<td>For clean cut circular holes.</td>
<td>Paper Faced Corner Mould</td>
<td>‘Goldline’ mouldings</td>
</tr>
<tr>
<td>Bondbreaker Tape</td>
<td>Sellotape 5850 Super Mask 18mm</td>
<td>Waterproofing Admixture</td>
<td>Multiplast Resin by Plaster Systems. Used in diluted form over sheet edges to control moisture suction.</td>
</tr>
<tr>
<td>Score and Snap Knife</td>
<td>Scoring tool for easy cutting.</td>
<td>Lumberlock</td>
<td>Studsaver</td>
</tr>
<tr>
<td>Wet Wall Cavity</td>
<td>Wet Wall Caddy</td>
<td>Support Angle</td>
<td>To support tiles. Is fixed over the lining to main frame</td>
</tr>
</tbody>
</table>

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Fix cups to the frame so that they will finish flush with the face of the wall lining. Plumb out the fittings.

Remove a 180 mm hole and a 115 mm hole from the wall lining to match the cups. The cups must finish flush with the face of the wall lining. Fix the wall lining in place.

Remove the manufacturer’s recommended size access hole for the mixer from the large flange. Remove a 30 mm hole from the small flange.

Apply a bead of the supplied sealant to the channel on the flanges and firmly push the flanges onto the cups.
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 HardieBlade™ 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 Safety Data Sheets available at www.jameshardie.co.nz.

FAILURE TO ADHERE TO OUR WARNINGS, SAFETY DATA SHEETS, AND INSTALLATION INSTRUCTIONS MAY LEAD TO SERIOUS PERSONAL INJURY OR DEATH.

James Hardie recommended safe working practices

<table>
<thead>
<tr>
<th>CUTTING OUTDOORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Position cutting station so wind will blow dust away from the user or others in working area.</td>
</tr>
<tr>
<td>2. Use one of the following methods based on the required cutting rate:</td>
</tr>
<tr>
<td><strong>BEST</strong></td>
</tr>
<tr>
<td>• Score and snap</td>
</tr>
<tr>
<td>• Hand guillotine</td>
</tr>
<tr>
<td>• Fibreshear</td>
</tr>
<tr>
<td><strong>BETTER</strong></td>
</tr>
<tr>
<td>• Dust reducing circular saw equipped with HardieBlade™ Saw Blade and HEPA vacuum extraction.</td>
</tr>
<tr>
<td><strong>GOOD</strong></td>
</tr>
<tr>
<td>• Dust reducing circular saw with HardieBlade™ Saw Blade.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CUTTING INDOORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cut only using score and snap, hand guillotine or fibreshears (manual, electric or pneumatic).</td>
</tr>
<tr>
<td>• Position cutting station in a well-ventilated area.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SANDING/REBATING/DRILLING/OTHER MACHINING</th>
</tr>
</thead>
<tbody>
<tr>
<td>When sanding, rebating, drilling or machining you should always wear a P1 or P2 dust mask and warn others in the immediate area.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPORTANT NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For maximum protection (lowest respirable dust production), James Hardie recommends always using “Best” — level cutting methods where feasible.</td>
</tr>
<tr>
<td>2. NEVER use a power saw indoors.</td>
</tr>
<tr>
<td>3. NEVER use a circular saw blade that does not carry the HardieBlade™ logo.</td>
</tr>
<tr>
<td>4. NEVER dry sweep — Use wet suppression or HEPA vacuum.</td>
</tr>
<tr>
<td>5. NEVER use grinders.</td>
</tr>
<tr>
<td>6. ALWAYS follow tool manufacturers’ safety recommendations.</td>
</tr>
</tbody>
</table>

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.co.nz 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 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 heavy duty
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.

HardieBlade™ Saw Blade
The HardieBlade™ Saw Blade used with a dust-reducing saw connected to a HEPA vacuum 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

3.1 GENERAL
Villaboard Lining can be fixed to either timber framing, light gauge domestic type steel framing and battens fixed over masonry. The framing and substrate used must comply with the relevant building regulations and standards and the requirements of this manual.

For untiled walls the studs spacing must not exceed 600mm centres and noggings 1200 centres maximum.

For tiled wall applications studs spacing must be closed to 400mm for a 6mm Villaboard Lining, and between 400mm to 600mm centres for a 9mm Villaboard Lining. Refer Table 10 for further information.

At sheet joint the studs must be minimum 45mm wide.

Notes
1. Stud spacings restrict the thickness of tiles used to finish Villaboard Lining. For more information refer to the Finishes and Maintenance section on page 25.
2. In internal and external corners use a PVC perforated corner mould or paper faced rigid moulding.
3. Ensure a 6mm building tolerance gap is provided at the floor and ceiling junctions with the Villaboard Lining.

3.2 TIMBER
Timber framing must at a minimum comply with the requirements of NZS 3604 ‘Timber Framed Buildings’.

The timber framing treatment and moisture contents must comply with the requirements of NZS 3602.

3.3 STEEL

The minimum size for steel stud framing should be 64mm deep x 35mm wide and 0.55mm base metal thickness (BMT) minimum.

Steel framing shall comply with the minimum stiffness requirements of NZS 3604. Refer to NASH 3405 document for further guidance on steel framing or contact steel framing supplier for information.

Steel sections shall be suitably galvanised zinc coated to comply with the durability requirements of NZBC. Refer to framing manufacturer for further information. Studs must not be less than 35mm wide at joints.

For tiled applications it is recommended to use a 0.75mm thick steel framing to achieve the required rigidity/stiffness.

3.4 MASONRY SUBSTRATE
Always ensure the substrate is given adequate time to dry out before the installation of Villaboard Lining. The wall surface must be clean, dry and free of any material that will affect the straightness of the battens. Refer to page 13 for further information.

3.5 SKILLION ROOF DESIGN
When installing Villaboard Linings direct to skillion roof framing, refer to Eaves and Soffit Linings Installation Manual.

3.6 FRAME TOLERANCES
Ensure the 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.

3.7 MASONRY WALL
Cut Villaboard Lining approximately 12mm less than floor to ceiling height to allow for building tolerances. Ensure a 6mm building tolerance gap is provided at the floor and ceiling junctions with the Villaboard Lining. Refer to page 14 for specific substrate requirements.
3.8 CURVED WALLS

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

<table>
<thead>
<tr>
<th>Curved wall minimum bending radii</th>
<th>Along Length (mm)</th>
<th>Across Width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Villaboard Lining 6mm</td>
<td>1800 (1200)</td>
<td>2400</td>
</tr>
<tr>
<td>Villaboard Lining 9mm</td>
<td>3000 (1800)</td>
<td>4000</td>
</tr>
</tbody>
</table>

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 sheet can be bent to the radius shown in the brackets.

To maintain the smoothness of the curve, studs must be closed to spacings as shown below.

<table>
<thead>
<tr>
<th>Curved lining — stud spacing</th>
<th>Range of Radii (mm)</th>
<th>Stud Spacing (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1200 to 3000</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>Above 3000</td>
<td>*400</td>
</tr>
</tbody>
</table>

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

Install Villaboard Lining across the framing either vertically or horizontally.

Sheet joints must coincide with the centre line of the framing member.

At door and window openings fix sheets around the opening in a way that the sheet joints do not coincide with the edges of openings. The sheet joint must be 200mm minimum away from the opening edge. See Figure 2.

Figure 2: Sheet layout
5 Installation

5.1 GENERAL
Place 6mm packers along the floor as temporary support for sheets. This will allow for any frame movement/shrinkage. Put sheets in place as shown.
Ensuring the sheet is level, fix starting from the centre of sheet and working outwards to avoid any drumminess.

5.2 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.
On timber frame use Villadrive collated screws for quick installation of Villaboard Linings. Alternatively the Villaboard Lining can also be fixed with HardieDrive stainless steel screws or 40 x 2.8mm HardieFlex nails.
For fixing Villaboard Lining to 0.55 – 1.0mm BMT steel framing, use 30mm Buildex FibreZip Class 3 collated screws. These screws must not be used in sea spray zones.
Nails must be finished flush (Figure 5). Screws can be driven 0.5mm below the sheet surface to achieve the required finish level (Figure 5). In steel framing the fasteners should be driven as close as possible to the stud corners to avoid deflection of the stud flange, see Figure 6.
Refer to Section 6 – Step 7, for finishing of fasteners.

Notes
1. For fastener selection and spacings see pages 10 -13.
2. Do not fix sheets to the bottom chord of roof trusses. Instead, fix to ceiling battens or furring channels.

Figure 3: First sheet

Provide 1-2mm gap between Villaboard Lining sheets at vertical, horizontal, internal or external corner joints.
Fix the remaining sheets in a similar sequence.

Figure 4: Fixing remaining sheets

Figure 5: Fastener depth

Figure 6: Screw fastening
5.3 FIXING TO FRAMED WALLS

Untitled 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 7 and 8 respectively.

Tiled walls
Where Villaboard Lining is to be finished with tiles, the sheets must be fixed with fasteners only as shown in Figure 9.

For tiled wall applications studs spacing must be closed to 400mm for a 6mm Villaboard Lining, and between 400mm to 600mm centres for a 9mm Villaboard Lining. Refer Table 10 for further information.

Figure 7: Fastening to wall frames

Figure 8: Fastener / adhesive fixing to wall frames

Notes
1. All surfaces to receive adhesive must be clean, free of dust, oil, etc.
2. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.
5.4 FIXING TO FRAMED CEILINGS

For ceiling applications either the fastener or fastener/adhesive method can be used. Refer to Figures 10 and 11 respectively.

Notes
1. Do not install tiles in ceiling applications.
2. Do not use adhesive only. Ensure sheet perimeter is fastened as shown.
3. All surfaces to receive adhesive must be clean, free of dust, oil, etc.
4. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.
5. It is recommended that flush stopping of joints is suitable when using recessed edge Villaboard Lining.
6. When nogs not installed for perimeter support, unsupported sheet edges across the framing must be supported by back blocking using a 300-400mm wide Villaboard Lining strip adhered to rear face and centered between the framing.
7. For external soffit applications refer to James Hardie Eaves and Soffit Linings Installation Manual.

Figure 10: Fastening to ceiling frames

Frame centres
600mm max.
Stagger sheet butt joints 600mm min.
Nogs to support sheet edges. Refer note 4.
250mm max.
200mm max.
300mm max.
12mm min. from edge
1-2mm gap
Villaboard Lining
Butt joints to coincide with the centre of framing
50mm min. at corners

Figure 11: Fastener / adhesive fixing to ceiling frames

Frame centres
600mm max.
Stagger sheet butt joints 600mm min.
Nogs to support sheet edges. Refer note 6.
250mm max.
200mm max.
100mm max.
12mm min. from edge
1-2mm gap
Villaboard Lining
50mm min. at corners
Daubs of stud adhesive (or equivalent) approx. 40mm dia.

Double nailing at centreline of sheet 50-75mm apart
250mm max.
12mm min. from edge

Notes
1. Do not install tiles in ceiling applications.
2. Do not use adhesive only. Ensure sheet perimeter is fastened as shown.
3. All surfaces to receive adhesive must be clean, free of dust, oil, etc.
4. Ensure daubs of adhesive never coincide with permanent fastener points, as adhesive shrinkage may cause fastener head protrusion.
5. It is recommended that flush stopping of joints is suitable when using recessed edge Villaboard Lining.
6. When nogs not installed for perimeter support, unsupported sheet edges across the framing must be supported by back blocking using a 300-400mm wide Villaboard Lining strip adhered to rear face and centered between the framing.
7. For external soffit applications refer to James Hardie Eaves and Soffit Linings Installation Manual.
5.5 FIXING TO MASONRY/CONCRETE WALL

Villaboard Lining can be installed over masonry, concrete and Aerated Autoclaved Cement (AAC) substrates by following the requirements as explained below.

5.6 BATTEN/FURRING CHANNEL METHOD

Note: This method is suitable for tiled or untiled applications.

1. Where substrate may be uneven and misaligned – this method allows correction of irregular surfaces; allows packing out to accommodate large surface variations.

2. 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.

3. Where services are run over walls, deeper furring channels may be used.

4. Use suitable masonry fasteners to structurally fix timber/steel battens or recessed furring channels as shown in Figure 12.

5. Pack behind battens as required to achieve a flat surface.

6. Villaboard Lining edges must be supported on the wall.

Figure 12: 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. The sheets can also be fixed vertically using this method.

4. The depth of timber battens must be suitable for the length of fasteners used.
6 Joints

6.1 GENERAL

Villaboard Lining joints are set with proprietary jointing compounds reinforced with perforated paper tape. Both recessed edge, square edge and butt joints are finished by using the jointing products outlined in this manual.

The performance of joints is the responsibility of the installer, as this is governed by the installation practices and the standard of workmanships 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 when positioning joints.

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

All site cut and site recessed sheet edges must be sealed with Dulux Acaprime 501/1 or Dulux Primacryl or similar.

In addition, provision for movement needs to be made by the installation of control joints. See Figure 18.

Table 6

<table>
<thead>
<tr>
<th>Jointing recommendations</th>
<th>Application</th>
<th>Base Compound</th>
<th>Topping Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry area walls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recessed Edge</td>
<td>Untiled</td>
<td>James Hardie Base Coat with perforated paper tape</td>
<td>James Hardie Top Coat, Plaster Systems compound or Gypsum topping compound</td>
</tr>
<tr>
<td>Tiled</td>
<td>James Hardie Base Coat with perforated paper tape</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Butt Edge</td>
<td>Untiled</td>
<td>Silicone Joint</td>
<td>N/A</td>
</tr>
<tr>
<td>Tiled</td>
<td>Silicone Joint</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Wet area walls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recessed Edge</td>
<td>Untiled</td>
<td>James Hardie Base Coat with perforated paper tape</td>
<td>James Hardie Top Coat</td>
</tr>
<tr>
<td>Tiled or Shower Lining</td>
<td>James Hardie Base Coat with perforated paper tape</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Butt Edge</td>
<td>Tiled or Shower Lining</td>
<td>James Hardie Base Coat with perforated paper tape</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Silicone Joint</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Figure 13: Vertical flush joint setout

Figure 14: Wall to wall junction

Note: When Villaboard® Lining is to be tiled the corners behind the Villaboard Lining must be tied together with a Lumberlok® Stud Saver steel corner angle. Refer to Figure 21 for this angle’s location.
Step 1
First, add 1 part of clean water into bucket.
Then add 2½ parts James Hardie Base Coat powder
Allow to soak for 1 minute.

Important Notes:
1. Do not apply James Hardie Base Coat in temperatures above 40º C or below 5º C.
2. Allow the compounds to dry before applying the next coat. The drying time will vary between 12 to 24 hours depending upon the weather conditions.
3. Site cut and site recessed sheet edges must be sealed with an acrylic sealer e.g. Dulux Acraprime 501/1, Dulux Primercryl or similar product.
4. In corners, use James Hardie uPVC internal/external corner mould primed with Dulux Primerlock or similar. A ‘GIB® Goldline™ Platinum’ corner mould can also be used.
5. Use only perforated paper tapes in straight joints.
6. It is recommended that one (1) base coat bag is mixed in three (3) portions.
7. Before stopping the sheet edges, Multiplast Resin or a similar product in diluted form must be applied to the sheet edges. Mix the resin as per the manufacturer’s recommendations.

6.2 JAMES HARDIE BASE COAT MIXING INSTRUCTIONS

Product Life:
James Hardie Base Coat has a shelf life of 12 months in unopened bags when stored in a cool dry place.
James Hardie Base Coat has a bag life of 1 month if opened bags are resealed and stored in a cool dry place.

6.2.1 Compound coverage
1kg of Base Coat will provide approximately 5 lm of standard joints. 1kg of Top Coat will provide approximately 5.6 lm of standard joints.

Step 2
Mix for 1½ – 2 minutes using paint mixer or equivalent (approximately 2500-3000rpm).
James Hardie Base Coat is NOT like the plaster based compounds. Initial mixing will indicate a dry mix and further mixing WITHOUT further addition of water will deliver the ideal workable paste.
Warning: Inadequate or over mixing can lead to poor workability and can cause performance issues. Do Not Hand Mix.

Step 3
The mix at this stage should be consistently smooth.
Based on the environmental conditions i.e. temperature, humidity and wind etc you may add maximum of 25ml of water per 1Kg of base coat powder in the mix at this stage to adjust workability. Mix it well.
(Note: Adding excess water than the recommendation may delay the drying of base coat and may cause joint cracking due to excessive shrinkage.)
The mix should be glossy and smooth. There should be no lumps in the mix.
6.3 SET RECESSED EDGE JOINTS

**Step 1 — Preparation**
Ensure that the recesses are clean and free of dust and contaminants. Sheet edges must be sealed prior to stopping with Multiplast Resin waterproofing admixture or other similar products. 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 broad knife.

**Step 3 — Embed tape**
Firmly embed the perforated paper tape centrally into the joint using a 50mm broad knife. Ensure that there are no voids under the tape and remove excess compound.

**Step 4 — Thin layer**
Immediately fill joint covering tape with a layer of James Hardie Base Coat applied with a 150mm broadknife.

Note: The jointing method shown on page 16 and 17 provides a level 4 finish. For more information about this and other finishes refer to Table 9.
Note: Steps 5, 6 and 7 are only required for paint and wallpaper finishes up to a level 4 finish. Refer Table 9 for level 5 finish.

Step 5 — Second coat (untiled walls only)
When the first 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 6 — Finishing coat (untiled walls only)
Ensure the second coat is fully dry. Using a finishing trowel, apply a coat of James Hardie Top Coat 280mm wide centrally over the joint and feather out the edges. Allow to dry fully before sanding.

Step 7 — Fastener heads (untiled walls only)
Apply a finishing coat of James Hardie Base Coat to fastener heads, feathering out the edges. Allow to fully dry before sanding.

6.4 SET SQUARE EDGE JOINTS
As an alternative to setting the recessed edge joints, square edge Villaboard Lining can also be jointed and stopped on stud as shown below. This detail will achieve a level 3 finish.

Step 1 — Preparation
When jointing un-recessed sheet joint, ensure that sheet edges are clean and free of dust and contaminants. Sheet edges must be sealed prior to stopping with Multiplast Resin water proofing admixture or other similar products. 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 50mm 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 — Second coat (untiled walls only)
When the first coat is fully dry, use a 200mm wide second coat trowel to apply the James Hardie Base Coat. Apply this coat approximately 300mm wide.

Step 6 — Finishing coat (untiled walls only)
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.
6.5 BUTT JOINT

The butt joint detail is shown in Figure 15. It consists of a 1-2 mm gap, 40 x 2.8mm HardieFlex™ nail, and bevel edge. The minimum gap is 12 mm.

6.6 PVC JOINT

The PVC joint detail is shown in Figure 16. It consists of a 1-2 mm gap, 40 x 2.8mm HardieFlex™ nail, and bevel edge. The minimum gap is 12 mm.

6.7 INTERNAL CORNERS

The internal corners can be formed as per one of the following two methods:

Method A:
1. Apply James Hardie Base Coat to both sides of the corner using a 70mm broad knife. Fold the perforated paper tape to form a corner and embed it into the corner using a 50mm wide corner trowel.
2. Cover the paper tape with James Hardie Base Coat using a 100mm corner trowel. Allow the base coat to dry. This will normally take up to 24 hours depending upon the temperatures and humidity conditions.
3. Once the base coat has dried, then apply a thin finishing coat over it with a corner trowel and smooth it out. Allow the compounds to fully dry before sanding.

Note: Step 3 is only required for untiled walls.

Method B:
Embed and fix a paper faced rigid spine corner mould (Goldline) in the corner and then stop over it using a James Hardie Base Coat. Follow steps 2 and 3 mentioned above to finish the corner joint.

6.8 EXTERNAL CORNERS

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

- Fit a perforated corner angle supplied by James Hardie or a paper faced rigid spine corner mould (Goldline) over the external corner and ensure straightness before fixing with HardieFlex nails at 300mm centres.
- Apply James Hardie Base Coat to both sides of the corner angle to a width of 150mm using a broad knife. Allow to dry before applying a second coat.
- Using a straight trowel, build up the edges to 250mm from the corner. Allow to dry.
6.9 CONTROL JOINTS

Control joints are required in long runs of Villaboard Lining walls or ceilings in either direction. 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 8 for maximum control joint spacings and Figure 18 for a typical detail.

Table 8

<table>
<thead>
<tr>
<th>Maximum spacing for control joints (m)</th>
<th>Steel Framing</th>
<th>Timber Framing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.55 – 0.75mm BMT</td>
<td>greater than 0.75 – 1.6mm BMT</td>
</tr>
<tr>
<td>General</td>
<td>9.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Tiles walls</td>
<td>4.8</td>
<td>4.2*</td>
</tr>
</tbody>
</table>

*The maximum wall area should be restricted to 10m² between control joints

- 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.

Figure 18: Control joint

Figure 19: Control joint

Note: Alternatively a PVC control jointer supplied by James Hardie can also be used to form a control joint.
7 Wet area application

7.1 BATHROOM AREAS
Villaboard Lining is most suitable for use in wet area applications. Villaboard Lining must be covered with a water proofing membrane in a shower application before the installation of tiles.

Note: Paints are not suitable for wet area applications (splash zone) and must not be relied upon to achieve water tightness.

7.2 INTERNAL SWIMMING POOL APPLICATION
To fix Villaboard Lining in internal swimming pool areas;

- The sheets must be back and edge sealed before installation.
- All sheet joints to be stopped.
- Only stainless steel fasteners must be used.
- Full perimeter fixing required.

In addition, it is recommended that H3.1 treated timber framing and ceiling battens are used to enhance the durability considering the high condensation levels.

Figure 20: Sealing around splash zones (showers)
Figure 21: Sealing around splash zones (vanities)
Figure 22: Wall to wall wet area tiled wall internal corner
7.3 WATERPROOFING MEMBRANE

A waterproofing membrane must be applied to Villaboard Lining when used in wet area or water splash area applications. A reinforcing fibre glass/band must be used in corners and walls to floor junctions. Always follow the recommendations of waterproofing membrane manufacturers. BRANZ appraised water proofing membranes are recommended for use in this application.

7.4 WET AREA PENETRATION

Note: Refer to Clause 8.5 for further information
8 Finishes and maintenance

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

Notes
1. For wet areas, the waterproofing requirements of all relevant codes, standards and regulations must be met.
2. Refer to the manufacturers’ specifications on application, compatibility and suitability of waterproofing membranes.

8.2 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.

8.3 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 9.
### Table 9

<table>
<thead>
<tr>
<th>Level of Finish</th>
<th>Definition*</th>
<th>Typical Jointing/Setting</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>This level of finish may be useful in temporary construction.</td>
<td>No stopping, taping, finishing or accessories are required. The work is confined to gluing or screwing/nailing sheets in place.</td>
<td>For use in areas where finishing and stopping is not considered necessary.</td>
</tr>
<tr>
<td>1</td>
<td>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.</td>
<td>Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape.</td>
<td>Surface free from excess jointing compound. Tool marks and ridges are generally acceptable.</td>
</tr>
<tr>
<td>2</td>
<td>For use in warehouse, storage or other areas where surface appearance is not of primary concern.</td>
<td>Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.</td>
<td>Minor tool marks and ridges are generally acceptable.</td>
</tr>
<tr>
<td>3</td>
<td>For use in areas which are to receive heavy or medium texture (spray or hand applied) finishes or where heavy wall paper coverings 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.</td>
<td>Joints and corner joints will be set with James Hardie Base Coat reinforced with perforated paper tape and James Hardie Top Coat.</td>
<td>This level of finish must be sufficiently smooth to accept heavy vinyl, tiles or textured coatings without blemishes.</td>
</tr>
<tr>
<td>4</td>
<td>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.</td>
<td>Refer to flush jointing recommendations on page 16–17, steps 1–7 recessed edge joints. All joints and corner joints will have tape embedded in James Hardie Base Coat applied over all joints, angles, fastener heads and accessories. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.</td>
<td>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.</td>
</tr>
<tr>
<td>5</td>
<td>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 sheen paints.</td>
<td>Refer to page 16 steps 1–4 for jointing. Final James Hardie Base Coat application should be feathered out to approximately 200mm + each side of the joint. Then a full skim coat of James Hardie Top Coat must be applied over entire sheet surface in order to achieve a uniform finish. This application is applicable to recessed edge sheets only. The use of square edge sheets will require a high build application and coating finish.</td>
<td>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.</td>
</tr>
</tbody>
</table>

8.4 PAINT FINISHES
Prior to the 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.

8.5 TILED APPLICATIONS
Before commencing tiling it is suggested that you refer to BRANZ ‘Good Tiling Practice’ guide to fully understand the substrate preparation/installation before tiling, also refer Table 10 for Villaboard Sheet thickness, stud spacing and tile thickness.
Refer to Clause 5.3 Tiled Walls for fixing Villaboard Lining to Framed walls.
Control joints must be provided to accommodate thermal/framing movement and stresses which will generate during the life of the building. Control joints must be carried out through the tiles to the exterior face. Refer Figure 18.
James Hardie only recommends the use of flexible tile adhesive for tile applications. Refer to adhesive manufacturer for suitability and application information. The size of tiles used over Villaboard Lining are restricted based on thickness of sheet. Refer Table 10 below.
Square edge sheets can be used for tiled applications. The sheet joint can either be stopped as per Figure 13 or it can be filled with a sealant as per Figure 16.
Note
1. Do not tile ceilings.
2. Tiling must not exceed 3m in height.
3. Provide control joints as per Table 8.
4. The Villaboard Lining joints can be staggered.

Table 10
<table>
<thead>
<tr>
<th>Villaboard Thickness (mm)</th>
<th>Tile Thickness (mm)</th>
<th>Sizes</th>
<th>Stud Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum Tile Weight per m2 (Kg)</td>
</tr>
<tr>
<td>6</td>
<td>≤8mm</td>
<td>Up to 15</td>
<td>300 x 300mm</td>
</tr>
<tr>
<td>9</td>
<td>&gt;8mm</td>
<td>15 - 30</td>
<td>300 x 600mm/400 x 400mm</td>
</tr>
<tr>
<td>9</td>
<td>&gt;8mm</td>
<td>31 - 60</td>
<td>300 x 600mm/400 x 400mm/300 x 900mm</td>
</tr>
</tbody>
</table>

Support angles are required to transfer the weight of tiles to the framing.
A support angle must be fixed at the base of the wall into the bottom plate. When tiling the full height of the wall, it is recommended that an intermediate support angle fixed into framing is also used to support the weight of tiles. The overall mass of tiles and the support required must be considered and the c/c distance between the support angles should be reduced for tiles thicker than 18mm. Refer Table 11 for recommended spacing of angle supports.

Table 11
<table>
<thead>
<tr>
<th>Guidance for consideration</th>
<th>Vertical Spacing of Support Angles (Metres, Max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tile Weight per m2 (Kg)</td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>1.6</td>
</tr>
<tr>
<td>31-42</td>
<td>1.2</td>
</tr>
<tr>
<td>43-60</td>
<td>0.8</td>
</tr>
</tbody>
</table>

8.6 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. Special attention must be given to water proofing membranes and tile adhesives. These must be suitable for the intended application and compatible with other materials they are used in conjunction with.
9 Product information

9.1 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 Category 3, Type B in accordance with AS/NZS 2908.2.

For Safety Data Sheets (SDS) visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

9.2 PRODUCT MASS
Based on equilibrium moisture content the approximate mass of Villaboard Lining is:

- 6mm thick — 8.3kg/m²
- 9mm thick — 12.4kg/m²

9.3 DURABILITY
Resistance to Moisture/Rotting
Villaboard Lining has demonstrated resistance to permanent moisture induced deterioration (rotting) and has passed 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)

9.4 FIRE PROPERTIES
Maximum service temperature for the Villaboard Lining is 60ºC.

Villaboard Lining sheet has been tested for heat release rate as per AS/NZS 3837 and the product has a Heat Release Rate below 50 kw/m².

Villaboard Lining has a ‘Group Number’ classification of 1-S as per the requirements of clause C of the NZBC.
September 2014
James Hardie New Zealand ("James Hardie") warrants for a period of 15 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 15 years 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 Consumer Guarantees 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 New Zealand Building Code (NZBC), 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. James Hardie has tested the performance of the Villaboard® Lining when installed in accordance with the Villaboard® Lining installation manual, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards, as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

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