

INSTALLATION MANUAL

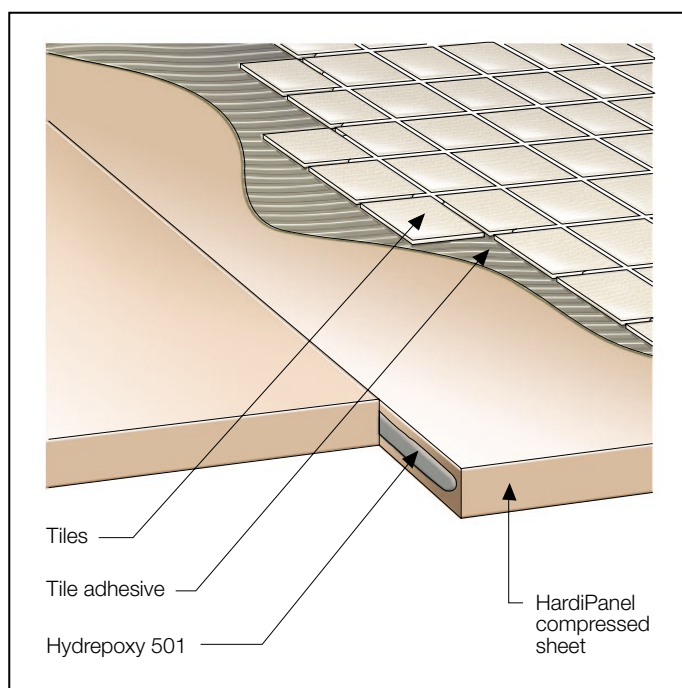


1 INTRODUCTION

James Hardie HardiPanel® compressed sheets are an alternative product to timber, particle board or plywood flooring and are an excellent substrate for ceramic tiles in wet and dry areas.

HardiPanel compressed sheets are commonly employed in preference to concrete flooring where conditions are such that either access is difficult or the structure will not accept the load of concrete. This difficulty is common in retrofit work.

HardiPanel compressed sheets provide a durable, strong and moisture resistant flooring substrate. They are commonly used in wet areas with confidence and are an excellent substrate for ceramic tiles.



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.

This manual covers the use of HardiPanel compressed sheets for internal structural flooring applications over lightweight timber or steel joists in domestic and commercial applications.

For wet area applications this manual must be read in conjunction with James Hardie's Wet area construction Design Manual which provides wet area waterproofing requirements and details.

For external decking applications refer to James Hardie's HardiPanel compressed sheets decking construction Technical Specification.

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 if you need more information, visit www.jameshardie.com.au or Ask James Hardie™ on 13 11 03.

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WE VALUE YOUR FEEDBACK

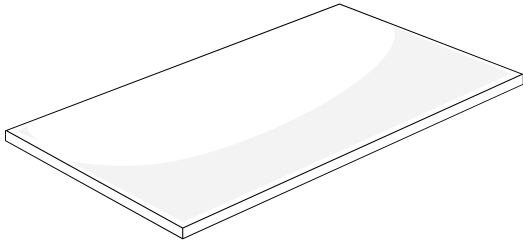
To continuously improve the development of our products and systems, we value your input. Please send any suggestions, including your name, contact details, and relevant sketches to:

Ask James Hardie™

Fax 02 9638 9535

literaturefeedback@jameshardie.com.au


HARDIPANEL COMPRESSED SHEET SIZES

	Sheet sizes: length (mm)	Width (mm)	Thickness (mm)
	1500*	900 1200	15/18 15/18
	1800	900 1200	15/18 15/18
	2100	900 1200	15 15/18
	2400	900 1200	15/18 15/18/24
	2700	900 1200	15 15
	3000	900 1200	15/18 15/18

*Not available in WA




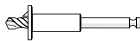



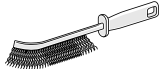
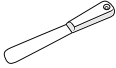
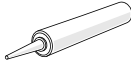
PRODUCT / ACCESSORIES / TOOLS

COMPONENTS SUPPLIED BY JAMES HARDIE

	HardiBlade® saw blade Ø 185mm poly diamond blade, for fast, clean cutting of James Hardie fibre cement		HydrEpoxy 501 Two part Epoxy to join and seal HardiPanel compressed 0.5 Litre and 2 Litre kits
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COMPONENTS NOT SUPPLIED BY JAMES HARDIE

James Hardie recommends the following products for use in conjunction with its HardiPanel compressed sheets. 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	TOOLS	DESCRIPTION
	Countersunk fasteners N° 10 x 40mm countersunk head woodscrew.		Level/straight edge For checking straightness of frame.
	Countersunk fasteners N° 10 x 30mm countersunk head self drilling screws.		Countersunk head drill 6mm countersinking bit.
	6mm masonry drill Provides a 6.2 to 6.3mm diameter hole.		Cordless drill Recommended tool for screw fixing the HardiPanel compressed sheets.
	Backing rod Backing to sealant in movement joints.		Wire brush Recommended for cleaning edges of HardiPanel compressed sheets.
	Spatula For applying HydrEpoxy to the sheet edges.		Sealant Suitable sealant for use in movement joints.

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 a dust reducing circular saw equipped with HardiBlade® saw blade and HEPA vacuum extraction.

DRILLING/OTHER MACHINING

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

IMPORTANT NOTES

1. NEVER use a power saw indoors.
2. NEVER use a circular saw blade that does not carry the HardiBlade® logo.
3. NEVER dry sweep - Use wet suppression or HEPA vacuum.
4. NEVER use grinders.
5. ALWAYS follow tool manufacturers' safety recommendations.

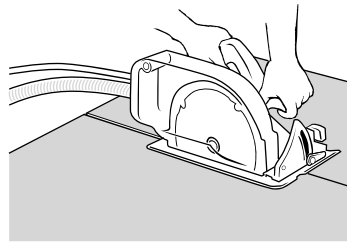
P1 or P2 respirators should be used in conjunction with above cutting practices to further reduce dust exposures. Additional exposure information is available at www.jameshardie.com.au to help you determine the most appropriate cutting method for your job requirements. If concern still exists about exposure 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.

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.



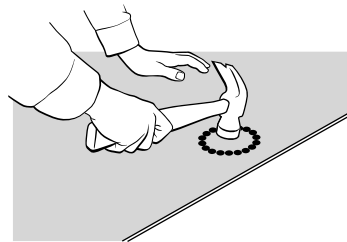
HOLE-FORMING

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 DESIGN

GENERAL

The Building Code of Australia (BCA) requires that floor structures be designed to meet the load requirements of Australian Standard AS 1170.1-2002; 'Structural design actions: Part 1 Permanent, imposed and other actions'. The combinations of dead and live loads are given by Part 0 of that standard.

In residential construction the normal practice is to use 15mm thick sheets supported on joists at 450mm centres, or 18mm sheets supported at 600mm centres. The sheets are fixed so the lengthwise direction is spanning across the joists, and in this case there is no need to have trimmers between the joists to support the sheet, see page 8.

CONCENTRATED LOADS

For residential applications, Table 3.1 of AS 1170.1 specifies a concentrated load of 1.8kN on a 350mm² area, which is equivalent to a 21.1mm diameter round or 18.7mm square applicator. As seen in Table 1 below, HardiPanel compressed sheets are able to sustain this load.

For other residential and commercial indoor applications, the concentrated loads of 2.7kN, 3.5kN and 4.5kN are applied over an area of no greater than 0.01m², namely a 100mm square applicator. The selection of the floor sheet thickness therefore depends on the magnitude of the concentrated load:

- 15mm thick sheet covers domestic situations.
- 18mm thick sheet caters for loads up to the 2.7kN figure of the standard
- 24mm thick sheet is required where the 3.5kN, 4.5kN or greater loads are to be found.

TABLE 1

MAXIMUM ALLOWABLE CONCENTRATED LOAD (kN)	
THICKNESS (mm)	SPAN/JOIST SPACING (mm)
	300 to 600
15	2.1
18	2.7
24	5.1

The code specifies higher loads in areas subject to crowd loading, storage of materials and heavy wheel loads. Any additional imposed loads must be considered. In this regard, it is necessary to determine if loads from machinery or other imposed concentrated loads are directly over supporting joists or whether these extraneous loads must also be supported by the flooring sheet.

Where load requirements are greater, and especially where wheel loads are involved, then all sheet edges must be supported.

TABLE 2

MAXIMUM ALLOWABLE UNIFORMLY DISTRIBUTED LIVE LOAD (kPa)						
THICKNESS (mm)	SPAN/JOIST SPACING (mm)					
	300	350	400	450	500	600
15	26.4	19.1	14.4	11.2	8.8	5.8*
18	38.4	27.9	21.1	16.5	13.2	8.8
24	69.1	50.4	38.3	30.1	24.1	16.4

NOTE: All figures governed by bending strength, but refer to Note 1.

UNIFORMLY DISTRIBUTED LOADS

Table 2 sets out the maximum distributed load for joist spacings between 300mm and 600mm, **with sheet supported on all edges**.

If the commercial application has similar service conditions to residential, and the concentrated load requirement does not exceed 1.8kN (for example, a toilet or shower area where the floor will be tiled), then the practice of not trimming between joists may be followed.

NOTES TO TABLE 1 AND TABLE 2

1. In all cases the deflection limit of span/200 under Serviceability Limit State loading has not been exceeded, except for the asterisked figure where the deflection is 3.8mm (span/160). If the span/200 limit is required (ie 3mm deflection), then the load must not exceed 4.6kPa.
2. The concentrated loads can be sustained under any load annulus 350mm² or greater.
3. The above capacities are working loads that need to be factored in accordance with Section 4 of AS 1170.0 to get to Ultimate Limit State (ULS) loading. The worst case partial factor has been assumed in these designs, namely $\psi_S = 1.0$ (short term loading in storage areas).
4. A working load of 1kPa has been allowed for partitioning and floor coverings in the establishment of these capacities.
5. The HardiPanel compressed sheets will provide these load capacities even if they become fully saturated.

4 FRAMING

GENERAL

HardiPanel Compressed flooring may be fixed to timber or steel joists. The type, size and spacing of the joists should be determined by a structural engineer. The thickness of the timber joist or the flange width of the steel joists should be sufficient (45mm minimum) to allow correct fixing of the HardiPanel compressed sheet.

Standard timber or steel joist framing systems are suitable for use with HardiPanel compressed sheets.

Joists should be spaced at maximum 450mm centres for 15mm sheets and maximum 600mm centres for 18mm sheets.

Joists and trimmers must be 45mm minimum width to allow correct fixing of the HardiPanel compressed sheets.

It is preferred to lay the sheets with the long edges across the joists because trimmers are not required between joists to support the long edges of sheets. In this case ends must be supported on the center line of joists.

When the sheets are laid along the joists, both the long and short edges of the sheets require continuous support, i.e. trimmers are required at sheet ends. Sheet edges must be supported on the center line of joists and trimmers.

Trimmers may also be provide where higher than normal > 1.8kN concentrated loads may be anticipated. Such loads may be caused by antique baths (i.e. claw and ball), heavy machinery with legs, or where there will be the use of trolleys.

NOTE

HardiPanel compressed flooring should not be used where steel or hard resin type wheels are employed on materials handling equipment i.e. pallet jacks.

TIMBER FRAMING

Use of timber framing must be in accordance with AS 1684 'Residential timber-framed construction' and the framing manufacturer's specifications.

Use only seasoned timber. Unseasoned timber must not be used because it is prone to shrinkage and can cause sheets and frames to move.

'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 AS 1684.2.

STEEL FRAMING

Use of steel framing must be in accordance with AS 3623 'Domestic metal framing' and the framing manufacturers' specifications. Framing members must be in the range 0.75mm to 1.6mm BMT (base metal thickness).

The steel framing must have the appropriate level of durability required to prevent corrosion.

LARGE TILED AREAS

A movement joint must be provided through both the floor sheeting and the tiles, spaced at not greater distance than 5m. The movement joint should be 5mm wide and filled with a polyurethane sealant over a foam backing rod.

FIXING

Space fixings at a maximum of 450mm along the joists, minimum of 12mm in from the sheet edges, and 50mm minimum from sheet corners, refer to Figure 2.

5 INSTALLATION STEPS

Step 1

Measure floor joist centres and ensure that correct sheet thickness is used, see page 5.

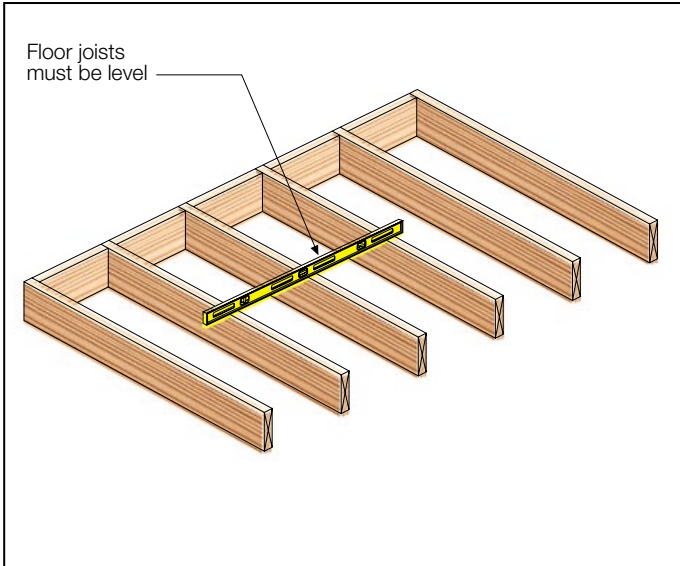


FIGURE 1 JOIST LAYOUT

HardiPanel compressed sheets may be installed along or across framing. Laying sheets across framing is preferred, as fewer trimmers are needed. Install trimmers where required to support the short ends of the sheets.

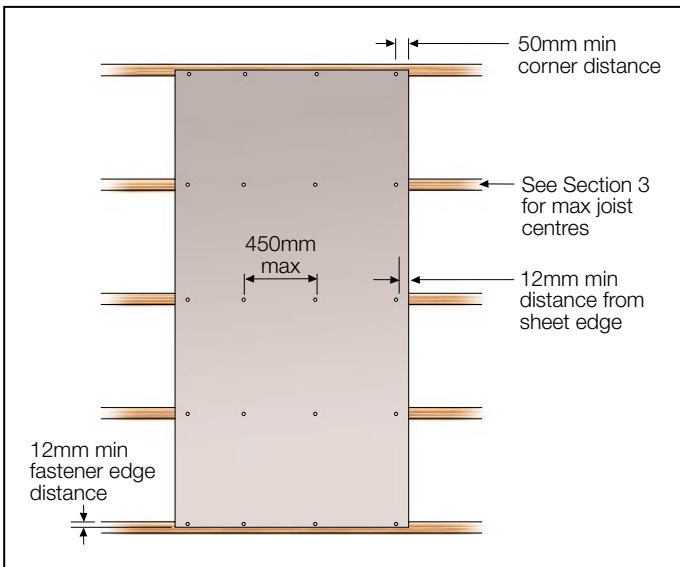


FIGURE 2 FIXING REQUIREMENTS

Step 2

Drill clearance holes into HardiPanel compressed sheet, for No.10 gauge screws using a 6mm countersunk masonry drill, which provides a 6.2 to 6.3mm diameter hole. Countersink hole to a depth of 1mm. This is measured from the top of the screw to the top of the sheet.

NOTE

Do not use hammer action.



FIGURE 3 PRE-DRILL SHEETS

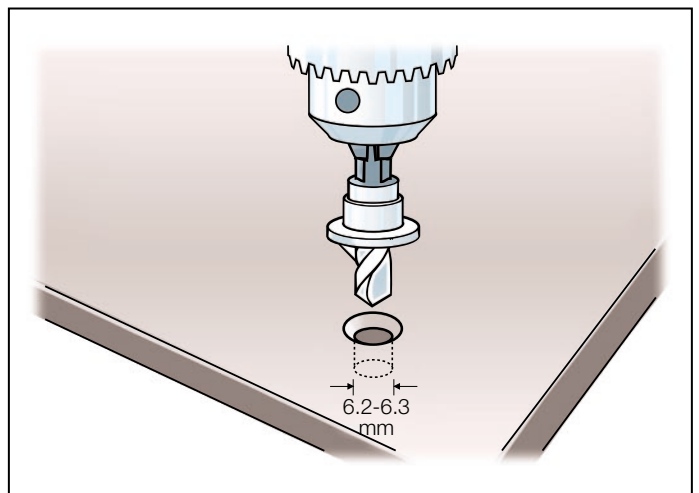


FIGURE 4 PRE-DRILL DIAMETER

Step 3

Screw-fix sheet to floor joists. Refer to Table 3 for fastener selection.



FIGURE 5 FIXING SHEET

TABLE 3

FASTENER SELECTION			
Product	Timber joists	Steel joists 0.75-1.6mm BMT	Steel joists Over 1.6mm BMT
15mm			
10g x 30mm CSK self drilling galvanised or yellow zinc wood screw.	✓		
10g x 30mm CSK self drilling galvanised or yellow zinc screw.		✓	
M6 x 30mm CSK galvanised or yellow zinc bolt with nut and washer			✓
18mm and 24mm			
10g x 40mm CSK self drilling galvanised or yellow zinc wood screw.	✓		
10g x 40mm CSK self drilling galvanised or yellow zinc screw.		✓	
M6 x 40mm CSK galvanised or yellow zinc bolt with nut and washer.			✓

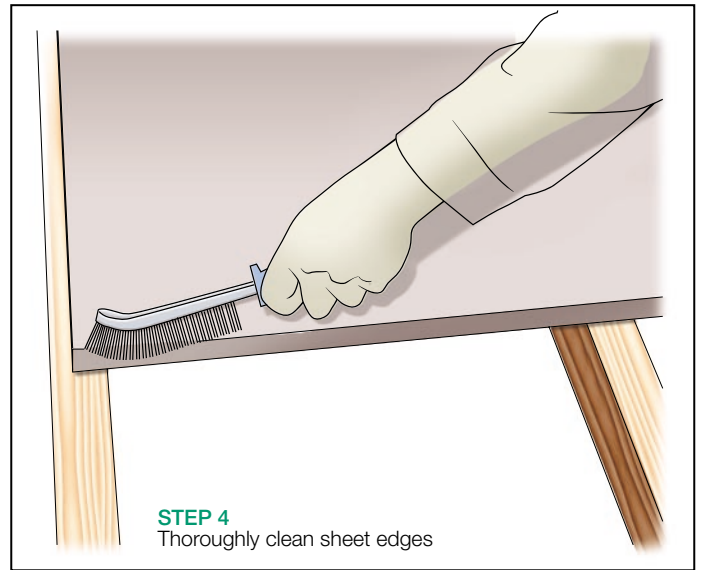


FIGURE 6 CLEAN SHEET EDGES

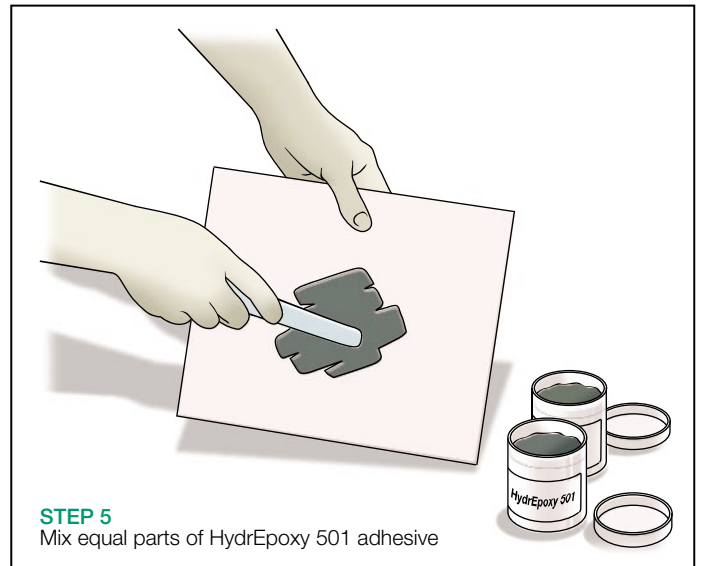


FIGURE 7 MIXING HYDREPOXY 501

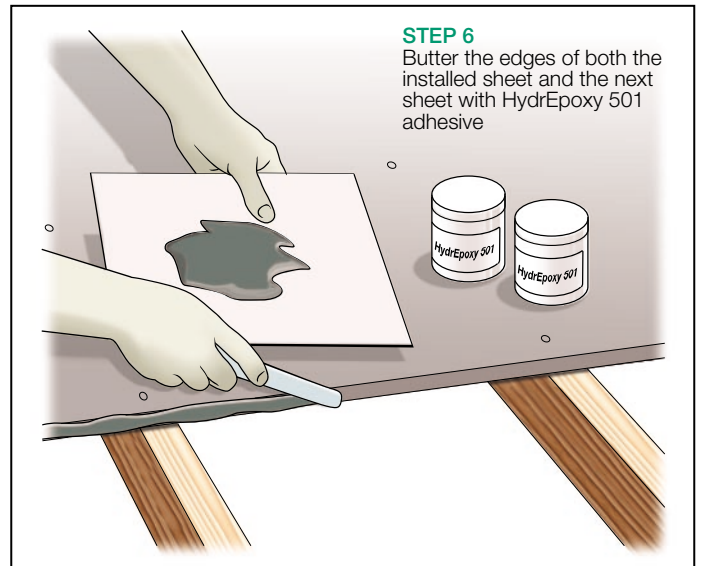


FIGURE 8 APPLYING HYDREPOXY 501

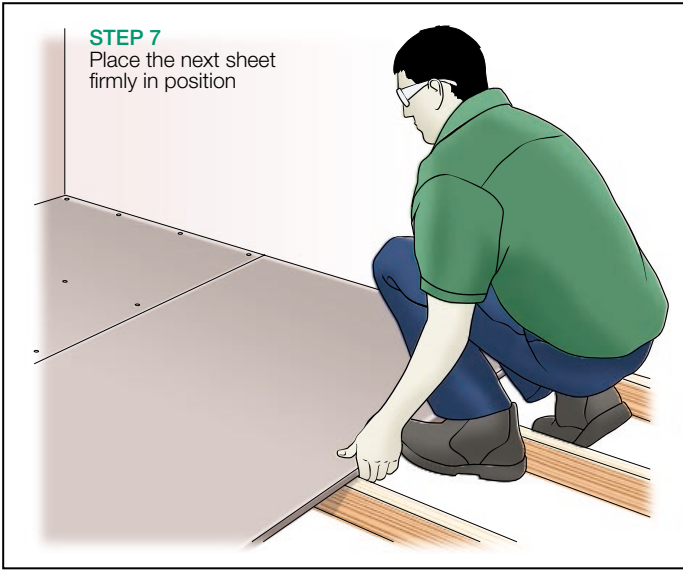


FIGURE 9 POSITION NEXT SHEET

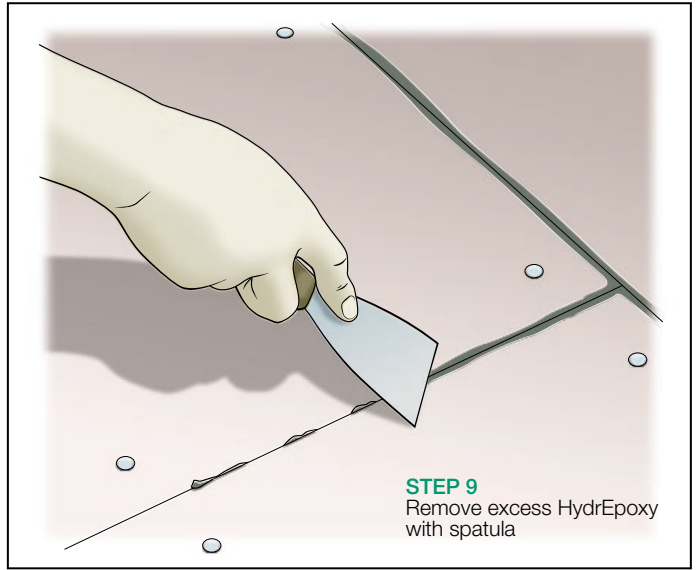


FIGURE 12 REMOVE EXCESS HYDREPOXY

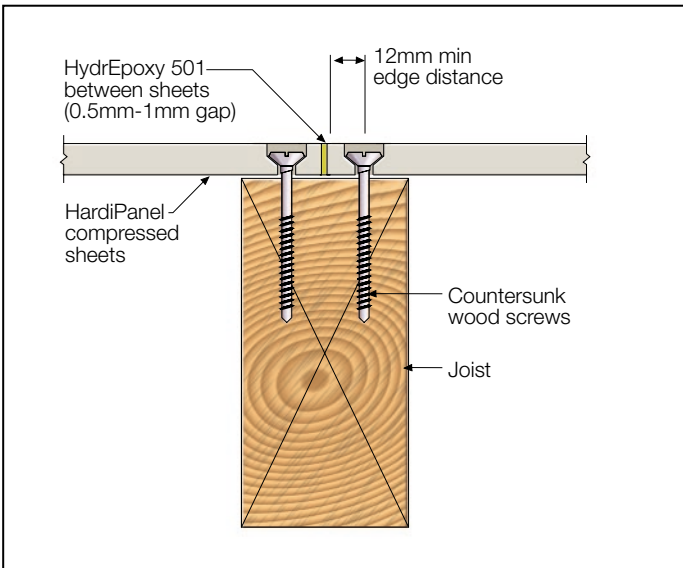


FIGURE 10 SCREW DETAIL

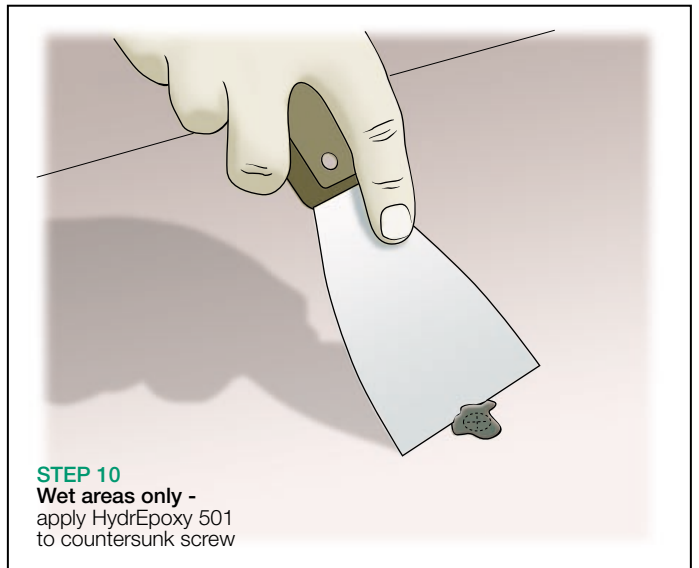


FIGURE 13 APPLY HYDREPOXY



FIGURE 11 PRE DRILL NEXT SHEET

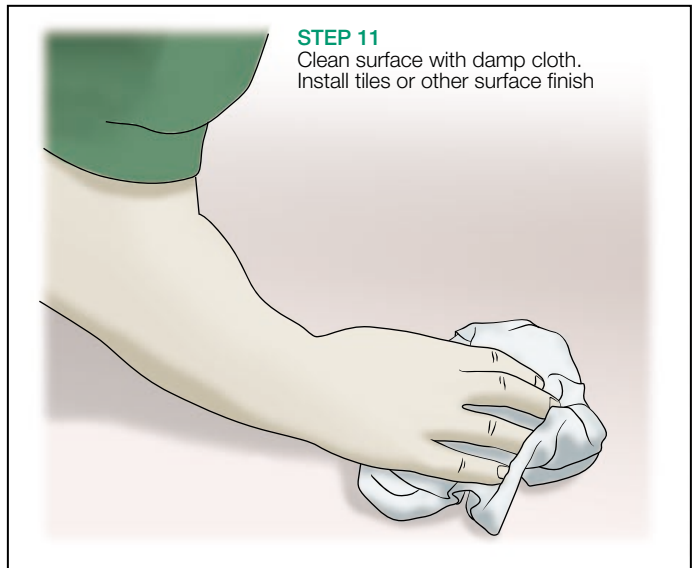


FIGURE 14 CLEAN SURFACE

TILING

If a fall to waste is not required, tiles can be fixed directly to the HardiPanel compressed sheeting using a proprietary tile adhesive conforming to the Australian Standards AS 2358. 'Adhesives – for fixing ceramic tiles' and AS 3958.1 'Ceramic Tiles – Part 1 Guide to the installation of ceramic tile'. For flooring applications a two part polymer modified cement is generally acceptable.

For this method, arrange or cut tiles so that a movement joint is carried through the tiles at all joints between sheets. Caulk such joints with a flexible wet area sealant rather than a tile grout.

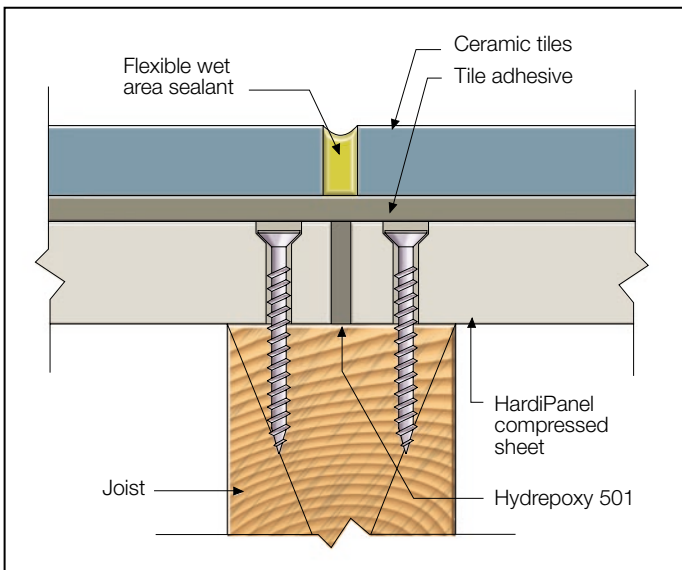


FIGURE 15 TILE JOINTS - NO MORTAR BED

CONTROL JOINTS

A movement joint must be provided through both the floor sheeting and the tiles, spaced at not greater distance than 5m. The movement joint should be 5mm wide and filled with a polyurethane sealant over a foam backing rod. Movement joints must also be placed where HardiPanel compressed sheet adjoins another flooring substrate such as timber flooring or a concrete slab.

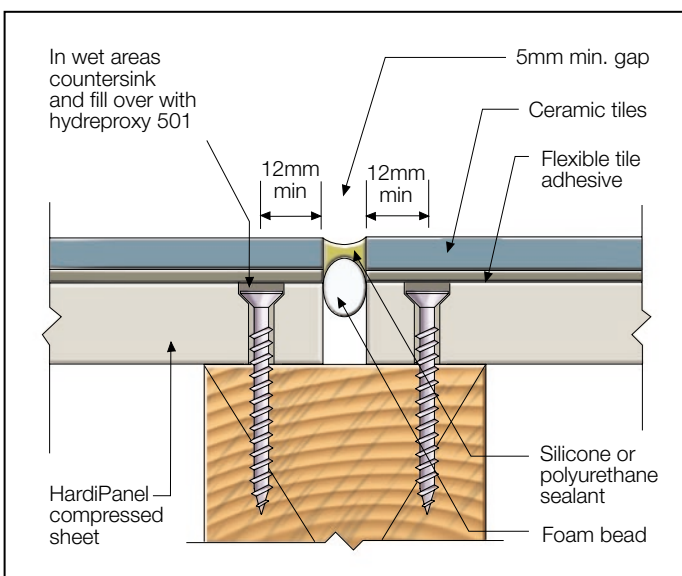


FIGURE 16 CONTROL JOINTS

MORTAR BEDS

Reinforced at joints – less than 30mm

If a fall to waste is required, floor tiles can be bedded directly into a graded mortar bed applied over HardiPanel compressed sheets.

The mortar bed must be reinforced over all sheet joints using 150mm wide galvanised wire mesh strip, approximately 1mm diameter gauge, embedded centrally in the mortar bed.

Prior to laying the mortar bed, clean down the floor and apply a coat of 'Cemstick' or equal to the floor.

The cement mortar bed must be 25mm nominal thickness and not less than 15mm thick at the floor wastes, with fall provided as required.

Reinforced – 30mm min

Both slate and marble are commonly used for tiling purposes.

A. Slate floor tiles

Slate may be used in much the same way as ceramic tiles. The slate should not be less than 9mm thick.

B. Marble floor tiles

Marble is a relatively weak material and if used as a flooring material should be isolated from structural movement. This can be achieved by modifying the flooring system to incorporate a fully reinforced mortar bed as shown. It is recommended that the services of a tradesperson experienced in the application of marble tiles be obtained.

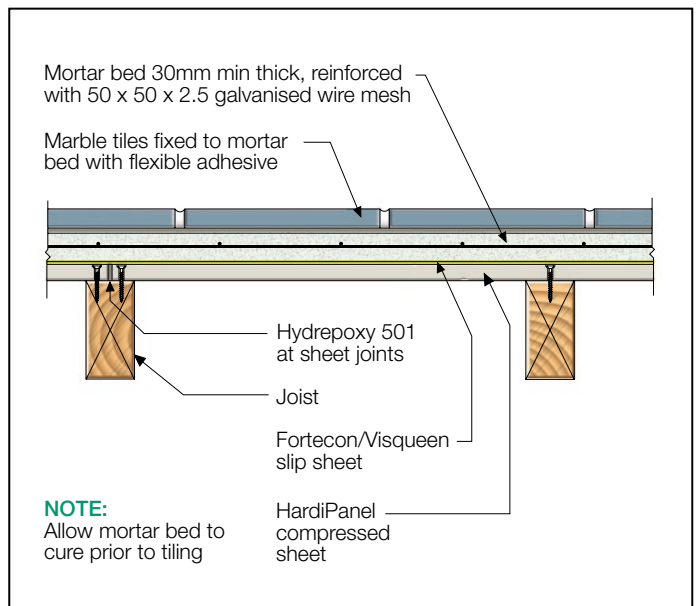


FIGURE 17 MORTAR BED

6 PRODUCT INFORMATION

GENERAL

HardiPanel compressed sheets are a cellulose fibre reinforced cement building product. The basic composition is Portland cement, ground sand, cellulose fibre and water.

HardiPanel compressed sheets are manufactured to AS/NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Panels' (ISO 8336 'Fibre Cement Flat Panels').

HardiPanel compressed sheet is classified Type A, Category 4 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 DENSITY

Based on equilibrium moisture content the approximate density of HardiPanel compressed sheet is 1620kg/m³.

DURABILITY

Resistance to moisture/rotting

HardiPanel compressed sheets have 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

HardiPanel compressed sheets are suitable where non-combustible materials are required in accordance with C1.12 of the Building Code of Australia.

HardiPanel compressed sheets have been tested by CSIRO and is classified as a Group 1 material in accordance with Specification C1.10a of the BCA.

HardiPanel compressed sheets have the following early fire hazard indices (tested to AS 1530 Part 3).

EARLY FIRE HAZARD INDICES (TESTED TO AS 1530) PART 3

Ignition index	0
Flame spread index	0
Heat evolved index	0
Smoke developed index	0 - 1

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.

MEMBRANES AND FINISHES

For wet area applications this manual must be read in conjunction with James Hardie's Wet area construction Design Manual which provides wet area waterproofing requirements and details. The waterproofing requirements of the relevant regulations must be met.

Once HardiPanel compressed sheets have been fixed in place, install floor tiles in accordance with tile manufacturers' specifications.

MAINTENANCE

Regular cleaning and maintenance of the finished surface, joints, junctions, penetrations etc must be carried out at regular intervals and as per the requirements of the relevant component manufacturer.

7 WARRANTY

James Hardie Australia Pty Limited ("James Hardie") warrants to the first purchaser of the product and the last purchaser prior to installation of the product for a period of 10 years from the date of purchase that the HardiPanel® compressed sheets (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:

- 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;
- this warranty is not transferable;
- 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. To obtain copies of such literature contact Ask James Hardie on 13 11 03. 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;
- the project must be designed and constructed in strict compliance with all relevant provisions of the current BCA, regulations and standards;
- 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;
- 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);
- all warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law;
- 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

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