James Hardie Building Products

HARDITEX™

TECHNICAL INFORMATION

July 1998

Harditex™ is the ideal lightweight cladding for a monolithic finish, yet it provides you with the comfort and peace of mind that comes with the stability and strength of James Hardie fibre cement. The only limiting factor is your imagination.

JAMES HARDIE TECHNICAL INFORMATION

CONTENTS

Contents

Cover: A Master Builders Award winning Neighbourhood Home by Fletcher Homes Ltd at Clemow's Orchard, Albany. The cladding substrate is Harditex™ Premium, by James Hardie.

Introduction

Current design trends favour the texture-plastered look with monolithic walls frequently highlighted with a variety of architectural design features.

Harditex™ is the ideal cladding for a monolithic finish, because it provides you with the comfort and peace of mind that comes with the stability and strength of James Hardie fibre cement. In other words, the best of both worlds.

When using Harditex™ the only limiting factor is your imagination. It can be used to create anything from subtle beauty to strong bold statements that make the most of colour, texture and style. So the latest design trends are yours for the asking.

Design flexibility with Harditex™ is further enhanced with the use of polystyrene shapes which provide a wide range of options for architectural detail. Please phone the James Hardie Building Systems Helpline on 0800 PANEL4U (726 3548) for more information on polystyrene shapes. Polystyrene shapes are applied by the coating contractor of your choice.

The Harditex™ base sheet, readily identified by its pink colour in its 'raw' state, has been developed to provide a durable substrate for a range of textured coatings. The coating of your choice is applied by a coating contractor licensed by the coating manufacturer. Section 7 gives further details.

Harditex™ is available in a regular 7.5mm sheet which is ideal for most residential applications. Where there is a need for superior strength, finish and impact resistance, such as in light commercial construction, or some residential homes, 9mm Harditex™ Premium is the answer. Installation is the same as for 7.5mm Harditex™, so the choice is yours.

This document is divided into seven sections:

Sections 1 to 5: The selection, working, framing and installation of James Hardie Harditex™ sheets, including bracing applications.

Section 6: Requirements for complying with the New Zealand Building Code including fire resistance, acoustic and bracing ratings.

- Providing the sheets are installed and maintained in strict accordance with this specification the Harditex™ sheet performance will be warranted by James Hardie in terms of the requirements of the New Zealand Building Code for 15 years.

Section 7: The joint and coating systems applied by specialist independent contractors.

- **The proprietary jointing and coating procedures are outside the control of James Hardie, therefore all warranties for performance of the coating systems must be given by the independent jointing and coating manufacturers and their licensed applicators.**

NOTE: It is important that you refer to 'Working Safer with Silica-based Products' prior to working with this product. From more information or a copy of this leaflet, contact James Hardie Helpline on 0800 808 868.

Refer also to *pages 6 and 7* of this brochure.

Harditex™ 7.5mm and Premium 9mm Checklist

James Hardie Harditex™ 7.5mm and 9mm is integrally coloured pink to identify the product.

FRAMING

- Framing – studs, plates and nogs must be dry, true and straight prior to fixing sheets *(page 8)*
- All sheet edges must be fully supported by framing *(page 8)* (generally sheets are fixed vertically).
- Studs 600mm centres maximum, nogs 1200mm centres maximum *(page 8)*

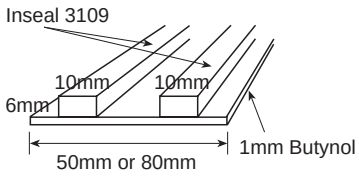
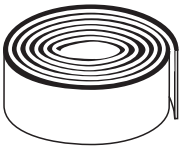
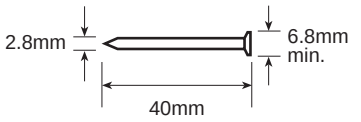
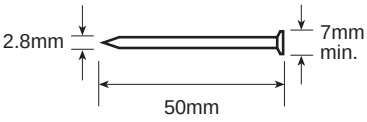
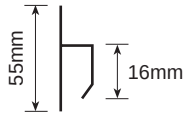
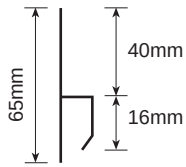
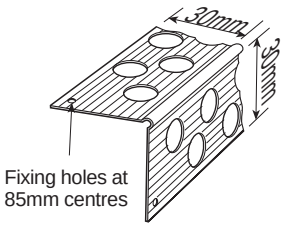
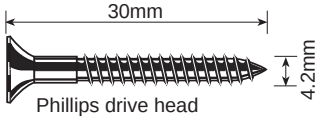
INSTALLATION

- Sheets are to be fixed, stopped and coated only when dry *(page 5)*
- Stack sheets flat in a dry area and protect from damage *(page 5)*
- When cutting, drilling, or grinding, safety glasses and an approved dust mask must be worn *(pages 6 and 7)*
- A breather-type building paper complying with NZS 2295 must be used behind Harditex™ sheets *(page 9)*
- In two-storey construction a horizontal control joint must be used at floor joist level *(page 8)*
- Sheet edges should not coincide with sides of doors and windows unless they are control or expansion joints. (Control joints 5.4m centres, expansion joints 14.4m centres) *(page 10)*
- Vertical joints are to be offset when walls are more than one sheet high *(page 10)*
- The tops of windows and doors must have head flashings *(page 10)*
- Gap between sheets is 1-2mm *(page 11)*
- Nail sheets from the centre of the sheets outward to avoid drumminess *(page 13)*
- Nailing – 150mm centres to perimeter and centre of sheet, 12mm from edges and 50mm from corner (nails 40 x 2.8 mm galvanised flat-head or stainless steel driven flush with sheet surface) *(page 12)*
- Internal corners – use Inseal 3259 (80mm wide and 1.5mm thick behind sheets) *(page 18)*
- Bracing ratings have been determined by BRANZ tests and ratings are shown on *page 19*
- Stainless steel nails (40mm x 2.8mm) must be used for all bracing panels and in severe coastal environments *(pages 21 and 34)*

JOINTING & COATING

- All stopped joints must have both edges recessed. Control joints should have square edges *(page 15)*
- Sheets must be coated within 3 months of fixing *(page 34)*
- External corners – use PVC external corner mould – perforated *(page 18)*
- Colours must have a light-reflective value (LRV) of 40% minimum regardless of gloss level *(page 37)*

Table 1: Accessories for James Hardie Harditex™

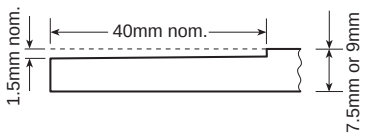
	Accessory	Size (mm)	Material/Appearance
Accessories for 7.5mm and 9mm Harditex™			
	Butynol Inseal strip 12-metre roll	Width 50 80 (corner joints)	Black
	Inseal 3109 sealing strip 12-metre roll	6 x 10	Black compressible foam (self-adhesive one side)
	Inseal 3259 sealing strip 50-metre roll	1.5 x 50 1.5 x 80 (corner joints)	Black compressible foam (self-adhesive one side)
	Hardiflex® nails: galvanised flat-head stainless steel Note: These nails are not stocked by James Hardie. Refer to your distributor.	40 x 2.8 40 x 2.8	Hot-dipped galvanised steel 316 stainless steel
	Weatherboard nails: galvanised flat-head stainless steel Note: These nails are not stocked by James Hardie. Refer to your distributor.	50 x 2.8 50 x 2.8	Hot-dipped galvanised steel 316 stainless steel
	7.5mm horizontal flashing	Length 3000	PVC/Bone
	9mm horizontal flashing	Length 3000	PVC/Bone
	External corner mould	Length 3000 Length 2700 Length 2400	PVC/White
	Stainless steel wood screw 100 screw bag 5 kg screw boxes	30 x 4.2	316 stainless steel

Section 1: Product information • Handling and cutting • Safety

Table 2: Harditex™ sheet sizes

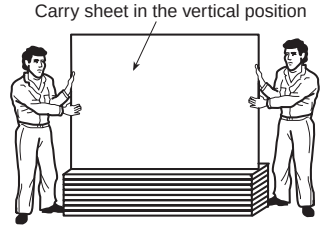
Thickness	Width	Length (mm)			
(mm)	(mm)	1800	2400	2700	3000
7.5	1200	✔	✔	✔	✔
9	1200		✔	✔	✔

Fig. 1 *SHEET EDGE FINISH – STEPPED RECESS*



Note: The stepped recessed edge needs less jointing compound and takes less time to set and finish. It gives a flatter, neater and stronger joint.

Fig. 2 *HANDLING HARDITEX™ SHEETS*



Note: Sheets must be allowed to dry before fixing otherwise drying shrinkage can occur and this will be detrimental to the finished job.

Product description

Harditex™ is a sheet material manufactured in New Zealand by James Hardie from fibre cement which is a composition of treated cellulose fibre, Portland cement, finely ground sand and water. Following forming into sheets the product is cured by high-pressure steam autoclaving.

Harditex™ 7.5mm and 9mm thick is used as the exterior cladding to timber and steel framing whilst also being the exterior bracing system (for timber frame only) when jointed and coated.

The product is identified by the fixing pattern printed on the face of the sheets, by a pink colour tint throughout the thickness and by the name Harditex™ printed on the reverse face of the 7.5mm sheet.

Harditex™ Premium 9mm sheets have the name Harditex™ Premium printed on the face side of the sheet.

Harditex™ Premium has a sanded face and is used where superior finish, strength and impact resistance are demanded.

New Zealand Standard

Harditex™ is manufactured to conform to NZS/AS 2908.2-1992: Cellulose Cement Products - Flat Sheets.

Installation – technical details

Harditex™ must be installed in accordance with the details of the specification. James Hardie has evaluated a number of proprietary joint and coating systems. These systems must be applied by licensed applicators nominated by the coating manufacturer. A list of proprietary jointing and coating systems is given on *page 40*. A Harditex™ installation video is available on request from James Hardie.

Sheet bracing

Harditex™ 7.5mm and 9mm sheets are suitable sheet materials for wall bracing in terms of NZS 3604. For full details of the Harditex™ bracing systems refer to *pages 19-33*.

Sheet properties

The Harditex™ cladding sheet is a lightweight fibre cement substrate which is resistant to permanent moisture damage, and which will not rot or burn. The sheet is securely fixed to the timber or steel framing by nailing or screwing.

Any special conditions or unusual applications must be referred to the technical staff of James Hardie Building Products Ltd. Phone the James Hardie Helpline: 0800 808 868.

NOTE: Steel framing is not included in this brochure. Information is available from James Hardie on request.

Sheet sizes

Harditex™ sheet lengths and widths are given in *Table 2*.
NOTE: All dimensions are nominal.

All these specifications can be used for 7.5mm- and 9mm-thickness Harditex™.

Sheet edge finish

The sheets have stepped recesses on both sides and one end to take a reinforced flush joint detail applied by the coating contractor. This allows for a monolithic finish of both vertical and horizontal joint details. (Refer Fig. 1.)

Sheet mass and moisture content

The approximate mass of 7.5mm Harditex™ at equilibrium moisture content (EMC) is 10.7 kg/m², 9mm is 13.4 kg/m².

Harditex™ sheets must be allowed to dry to EMC before fixing to framing, otherwise drying shrinkage can occur which will be detrimental to the finished job.

NOTE: Dry Harditex™ sheets vary in moisture content with the seasons and prevailing weather conditions. As a guide, a dry sheet can vary between 6% moisture content in summer and 14% in winter.

The sheets are also defined as having an equilibrium moisture content where the sheet is under conditions of 25°C and a 55% relative humidity.

Moisture content at EMC	7%
Moisture content at saturation	33%

Fire properties

Harditex™ will not burn and has the following Early Fire Hazard Indices (tested to AS 1530 part 3 1982).

Ignition Index	0
Flame Spread Index	0
Heat Evolved Index	0
Smoke Developed Index	0-1

NOTE: Zero is the best possible result.

C3 Spread of Fire

The Harditex™ substrate for exterior texture coatings with a surface finish coating of not more than 1mm in thickness is considered to meet the performance provisions of NZBC C3.3.5 when used to clad all buildings.

When the applied surface finish coating is more than 1mm in thickness, the coating manufacturer must be consulted to obtain Ignitability Index and/or non-combustibility data for the substrate coating system. Performance requirements are given in C3/AS1 Table 2.

Handling and storage

Harditex™ sheets must be stacked on a smooth, level surface. Edges and corners must be protected from damage. Carry sheets on edge. (Refer *Fig. 2*.) Store under cover and keep dry prior to fixing, jointing and coating.

Cutting

Suitable cutting methods are 'score-and-snap', hand guillotine, hand sawing, power sawing and the Hardishear™ power cutter.

Score-and-snap

'Score-and-snap' is a fast and efficient method of cutting using James Hardie's special tungsten-tipped 'score-and-snap' knife. (Refer *Fig. 3*.)

- Preferably score from the face side of the sheet.
- Position the straight-edge along the line of the cut.
- Score against the straight-edge and repeat the action to obtain adequate depth for a clean break – normally one-third of the sheet thickness.
- Snap upwards to achieve break.
- Clean up edges with a rasp if necessary.

Hand guillotine

The Bentley™ hand guillotine produces clean, straight edges. Make the guillotine cut on the off-cut side of the line to allow for the thickness of the blade. (Refer *Fig. 4*.)

Hand sawing

Hand sawing is suitable for general cutting operations and for small cuts, notchings or small penetrations.

Fig. 3 *SCORE-AND-SNAP METHOD*

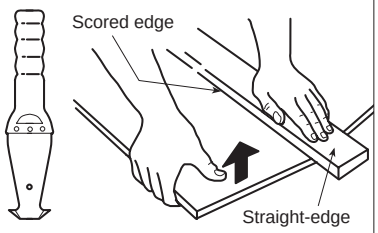


Fig. 4 *HAND GUILLOTINE METHOD*

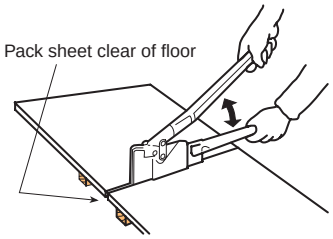
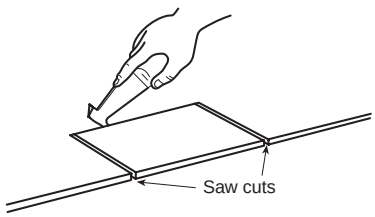


Fig. 5 *HAND SAWING METHOD*



Preferably use an old handsaw. A quick forward jabbing action is best.

For neatness, mark out the cuts to be made on the face side of the sheet. Where small notches are to be made, cut the two sides with the handsaw or hand guillotine, score along the back with the 'score-and-snap' knife and snap upwards. (Refer *Fig. 5*.)

Fig. 6 *HARDISHEAR™ POWER CUTTER*

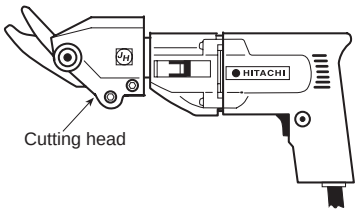


Fig. 7 *SITE-GROUND RECESSED-EDGE DETAIL*

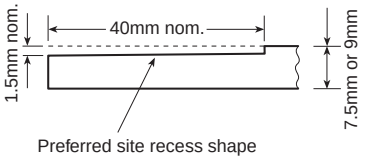
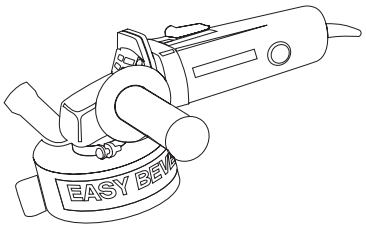


Fig. 8 *HITACHI EASY BEVEL*



Power sawing, site recessing and hole forming

Safety precautions

When cutting, drilling or grinding, safety glasses and a dust mask must always be worn. This can be either a disposable P2 dust mask or a half mask with a disposable cartridge. The mask must fit properly and be approved for use with dust. The mask must be repaired or replaced as necessary and cleaned often.

All dry power-cutting operations must be carried out in open-air situations or in well ventilated spaces and dust extraction equipment must be fitted to the dry-cutting tool.

All aspects of wet and dry cutting must comply with the latest regulations of the Occupational Safety and Health (OSH) division of the Labour Department. (Refer to 'Recommended safe working practices', *page 7*.)

Power sawing

Power cutting using a dry diamond or carborundum saw blade gives an acceptable edge.

Clamp a straight-edge to the sheet and run the saw base plate along the straight-edge when making the cut.

Hardishear™ power cutter

A Hardishear™ power-cutting tool can be used for 7.5mm and 9mm Harditex. (Refer *Fig. 6*.)

For details and availability of the Hardishear™, phone the James Hardie Helpline on 0800 808 868.

Site recessing

Where it is necessary to produce a ground recess detail on site, use a portable angle grinder fitted with a strong, thick carborundum blade or similar and a dust extraction unit fitted to a vacuum cleaner. Do all edge grinding outside in a well-ventilated area. Run down the edge of the face to produce a stepped recess approximately 40mm wide but not exceeding 1.5mm at its deepest point. (Refer *Fig. 7*.)

A suitable tool for this is the Hitachi Easy Bevel (refer *Fig. 8*), available from Accent Tools, 232 Bush Rd, Albany, Auckland, phone (09) 415-2545, or major Hitachi distribution outlets.

Hole forming

Small rectangular or circular holes can be achieved by drilling a series of small holes around the perimeter of the hole then tapping out the waste pieces from the sheet face. Tap carefully to avoid damage to sheets, and clean rough edges with a rasp. (Refer *Fig. 9*.)

Large rectangular openings, such as for wall ventilators, can be made by the following method:

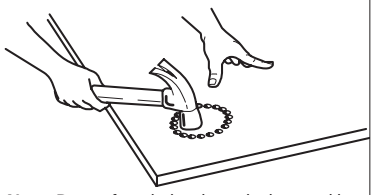
- Mark out the hole on the face side of the sheet.
- Drill a hole in each corner as shown in *Fig. 10*.
- Score to the outside of the holes to half the sheet depth.
- Turn sheet over and score the reverse face to half the depth using the drilled holes as a reference.
- Knock out the scored material to form the hole. (Refer *Fig. 10*.)

Alternatively, large rectangular holes can be formed with a 110mm-diameter diamond-blade saw.

For smooth, clean-cut circular holes:

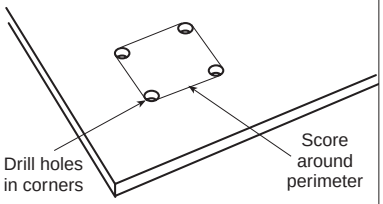
- Mark the centre of the hole on the sheet.
- Pre-drill a 'pilot' hole.
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a tungsten-tipped ring cutter fitted to a heavy-duty electric drill. Sandvik ring-cutting kits or similar are available for this purpose.

Fig. 9 *CIRCULAR HOLE FORMING*



Note: Do not form holes through sheets with cold chisels, heavy hammers or any other 'aggressive' methods. Such forceful methods will damage sheets and may cause other problems at a later date.

Fig. 10 *RECTANGULAR HOLE FORMING*



Recommended safe working practices

Breathing in fine silica dust liberated when working with products such as fibre cement, clay and concrete is hazardous. Over time, usually a number of years, this may result in lung bronchitis, silicosis and lung cancer. **Work safely** with fibre cement sheets by following the precautions described below.

- Minimise dust when cutting sheets, by using either Score-and-Snap knife, Bentley™ hand guillotine or Heavy Duty Hardishear.™
- When using other power tools or abrasive hand tools, wear approved personal protective equipment, i.e., P1 or P2 dust mask and safety goggles.
- Ensure containment of dust during clean-up and disposal.

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

For more information contact the James Hardie Helpline: 0800 808 868

Section 2: Framing

General requirements

NOTE: For Harditex™ bracing systems framing requirements refer to page 20.

Correct design of the framework and careful consideration of the sheet set-out (refer *page 10*) to minimise joints will significantly contribute to the long-term success of all flush-jointed wall systems. Allowance must be made for the provision of both horizontal and vertical control joints and expansion joints at the design stage (refer *pages 15-17*).

All Harditex™ sheet edges must be fully supported by the framing. Framing must be rigid and not rely on the Harditex™ for stability.

All studs and nogs must be checked with a long straight-edge for line and face accuracy to ensure the timber stud wall has a true and accurate outside face before the Harditex™ sheet is fixed (refer *Table 3, page 9*).

Harditex™ must not be used in full pole house construction where excessive structural movement could be encountered. It can be used on the upper level of pole platform construction where the poles terminate at the underside of the floor level.

Timber frame

All timber framing must be in accordance with NZS 3604 Code of Practice for Light Timber Frame Buildings.

Specific design to NZS 4203:1992 and NZS 3603:1993 can also be undertaken providing:

- The framing centres do not exceed those given in this specification.
- The framing member widths conform to this specification.

Standard green frame or kiln-dried timber can be used for single-storey or double-storey construction with the following exceptions:

1. When the inter-storey wall height exceeds the sheet length and horizontal joints need to be introduced, all timber framing must be kiln dried to minimise vertical shrinkage as this can cause horizontal joint pouting.
2. When the one sheet spans from top to bottom plate of the same storey, standard green frame can be used.
3. Standard green frame or kiln-dried timber can be used for floor joists. Because green floor joists can have significant shrinkage and kiln-dried joists can also move, a horizontal control joint must be located at the floor joist level as shown in *Figs 25, 26 or 27*.
4. Harditex™ must not be fixed to timber framing with a moisture content in excess of 24% and for fully air-conditioned buildings moisture content must not exceed 18% in accordance with NZS 3602:1990.

NOTE: Kiln-dried timber will minimise shrinkage. This is particularly important for multi-storey buildings and applications which are more than one sheet length in height.

Refer also to 'Structural details', *page 10*, for further information. Timber framing must be either ex 50mm wide, or when kiln-dried is used, 35mm minimum finished size at intermediate studs and 45mm wide at all sheet joints to give sufficient width to fix sheets at joints. Studs must be at maximum 600mm centres between continuous top and bottom plates and nogs at maximum 1200mm centres. (Refer *Fig. 22*.)

SPECIAL NOTE: 35mm-wide kiln-dried timber must not be used at any sheet cladding or lining joints because of insufficient nailing width.

Steel frame

Details for steel frame can be obtained by phoning the James Hardie Helpline on 0800 808 868.

Frame set-out

It will be more economical when the timber is pre-cut or set out to suit the exterior cladding rather than the interior lining. For a typical example of this refer *Fig. 11*.

Batten requirements

Battens for fixing the sheets are required when the sheets are fixed over:

- Gypsum board or fire-rated gypsum board
- Softboard, polystyrene or similar sheets
- Concrete, masonry block or brick walls.

Batten specification

- Timber battening is to have a minimum thickness of 40mm to give adequate sheet nail penetration.
- Steel battens are to be a minimum of 72mm wide x 23mm deep x 0.55mm thick and to have a bearing surface of 37mm. Battens are to be galvanised steel (257g/m^2 zinc coating) and fixed to manufacturer's specifications.

All battening centres and sheet fixing is to be strictly in accordance with the framing and fixing required by this specification. Care must be taken to ensure the battens are packed and aligned to give a true even surface for the sheets to be fixed. Check the face of the battens with a long straight-edge before fixing the sheets.

Building paper

A breather-type building paper complying with NZS 2295, as required by NZS 3604, must be fixed to the outside face of timber framing before fixing the Harditex™ sheet. *Note that for clarity building paper is generally not shown in the drawings in this brochure.*

Curved applications

Harditex™ can be used for curved applications. The minimum recommended radius for convex or concave fitted sheets of 7.5mm and 9mm thickness is 1800mm. The sheets must be bent only along the length.

NOTE: The framing is to be closed up to 400mm centres for curved applications to give extra support to the curve.

Kiln-dried framing must be used when horizontal sheet joints are introduced into the height of the curved frame.

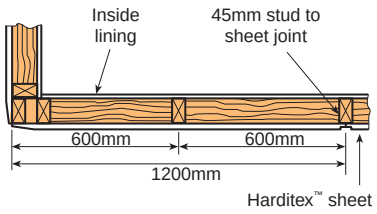
Exterior frame straightness

To achieve a visually acceptable finish to the textured Harditex™ the frame straightness tolerances listed in *Table 3* must be used.

Bracing sheets stopped below top plate

Where bracing sheets are stopped below the level of the top plate, refer to *Fig. 49* for framing details.

Fig. 11 *FRAME AND STUD SET-OUT*



Note: When alternative 35mm and 45mm kiln-dried studs are used it is useful to set out the alternative studs in one direction around the building, working from one reference point.

Table 3: Frame straightness tolerances

Straight-edge (mm)	Tolerance (mm)
Good finish	
600	2
1200	3
3000	4
Measured across plastered site joints:	
200	0.5
Excellent finish	
600	1
1200	2
3000	3
Measured across plastered site joints:	
200	0.5

Note: These tolerances apply to any point on the face of the Harditex™ cladding when measured with a straight-edge in any direction.

Section 3: Sheet layout • Fixing

Fig. 12 *SHEET LAYOUT FOR OPENINGS*

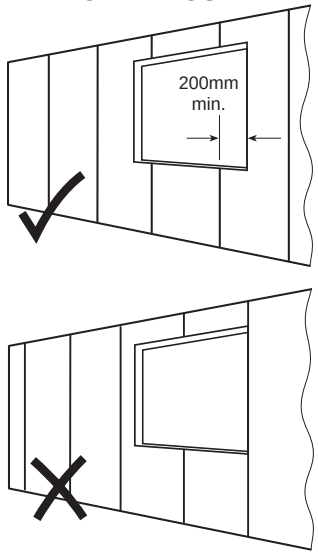
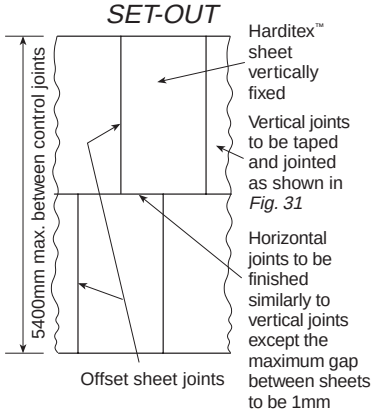
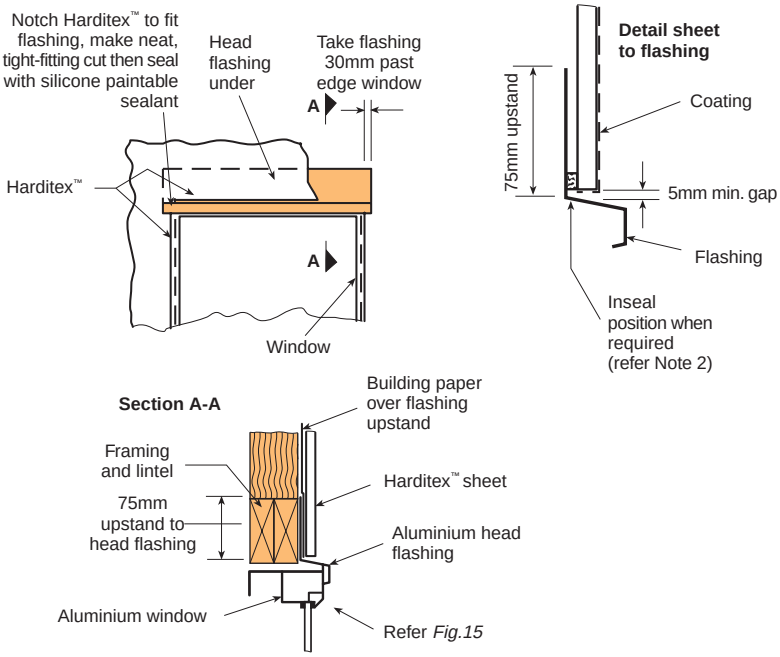


Fig. 13 *OFFSET SHEET SET-OUT*



Notes:
1. When horizontal sheet joints are used for timber frame only kiln-dried timber must be used.
2. In multi-storey applications the horizontal control joints must coincide with floor joists (refer *Figs 25, 26 and 27*).

Fig. 14 *STANDARD WINDOW OR DOOR HEAD DETAIL*



Notes:
1. When Inseal 3109 6mm x 10mm is used between the Harditex™ and the flashing the upstand can be reduced to 45mm.
2. When the sheet is brought hard down onto the flashing for appearance reasons, the bottom edge of the sheet must be back-sealed. A continuous 6mm x 10mm Inseal 3109 strip must also be used to seal the back of the sheet.
3. For details of recessed windows refer to *pages 38 and 39.*

Structural details

- Harditex™ cladding systems are suitable for both commercial and domestic applications. These must be limited to two storeys in height unless specific design is undertaken for the attachment of the Harditex™ sheets to the structure. This is because the Harditex™ sheets form a very rigid element and will act as a structural diaphragm. If a high wall is incorrectly designed the lateral forces on the building may be absorbed by the Harditex™ sheets before the designed structural bracing systems, which could lead to serious damage to the sheet fixing and jointing. This aspect must be structurally considered by an engineer before work of greater than two storeys is undertaken. Harditex™ has substantial sheet bracing performance (refer to *page 19*).
- All sheets must be installed vertically for timber frame construction as this method gives the best overall performance.
- Sheets may, however, be laid horizontally for timber frame when a depth of cladding not more than 1200mm high is required (one width of sheet). Examples are fascias, spandrels or narrow bands of cladding along the building. Refer also to 'Curved applications', *page 9*

Door and window openings

Where sheet joints are above and/or below door or window lines, joints may crack due to structural movement. Fix sheets across door and window openings so sheet edges do not coincide with the side of the window or door, then cut away waste. (refer *Fig. 12*.)

An alternative method to accommodate this possibility is to provide an expressed joint at window edges flashed with Inseal or a sealant-filled joint. (Refer *Figs 23 and 24*.)

When Harditex™ is fixed more than one sheet high on large walls the joints must be offset. (Refer *Fig. 13*.)

Flashings

The tops of windows and doors must be flashed with a head flashing (refer *Figs 14 and 15*). Use pre-shaped aluminium flashings. The sides of the windows must be sealed with Inseal 3109 6mm x 10mm strips or a paintable silicone.

The Inseal strips are adhered to the window overlap before installation (refer *Fig. 16*).

When silicone sealant seals are used the continuous bead of sealant is applied under the window overlap before the window is fixed (refer *Fig. 16*).

NOTE: Silicone applied as a fillet to the window edge and onto the cladding is not an effective weathering method and must not be used.

Fig. 15 *HEAD FLASHING DETAIL*

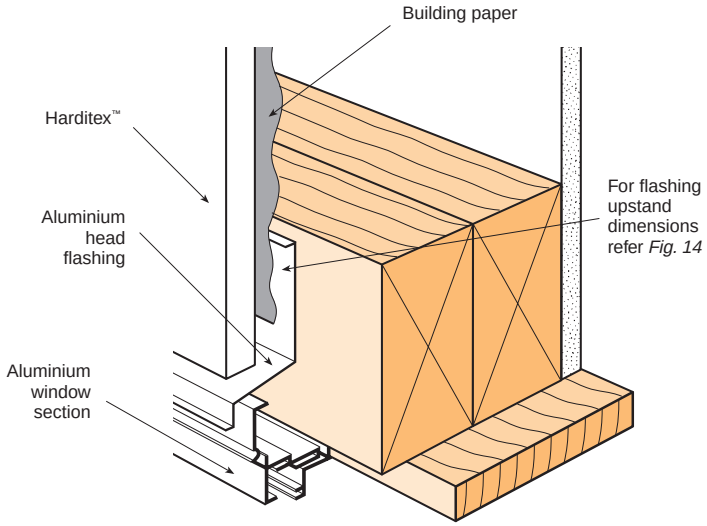


Fig. 16 *SIDE FLASHING DETAIL (INSEAL OR SEALANT SEAL)*

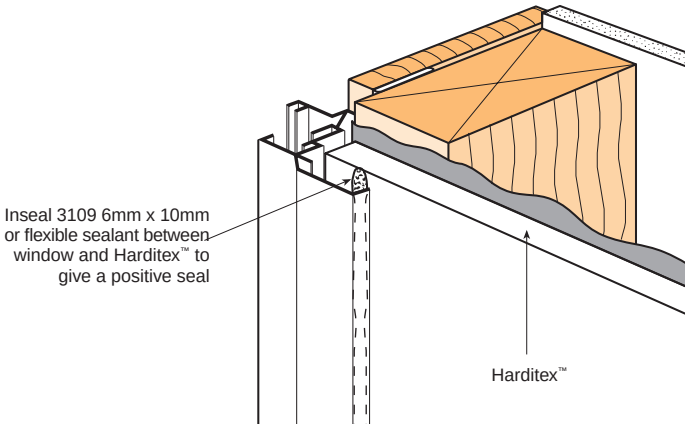


Fig. 17 *SILL FLASHING DETAIL*

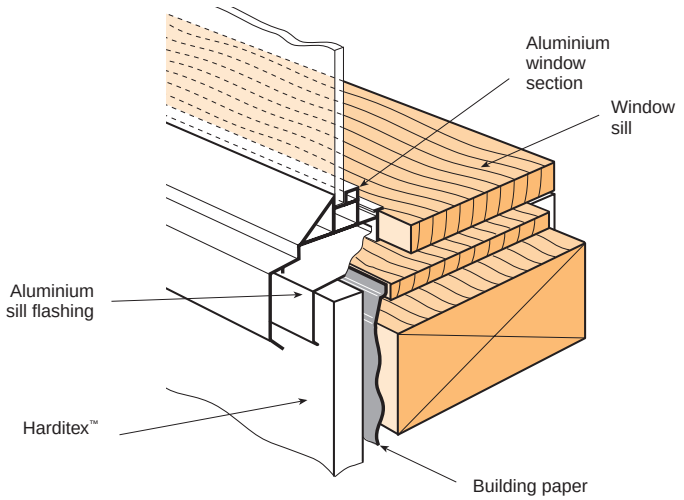
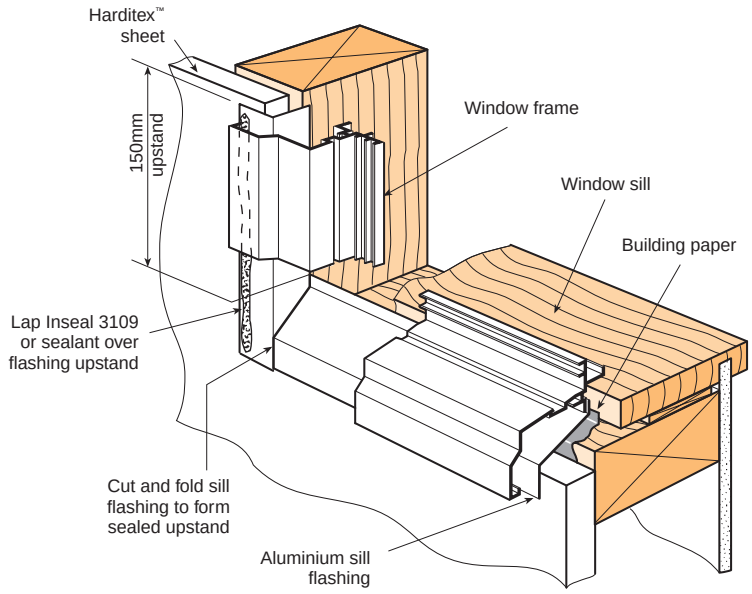


Fig. 18 *SILL FLASHING UPSTAND*



When aluminium joinery is used sill flashings give good long-term protection (refer *Fig. 17*).

The sill flashing needs the end turned up to be effective (refer *Fig. 18*).

Ground clearance

Slab on ground

The concrete slab floor-to-ground dimension must be 150mm minimum to comply with paragraph EI/ASI 2.0.1(a) of the New Zealand Building Code.

The sheet must finish no closer to the ground than shown in *Fig. 19* or the alternative detail in *Fig. 20* or, on timber pile, as shown in *Fig. 21*. In no case can the Harditex™ be taken closer than 50mm to the finished ground, whether paved or unpaved.

Timber piles

When timber-piled foundations are used, the Harditex™ can be carried to within 50mm of the finished ground level (refer *Fig. 21*).

Fixing

Nail at 150mm centres to the perimeter of sheets and intermediate studs and nogs (refer *Fig. 22*). Nails must be hammer driven flush with the sheet surface. Do not fix closer than 12mm to the sheet edge or 50mm to the corner of the sheet. Do not overdrive the nails below the sheet surface as this can weaken the nails' holding.

Commence fixing from the centre of all sheets and work outwards to ensure they are hard against the framing to eliminate any drumminess.

The sheet must be held firmly against the stud when nailing to minimise break-out at the back of the sheet.

Fix in conjunction with the dot pattern on the sheet which is set out for normal vertical sheet fixing. Use 40mm x 2.8mm galvanised flat-head Hardiflex™ or 316 stainless steel nails (refer *Table 1, page 3*).

Hot-dipped galvanised nails and screws have a durability of 10 years in very severe coastal conditions of New Zealand. Therefore in these locations alternatives such as stainless steel fixings available from stockists of James Hardie products must be used. Refer also to the New Zealand Building Code requirements (*page 34*).

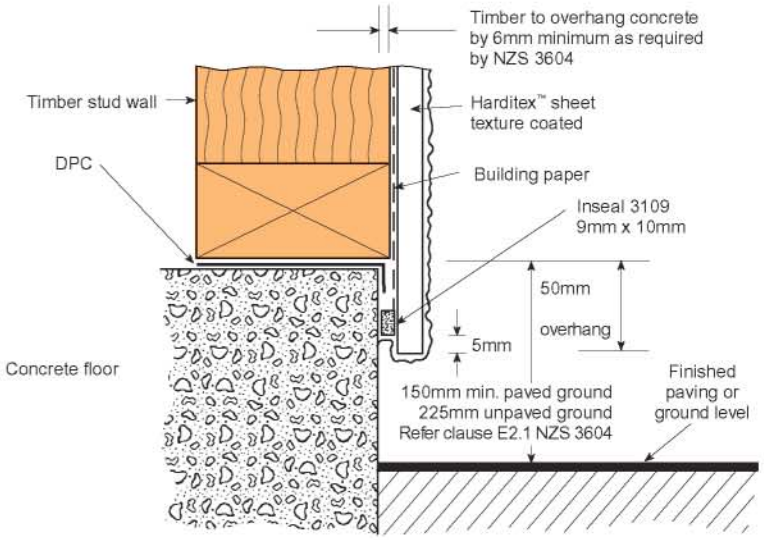
Harditex™ 7.5mm and 9mm sheets can also be fixed to timber frame with 30mm x 4.2mm 316 stainless steel wood screws (refer *Table 1, page 3*).

It is very important to use the correct drill gun with 316 stainless steel screws. For the best results, use the low speed Hitachi model WF4DY. This model delivers high torque with a slow speed vibrating action which is very suitable for stainless steel screws because it minimises damage to the drill bit and screw head.

NOTE: These screws can only be used for design wind pressures up to 2 kpa.

These screws drill through the sheet and self-embed into the sheet. Embed the screws 1-2mm in the body of the sheet and ensure they are flush in the recess to avoid over-embedding.

Fig. 19 *HARDITEX™ OVERHANG DETAIL TO CONCRETE OR BLOCKWORK BASE*



Note: Refer also to ground clearance Clauses to fully comply with the New Zealand Building Code.

Fig. 20 *BASE DETAIL FOR HARDITEX™ ON CONCRETE SLAB WITH CAST-IN BEARER*

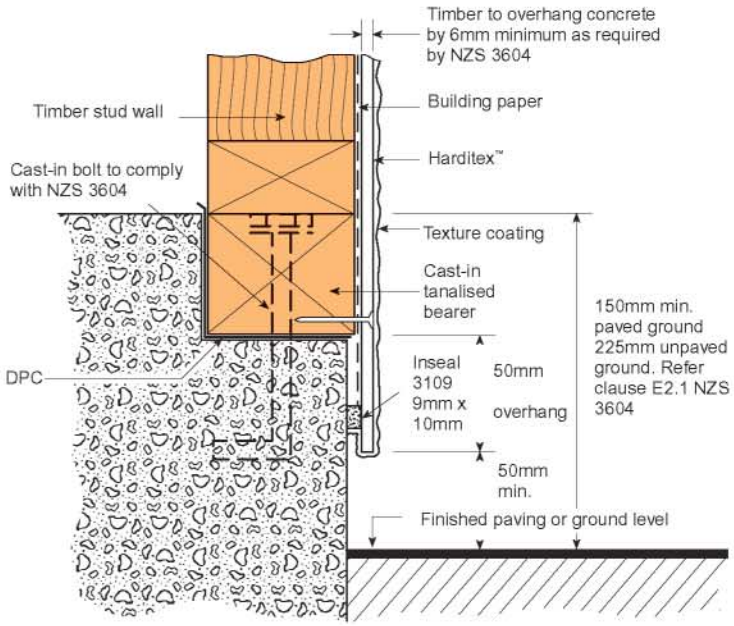
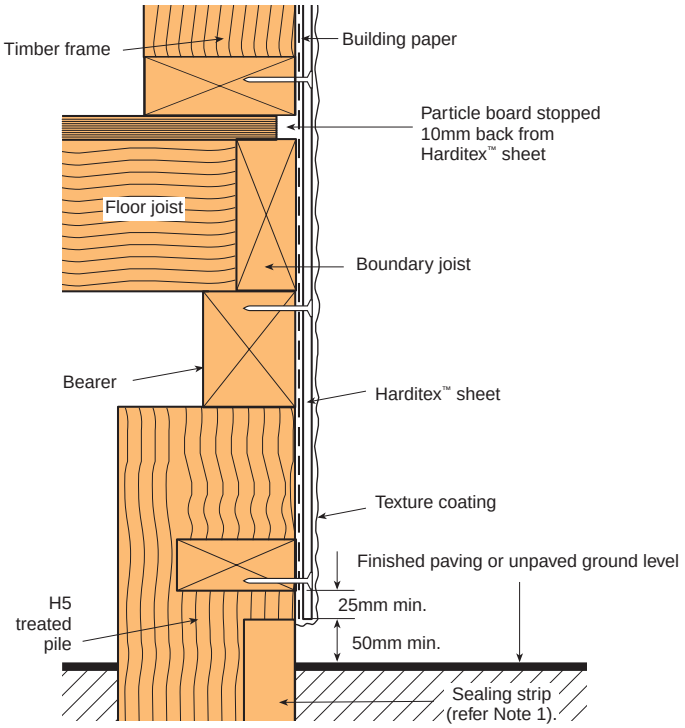
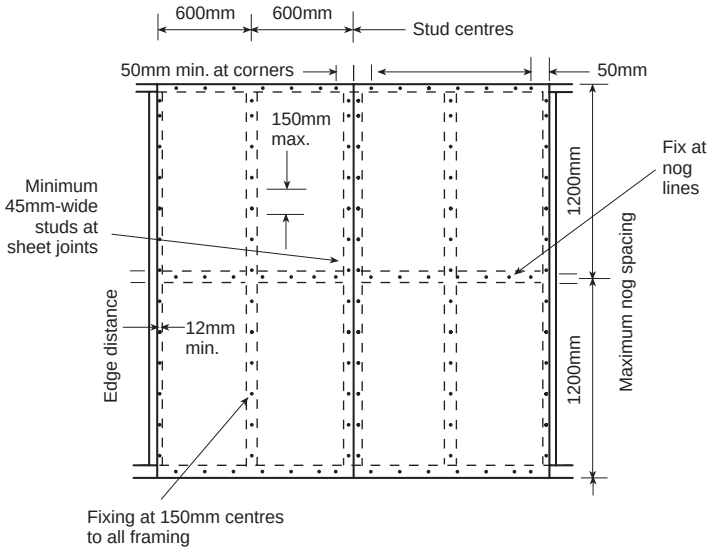


Fig. 21 *BASE DETAIL FOR HARDITEX™ ON TIMBER PILE*



Notes:
1. The gap under the Harditex™ can be sealed off with an H5 treated timber or concrete surround cast into the ground between the piles.
2. Provide adequate sub-floor ventilation as required by NZS 3604.

Fig. 22 *STANDARD VERTICAL SHEET FIXING*



Section 4: Control, expansion and corner joints

Control joints

Control joints are provided to take up the minimal movement when sheets are flush jointed together.

Vertical and horizontal control joints must be provided to limit the monolithic cladding area.

Vertical and horizontal control joints must be provided at 5.4 metre maximum centres.

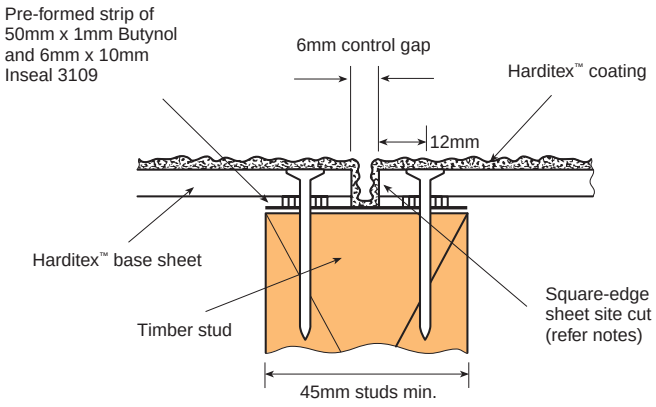
Horizontal control joints must be provided at the inter-storey floor joist level (refer *page 8*).

Provide a maximum 6mm gap between the sheets.

Control joints must be located at 5.4 metre centres from corners. When an opening is in the vicinity of a control joint then the edge of the opening is an ideal location for it. A good location for control joints is behind downpipes.

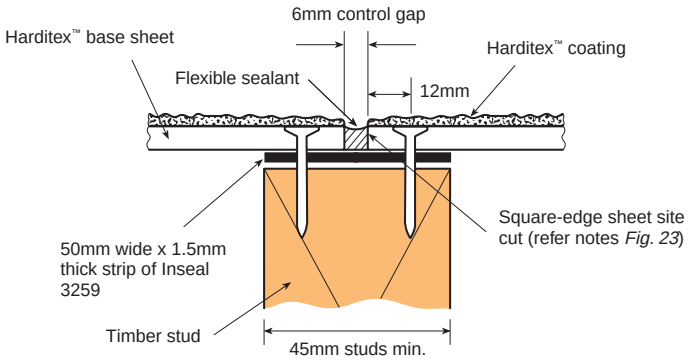
For details of alternative vertical control joints refer *Figs 23 and 24*.

Fig. 23 *VERTICAL BUTYNOL INSEAL CONTROL JOINT (ALTERNATIVE 1)*



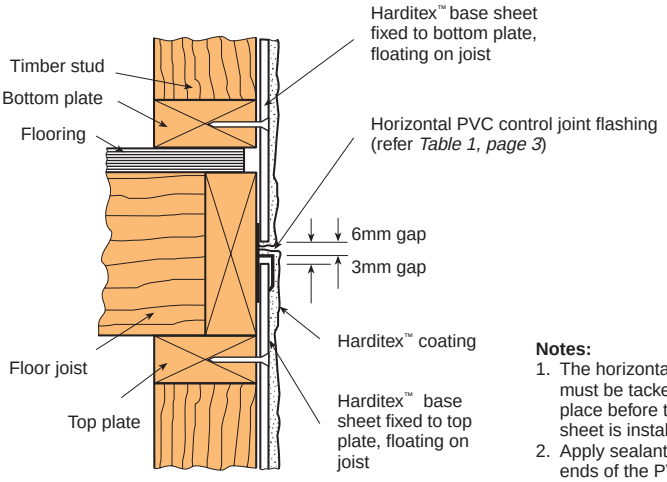
Notes:
1. Butynol Inseal Strip is available in 12-metre rolls from James Hardie stockists.
2. This alternative can be left open to give an expressed joint appearance.
3. The finish coating must be sprayed into the joint to give a complete seal to the Butynol and the sheet edges.
4. The sheet edge is to be site cut to give a square edge as shown above and in *Fig. 24*. Refer also to the site-cutting recommendations on *page 6*. The frame set-out and joint positioning in the wall will need to allow for this reduced sheet width.

Fig. 24 *VERTICAL SEALANT CONTROL JOINT (ALTERNATIVE 2)*



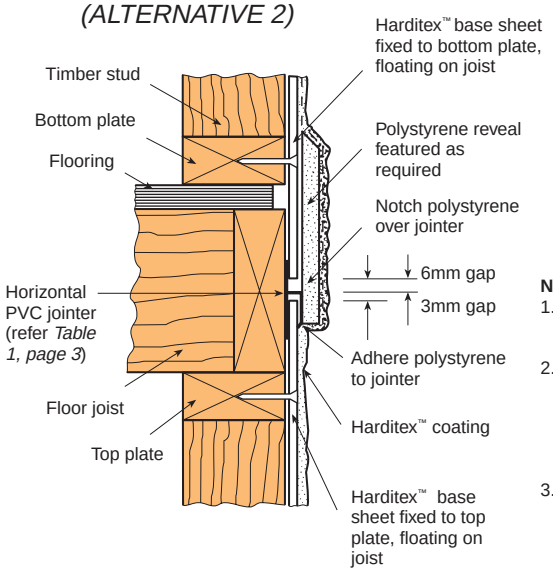
Notes:
1. Mask out the sheet both sides of the joint to apply the flexible sealant.
2. Use only a top-quality paintable flexible silicone sealant.
3. The finish coating must be stopped each side of the flexible sealant to avoid rippling of the textured surface.
4. In some cases the sealant can colour-match the finish coating; check with the sealant manufacturer.
5. Joint preparation and priming must be carried out according to the sealant manufacturer's instructions.
6. Joint sealant must be checked for compatibility with the coating applicator.
7. When the coating is carried over the sealant joint, long-term coating rippling can occur.

Fig. 25 *HORIZONTAL FLASHING CONTROL JOINT (ALTERNATIVE 1)*



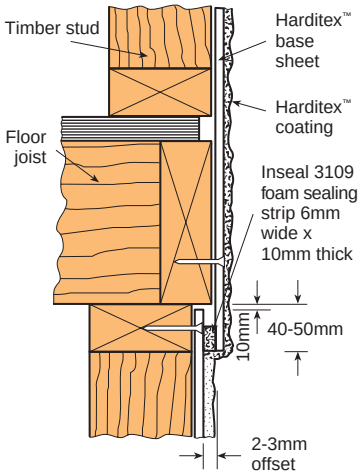
Notes:
1. The horizontal jointer must be tacked into place before the top sheet is installed.
2. Apply sealant to the ends of the PVC jointer to stop water penetration.

Fig. 26 *HORIZONTAL REVEAL CONTROL JOINT (ALTERNATIVE 2)*



Notes:
1. Dimensions of polystyrene reveal to be to the specifier's choice
2. For methods of adhering and finishing the polystyrene shape refer to the selected jointing and coating manufacturer.
3. Apply sealant to the ends of the PVC jointer to stop water penetration.

Fig. 27 *HORIZONTAL OVERLAP CONTROL JOINT DETAIL (ALTERNATIVE 3)*



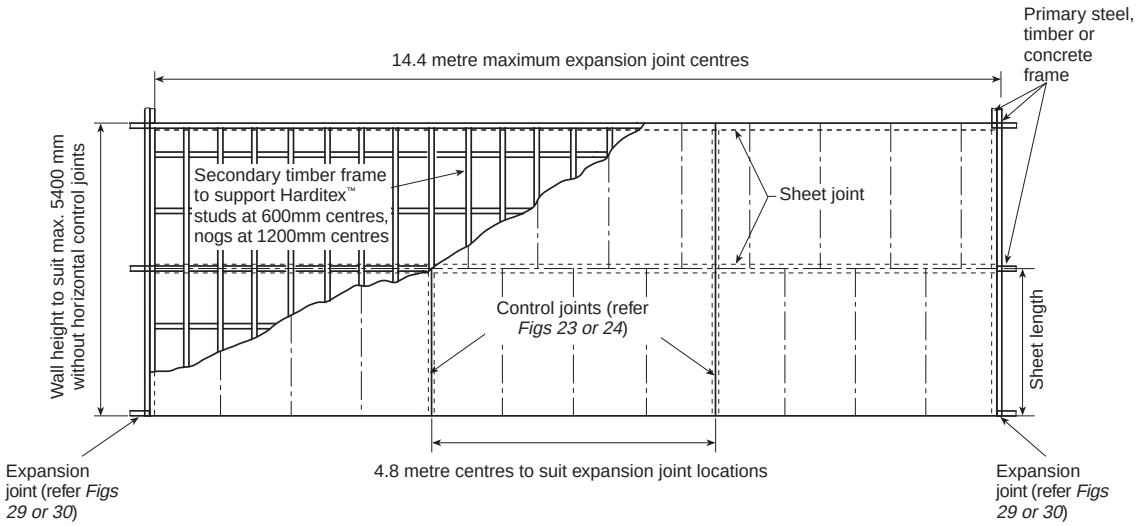
For details of alternative horizontal control joints refer *Figs 25, 26 and 27.*

Expansion joints

Expansion joints are provided to panelise elements to allow for long-term frame movement that occurs because of component shrinkage and temperature-related expansion and contraction.

Vertical structural expansion joints must be provided where walls exceed 14.4 metres in length. These expansion joints must be correctly designed structural joints. They must have total framing, including top and bottom plate, lining and cladding separation to allow for the structural framing expansion and contraction that can occur.

Fig. 28 *PANELLISED TIMBER FRAME OVER STEEL PORTALS – EXPANSION JOINT LOCATIONS*



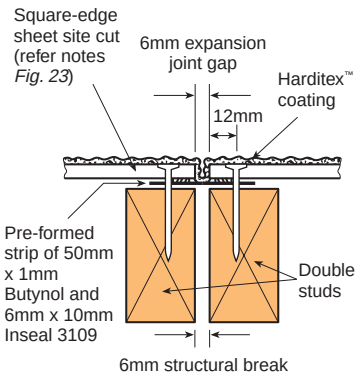
A well designed long wall will therefore have full expansion joints at 14.4 metre maximum centres with intermediate control joints at 5.4 metre centres maximum from an expansion joint. (Refer *Fig. 28*.)

Note that for minimum sheet cutting, control joints can be placed at 4.8 metre centres between expansion joints at 14.4 metre centres.

NOTE: These expansion joints must be used on commercial and industrial applications where long wall lengths are frequently required. This can be achieved by panellising the Harditex™ support framework off the main structural frame. These details are difficult to achieve on domestic construction therefore walls greater than 14.4 metres must be avoided.

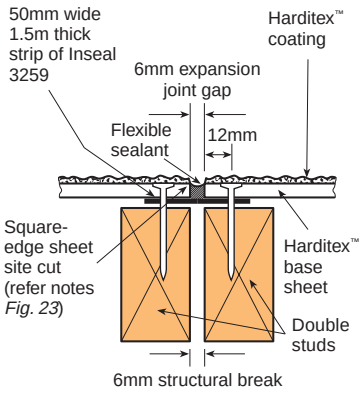
For details of alternative vertical expansion joints refer *Figs 29 and 30*.

Fig. 29 *VERTICAL BUTYNOL INSEAL EXPANSION JOINT (ALTERNATIVE 1)*



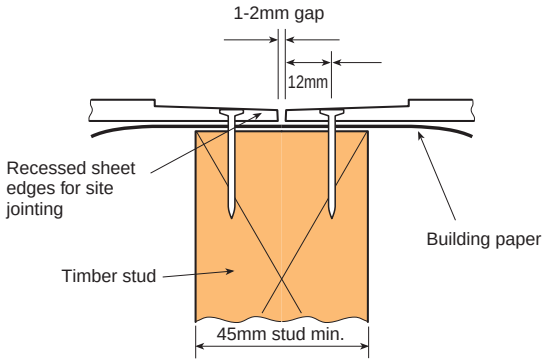
Note: Refer to *Fig. 23* for general notes relating to this as the details are the same except for the double studs.

Fig. 30 *VERTICAL SEALANT EXPANSION JOINT (ALTERNATIVE 2)*



Note: Refer to *Fig. 24* for general notes relating to this as the details are the same except for the double studs.

Fig. 31 *RECESSED-EDGE SHEET JOINT DETAIL*



Notes:
1. The recessed edge of the Harditex™ sheet is designed to accommodate a tape-reinforced flexible jointing system, to achieve a flush finish with textured coatings. Refer also to the selected coating contractor for joint details.
2. When the sheet recessed edge is cut away, site grinding of the edge to form a recessed joint is required before the sheet is fixed. (Refer *Fig. 7.*)

Fig. 33 *PVC CORNER FINISHING*

Before fixing external corner angle in position fill any gaps between Harditex™ base sheets with flexible sealant

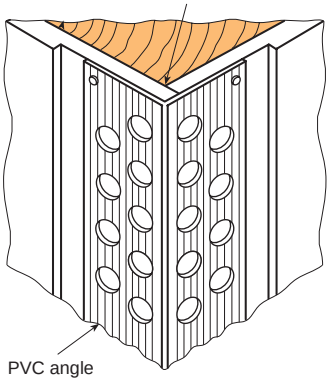
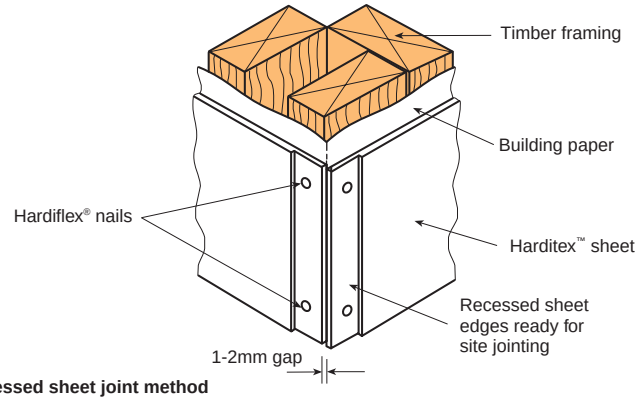


Fig. 32 *RECESSED-EDGE EXTERNAL CORNER DETAIL*

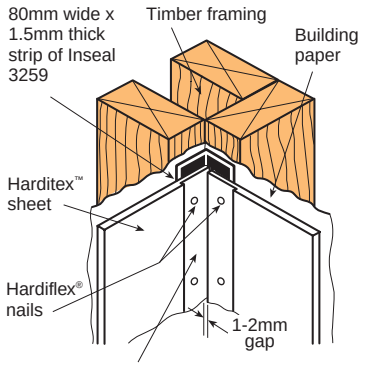


Recessed sheet joint method

The following external corner details must have recessed edges and can be finished by the following methods.
- The external corner can be jointed with flushing and finishing compounds and reinforcing tape continuous around the corner as described in *Fig. 31.*
- The external corner can be tied together with an exterior-quality PVC angle fitted over the recessed edges of the Harditex™. Nail-fix to frame. Nail both legs of the angle with 40mm Hardiflex® nails at 255mm centres. The corner must then be finished with flushing and bedding compound over the angle. Refer *Fig. 33* for finishing detail. The PVC angle is available from stockists of James Hardie products.

Square sheet edge method
- Open joint or sealant joint (refer notes *page 15)*
- The joints are finished similar to *Figs 23 and 24*, except use 80mm-wide Butynol Inseal or Inseal 3259 to allow for the corner joint.

Fig. 34 *RECESSED-EDGE INTERNAL CORNER DETAIL*



Notes:
1. The internal corners can be jointed with flushing and finishing compounds and reinforcing tape continued around the corner as described in *Fig. 31.*
2. Square sheet edge methods with open joint or sealant joint can also be used (refer *Figs 23 and 24*).

Base sheet jointing details

The recessed-edge sheet joint is formed between each edge of the Harditex™ sheet for both vertical and horizontal joints (refer *Fig. 31*) and at internal and external corners.

The jointed panel must be limited in size by the use of vertical and horizontal control and expansion joints.

Corner joints

External and internal corners have the jointing and coating continuous around the corner or are reinforced with a perforated corner angle (refer *Fig. 33*). Expressed external and internal corners can be used. Details are similar to those shown in *Figs 23 and 24*.

For external corners refer to *Figs 32 and 33*.

At internal corners adhere a strip of Inseal 3259 in position before fixing sheets. (Refer *Fig. 34.*) The sheets can then be finished with the standard tape-reinforced flexible jointing system. (Refer *Figs 31 and 34.*)

Corner details can also be expressed or sealant filled similar to the details shown in *Figs 23 and 24*. Refer to the notes in *Figs 23 and 24*.

Section 5: Bracing systems

Table 4: Bracing ratings for 7.5mm or 9mm Harditex™

System number	Bracing element length (mm)	End straps	Bracing details	NZS 3604:1990 rating in bracing units per metre of element length	
				Wind	Earthquake
HT1	1200 or more	Not required	Refer *Figs 35 and 36* Holding down (HD) bolts to concrete floor	100	90
HT2 HT3	900 - 1200 1200 or more	Required (refer *Figs 42 or 46*)	Refer *Figs 37 and 38* HD bolts to concrete floor	100 115	100 100
HT4 HT5	1200 - 2400 2400 or more	Not required	Refer *Fig. 39*	130 130	110 120
HT6 HT7 HT8	900 - 1200 1200 - 2400 2400 or more	Not required	Refer *Figs 40 and 41* HD bolts to concrete floor	100 115 120	80 90 100
HT9	600	Required (refer *Fig. 42*)	Refer *Fig. 43*	93	98
HT10	600	Required (refer *Figs 47 and 48*)	Refer *Figs 44 and 45* HD bolts to concrete floor Coach bolts to timber floor	93	98
HT 11B	900 or more	Not required	Refer *Fig. 50A and 50B* Use coach screw to joists Winstones Gib® Braceline on inside face Harditex™ on outside face	191	168
HT12B	900 or more	Not required	Refer *Fig. 51A and 51B* HD bolts to concrete floor Gib® Braceline on inside face Harditex™ on outside face	191	168
HT13B	2400 or more	Not required	Refer *Fig. 52A and 52B* Gib® Braceline on inside face Harditex™ on outside face	190	162
HT14B	2400 or more	Not required	Refer *Fig. 53A and 53B* HD bolts to concrete floor Gib® Braceline on inside face Harditex™ on outside face	190	162
HT15B	3200 or more (window panel)	Not required	Refer *Figs 54A, 54B, 55 and 56* HD bolts/coach screws to floor Gib® Braceline on inside face Harditex™ on outside face	75	63
HT16B	3200 or more (window panel)	Not required	Refer *Figs 54B, 54C, 55 and 56* Gib® Braceline on inside face Harditex™ on outside face	75	63
HT 17GB	2400 or more	Not required	Refer *Fig. 52A and 52C* 9.5mm Gib® Standard on inside face Harditex™ on outside face	190	114

This specification is used to install and determine the bracing ratings of Harditex™ 7.5mm and 9mm external wall bracing and claddings. Bracing ratings have all been determined by BRANZ testing and are suitable for use in conjunction with NZS 3604 Code of Practice for Light Timber Frame Construction Not Requiring Specific Design.

Framing

The Harditex™ bracing systems in this brochure apply only to timber frame construction, and are not to be used for steel frame construction.

The timber framing must be in accordance with NZS 3604 Code of Practice for Light Timber Frame Buildings.

The studs must be spaced at 600mm maximum centres, between continuous top and bottom plates with nogs at 1200mm maximum centres.

Fixing

Harditex™ bracing sheets must be fixed vertically with all sheet edges on framing. Sheet joints must be avoided at the corners of openings (except for expansion and control joints). Refer to *pages 15-17* for full details of control and expansion joints.

When bracing panels contain control and expansion joints the panels must be separated, for design purposes, into separate units each side of the joints.

To achieve the bracing ratings shown in *Table 4*, full-height sheets without joints must be used for walls up to 3000mm in height. When bracing walls exceed 3000mm in height, one sheet joint is permissible up to a maximum bracing element height of 4800mm. Jointing sheets in the horizontal direction is permissible to make up the element length. Jointing must be kept to the minimum, for example an 1800mm element length must be a 1200mm- and 600mm-wide sheet or two 900mm-wide sheets.

Always ensure the sheet join is on the centre line of the stud or nog to achieve the fixing as detailed.

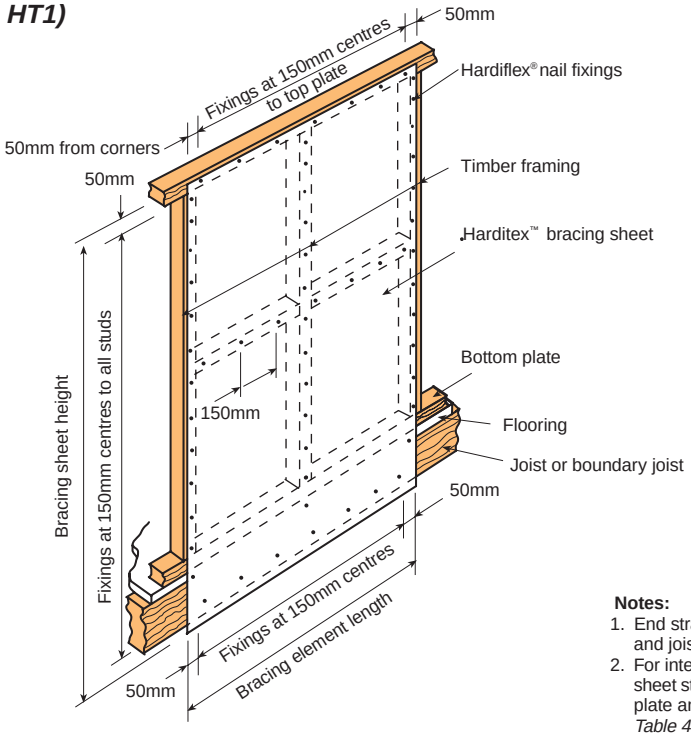
There is no limit to the length of bracing elements.

When end fixing straps are used, the strap and the holding-down bolt/coach screw must be used at the end of each element length. When just HD bolts/coach screws are used they are required at the end of each element length.

When group nailing is used it must be at the end of each bracing sheet. When HD bolts or coach screws are required with group nailing, they must be at the end of each sheet as shown in the relevant figure.

Fix all Harditex™ sheets to timber framing with 40 x 2.8mm 316

Fig. 35** HARDITEX™ TO TIMBER JOISTS WITHOUT END STRAPS* ***(System HT1)



Notes:
1. End strap fixing between studs and joists is not required for this system.
2. For internal walls System HT1 can have the sheet stopped at the underside of the bottom plate and achieve the same ratings given in *Table 4*.

stainless-steel Hardiflex™ nails. Nail at 150mm centres (or as specified in the diagrams) to sheet edges and to intermediate framing and nogs.

Nails must be driven a minimum of 12mm from the sheet edge and 50mm from corners. The sheets must be held hard against the framing during nailing to minimise nail break-out.

Drive all nails flush with the Harditex™ sheet surface. Do not punch as this can weaken the nails' holding.

Fix all Harditex™ sheets from the centre working towards the outside to avoid drumminess.

Certain bracing applications require the use of end strap fixing. The end straps must be rebated into the framing behind the sheets. (Refer *Table 4* and *Figs 42, 46, 47 and 48.*)

Bracing

Harditex™ will provide bracing for buildings designed and constructed in accordance with NZS 3604 (NZS 3604 is cited in Approved Document BI/AS1 Clause 4.0.)

For verification of this aspect of the product refer to BRANZ Appraisal Certificate No. 229, 1995 (James Hardie Wall Bracing Systems).

Harditex™ when used as the required bracing must also be used with the appropriate fixings as set out in *Table 4*. Refer also to *Figs 35 to 56* for Harditex™ sheet bracing details.

Sheets stopped below top plate

Where bracing sheets are stopped below the level of the top plate refer to *Fig. 49* for details.

Bracing panel height

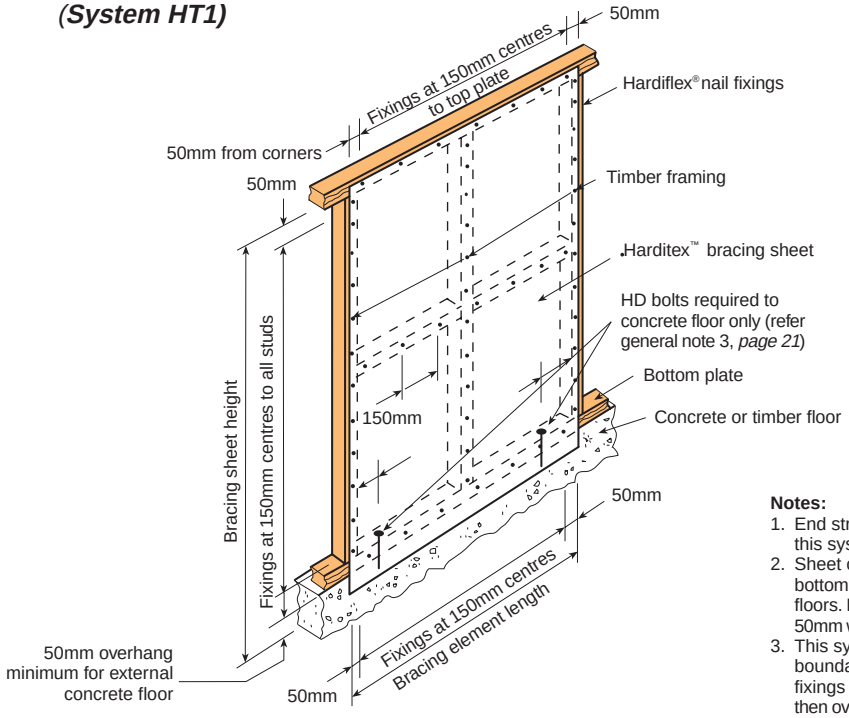
Bracing panel height is normally 2400mm and all bracing ratings given in *Table 4* are for this panel height.

When other heights are required refer to Clause K.7 NZS 3604. The maximum height for all these bracing panels is 4800mm.

General notes for all bracing figures

1. Where boundary joists are required they must be continuous members nailed to the ends of joists and must not be nogged between.
2. For the Harditex™ or Harditex™/ Gib® Braceline ratings for all figures refer to *Table 4*.
3. Where holding down bolts are required the HD bolts must be M12 hot-dipped galvanised with 50 x 50 x 3mm galvanised washers. Fix as shown in Fig. 4.17 NZS 3604.
4. All nail fixings to bracing panels must be 316 stainless steel to meet the 50-year durability requirements.

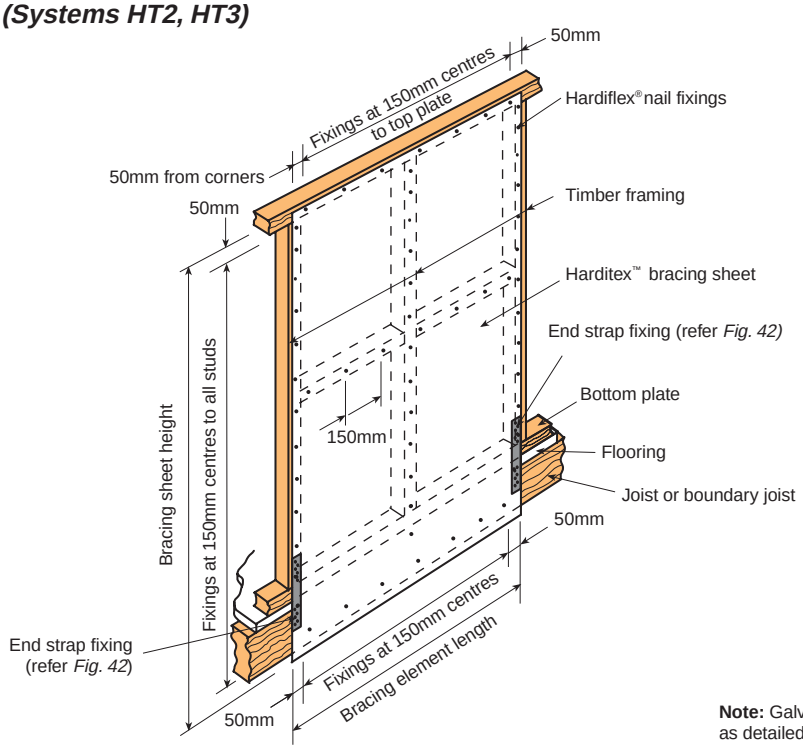
Fig. 36 *HARDITEX™ TO TIMBER OR CONCRETE FLOORS WITHOUT END STRAPS* ***(System HT1)***



Notes:

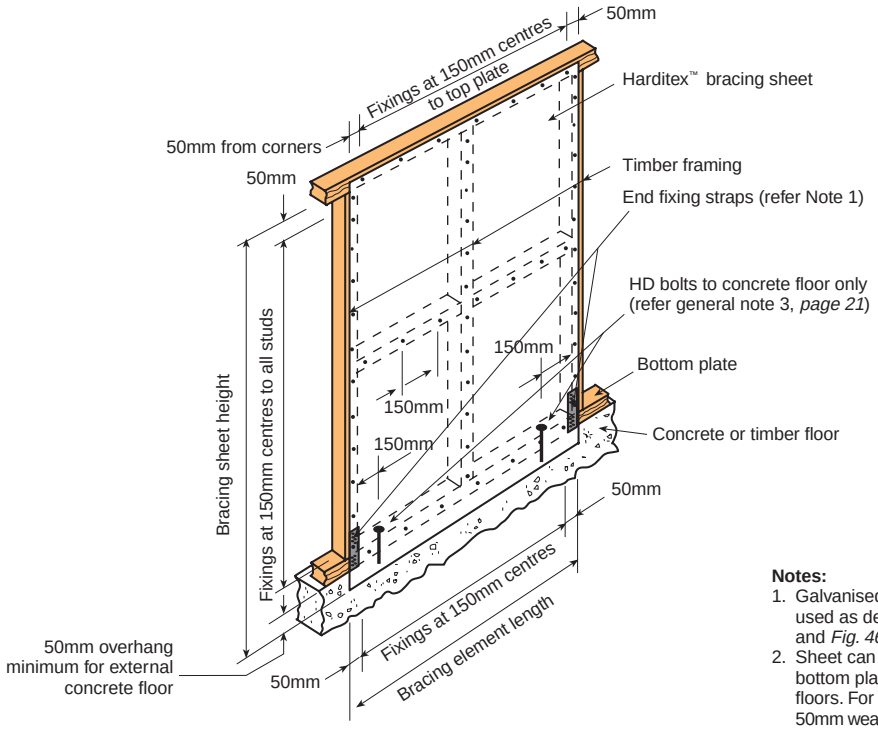
1. End strap fixing to studs is not required for this system.
2. Sheet can finish flush with underside of the bottom plate for internal timber and concrete floors. For external walls to concrete floors a 50mm weathering overhang must be provided.
3. This system can also be used for external boundary joists with the one row of bottom fixings at 150mm centres. The sheet must then overhang the bottom of the joist by 50mm for weathering.

***Fig. 37** HARDITEX™ TO TIMBER JOISTS WITH END STRAPS*
(Systems HT2, HT3)



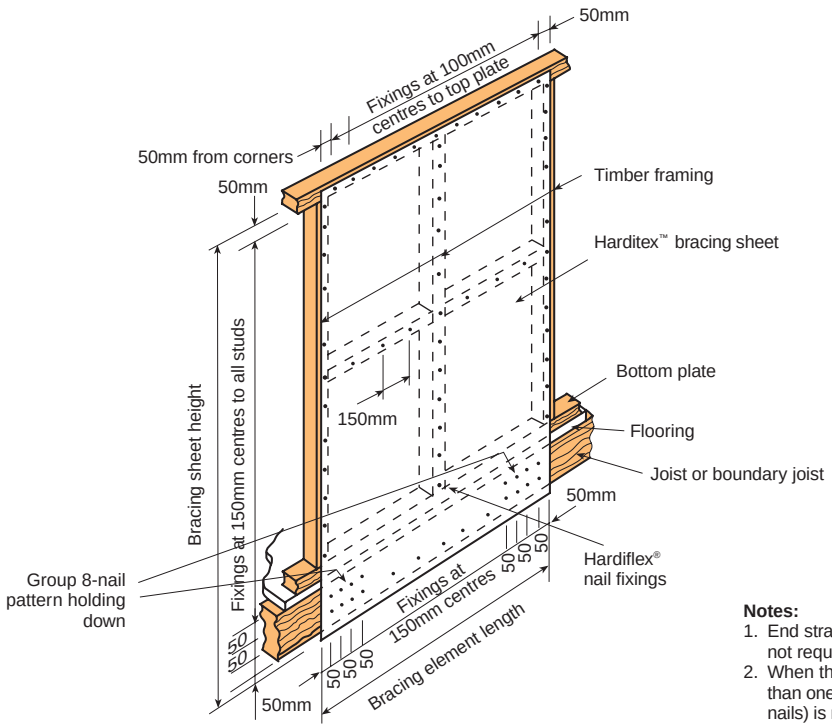
Note: Galvanised-steel end fixing straps to be as detailed in *Fig. 42.*

***Fig. 38** HARDITEX™ ON TIMBER OR CONCRETE FLOORS WITH END STRAPS*
(Systems HT2, HT3)



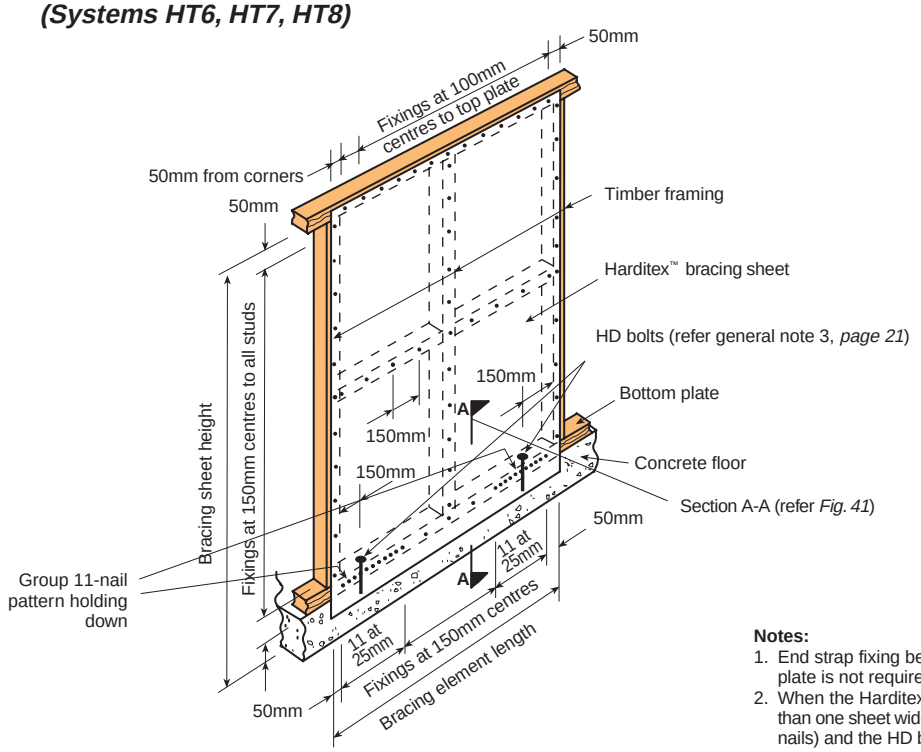
Notes:
1. Galvanised-steel end fixing straps must be used as detailed in *Fig. 42* for timber floors and *Fig. 46* for concrete floors.
2. Sheet can finish flush with underside of the bottom plate for internal timber and concrete floors. For external walls to concrete floors a 50mm weathering overhang must be provided.

Fig. 39 *HARDITEX™ GROUP NAIL FIXING TO TIMBER JOISTS(Systems HT4, HT5)*



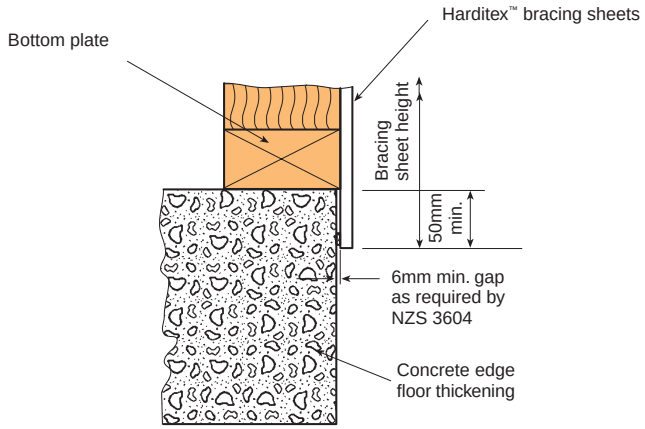
Notes:
1. End strap fixing between studs and joists is not required for these systems.
2. When the Harditex™ bracing panel is more than one sheet wide the 8-nail pattern (group nails) is required to end of each sheet length.

Fig. 40 *HARDITEX™ GROUP NAIL FIXING FOR CONCRETE FLOORS* ***(Systems HT6, HT7, HT8)***



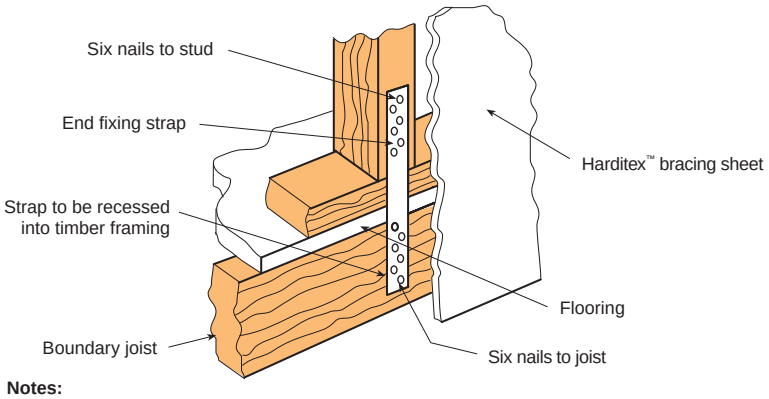
Notes:
1. End strap fixing between stud and bottom plate is not required for this system.
2. When the Harditex™ bracing panel is more than one sheet wide the 11-nail pattern (group nails) and the HD bolts are required to end of each sheet length.

Fig. 41 *SECTION A-A*



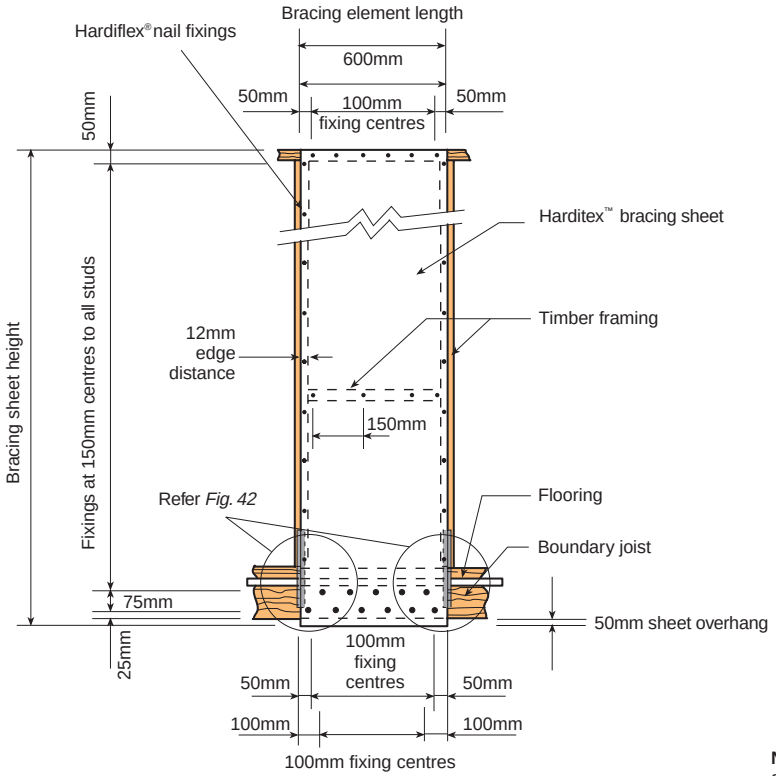
Note: The 50mm sheet overhang is essential for this detail to develop the nail holding.

Fig. 42 *END FIXING STRAP TO TIMBER FLOOR JOISTS*



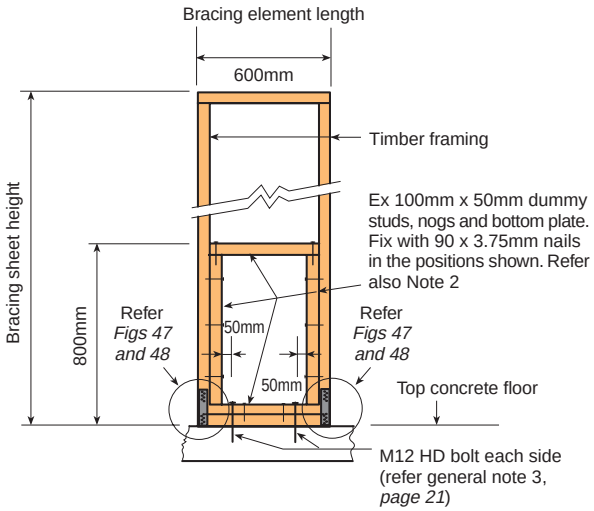
Notes:
1. The strap must be 25mm x 1mm galvanised steel capable of carrying a tension force of 6KN (capacity load as defined in NZS 3604)
2. Strap nails must be 40 x 2.8mm diameter hot-dipped galvanised.

Fig. 43 *600MM-WIDE HARDITEX™ TO TIMBER FLOOR – BOUNDARY JOISTS*
(System HT9)

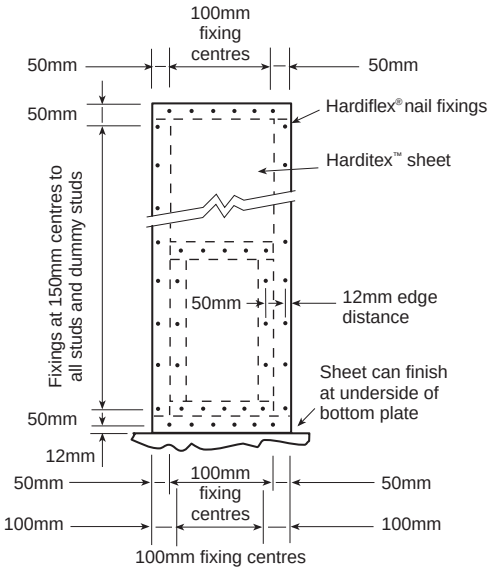


Note: Galvanised-steel fixing straps must be as detailed in *Fig. 42*.

Fig. 44 *600MM-WIDE HARDITEX™ TO CONCRETE FLOOR*
(System HT10)



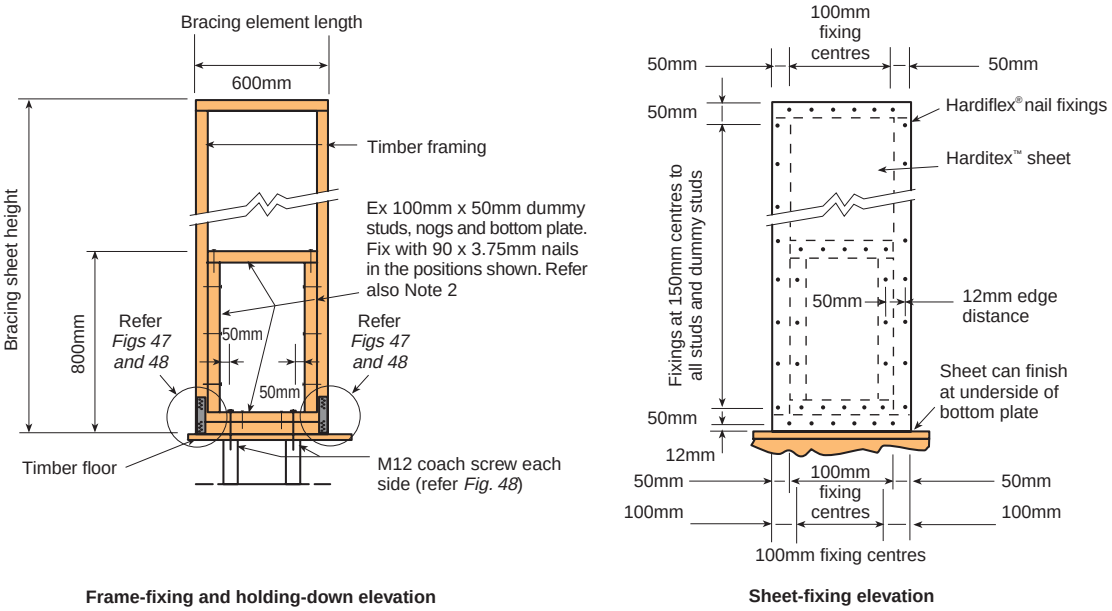
Frame-fixing and holding-down elevation



Sheet-fixing elevation

Notes:
1. Galvanised-steel end fixing straps must be as detailed in *Figs 47 and 48.*
2. The dummy studs are nailed to the main studs with 3 horizontal 90 x 3.75 nails per dummy stud, and the dummy nogs nailed with two 90 x 3.75 nails to the dummy studs and the dummy bottom plate nailed to the bottom plate with two 90 x 3.75 nails between the coach bolts.
3. The sheet must overlap the concrete floor by 50mm when weathering overlap is required on an external wall. (Refer *Fig. 41.*)

Fig. 45 *600MM-WIDE HARDITEX™ TO TIMBER FLOOR*
(System HT10)

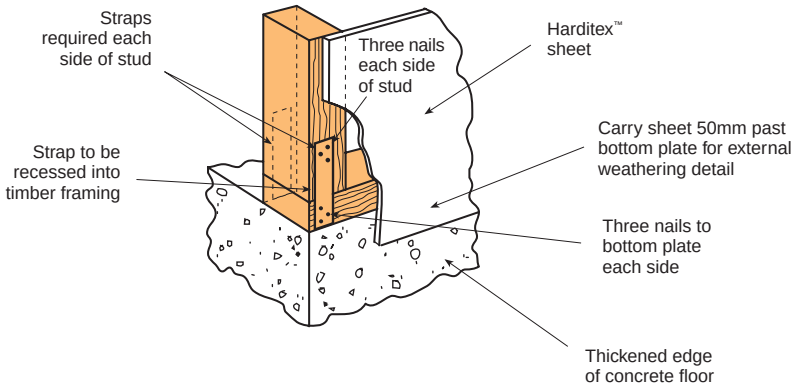


Frame-fixing and holding-down elevation

Sheet-fixing elevation

Notes:
1. Galvanised-steel end fixing straps must be as detailed in *Figs 47 and 48*.
2. The dummy studs are nailed to the main studs with 3 horizontal 90 x 3.75 nails per dummy stud, and the dummy nogs nailed with two 90 x 3.75 nails to the dummy studs and the dummy bottom plate nailed to the bottom plate with two 90 x 3.75 nails between the coach bolts.
3. When external weathering is required the sheet must overlap the bottom of the timber by 50mm.

Fig. 46 *END FIXING STRAP TO BOTTOM PLATE ON CONCRETE FLOOR*



Notes:
1. The 2 straps combined must be capable of carrying a tension force of 6KN (capacity load as defined in NZS 3604). This is achieved by a 25mm x 1mm strap each side, each of 3KN capacity. (3 nails each end of a 25mm x 1mm strap give 3KN capacity and 6 nails each end of strap give 6KN capacity.)
2. Strap nails must be 40 x 2.8mm diameter hot-dipped galvanised flat-heads.

Fig. 47 *END FIXING STRAP DETAIL FOR CONCRETE AND TIMBER FLOORS – 600MM-WIDE PANEL*

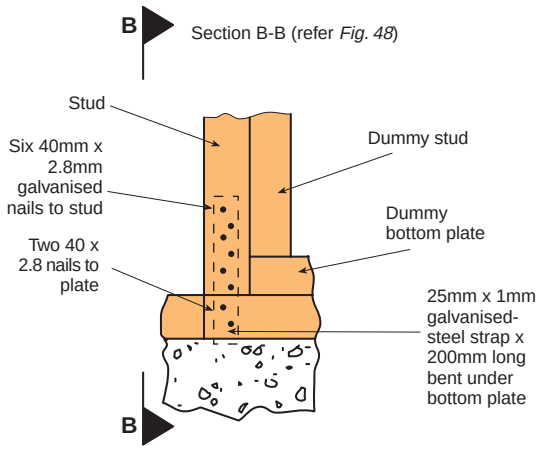


Fig. 48 *SECTION B-B*

For timber floor: 12mm diam. coach screw hot-dipped galvanised to penetrate 120mm into floor and joists. 50mm x 50mm x 3mm galvanised washer.

For concrete floor: HD bolts must be M12 hot-dipped galvanised with 50mm x 50mm x 3mm galvanised washers. Fix as shown in Fig. 4.17 NZS 3604.

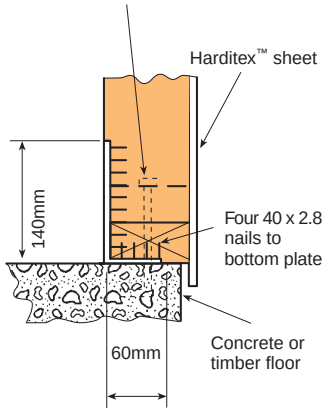
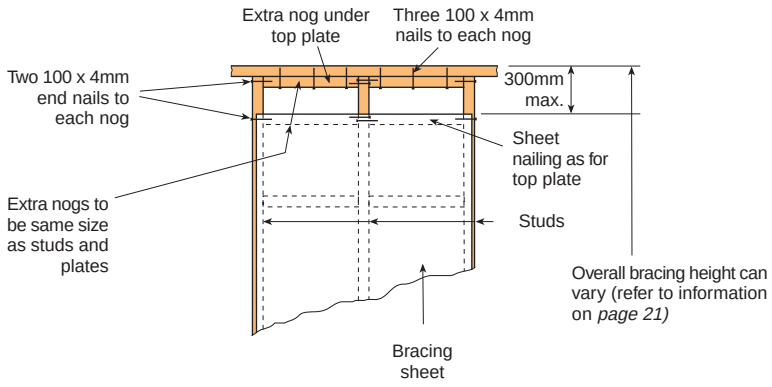
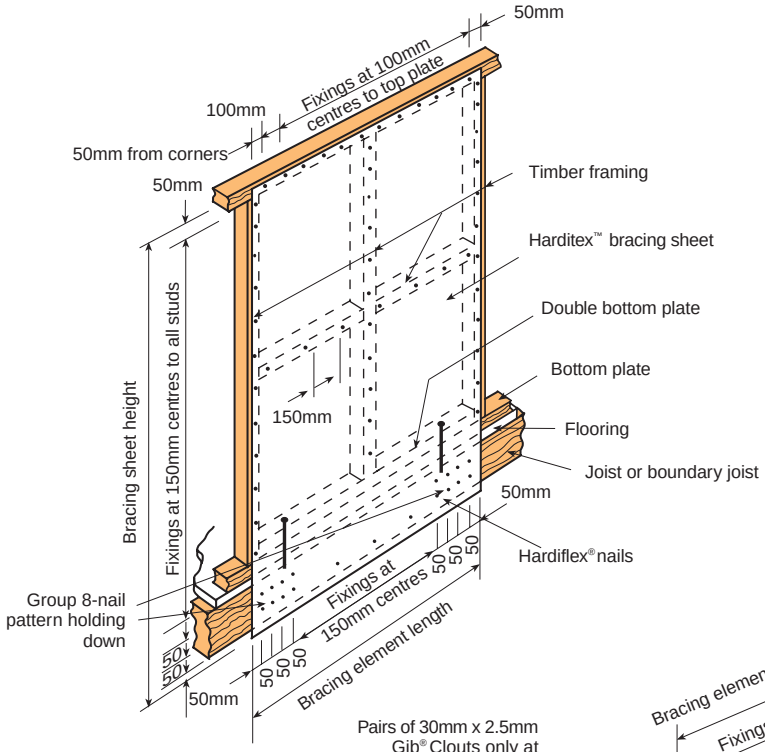


Fig. 49 *DETAIL WHEN BRACING SHEET STOPPED BELOW TOP PLATE*



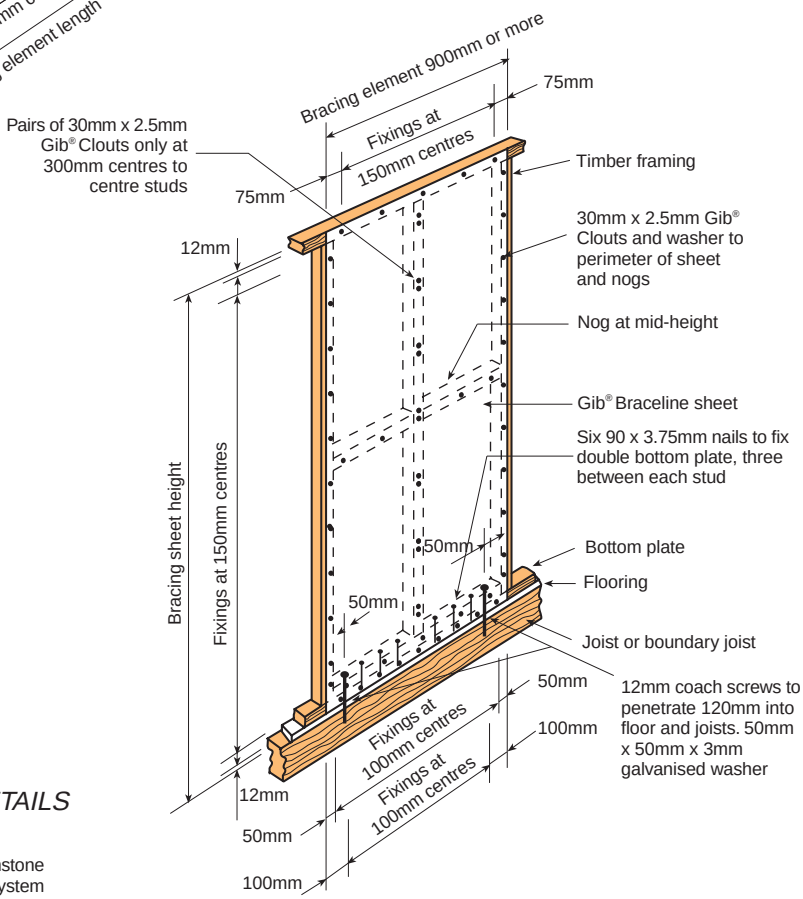
Notes:
1. All sheet nailing must be as shown for the various bracing systems.
2. The full bracing values for full-height sheets for each system can be used when this detail is followed.
3. This detail must be used instead of the detail shown in Fig. K1 NZS 3604

Fig. 50 *HARDITEX™/GIB® BRACELINE GROUP NAILING DETAIL TO TIMBER JOISTS*
(Systems HT11B)



A
HARDITEX™ FIXING DETAILS

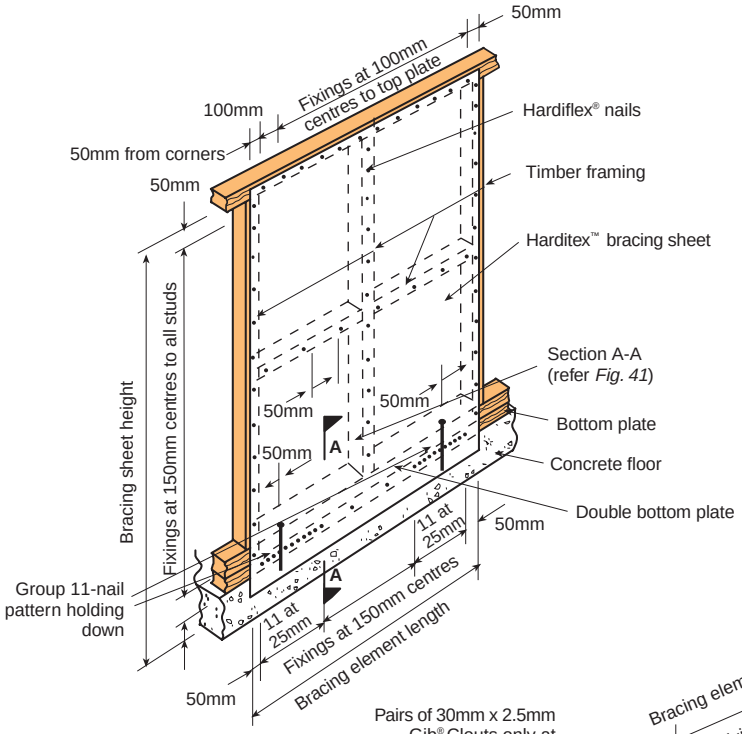
Notes:
1. End strap fixing between studs and joists is not required for these systems. Use coach screws as detailed.
2. When the Harditex™/Gib® Braceline panel is more than one sheet wide the eight-nail pattern (group nailing) and the coach screws are required to end of each sheet length.



B
GIB® BRACELINE FIXING DETAILS

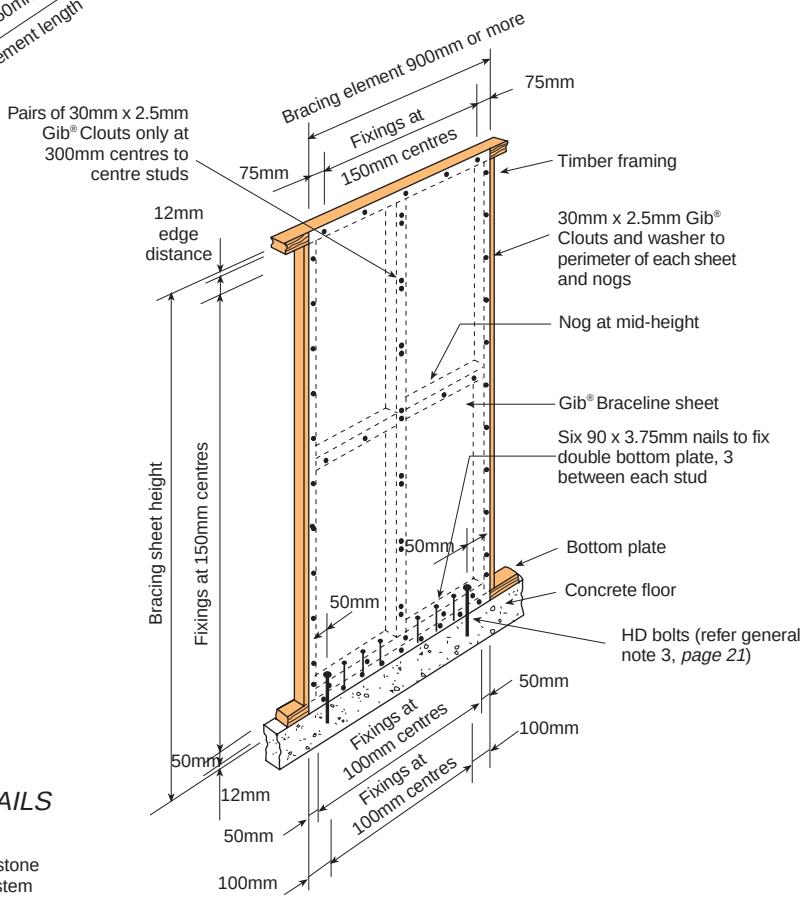
Notes:
1. All Gib® Braceline sheets to be fixed to Winstone Wallboards specifications, Gib® Bracing System Nov 1994.
2. All Gib® Braceline sheets to be stopped to Winstone Wallboards specifications, Gib® Stopping and Finishing Systems Nov 1992.

Fig. 51 *HARDITEX™/GIB® BRACELINE GROUP NAILING DETAIL ON CONCRETE FLOOR* ***(System HT12B)***



A
HARDITEX™ FIXING DETAILS

Notes:
1. End strap fixing between studs and joists is not required for these systems. Use HD bolts as detailed.
2. When the Harditex™/Gib® Braceline panel is more than one sheet wide the 11-nail pattern (group nailing) and the HD bolts are required to end of each sheet length.



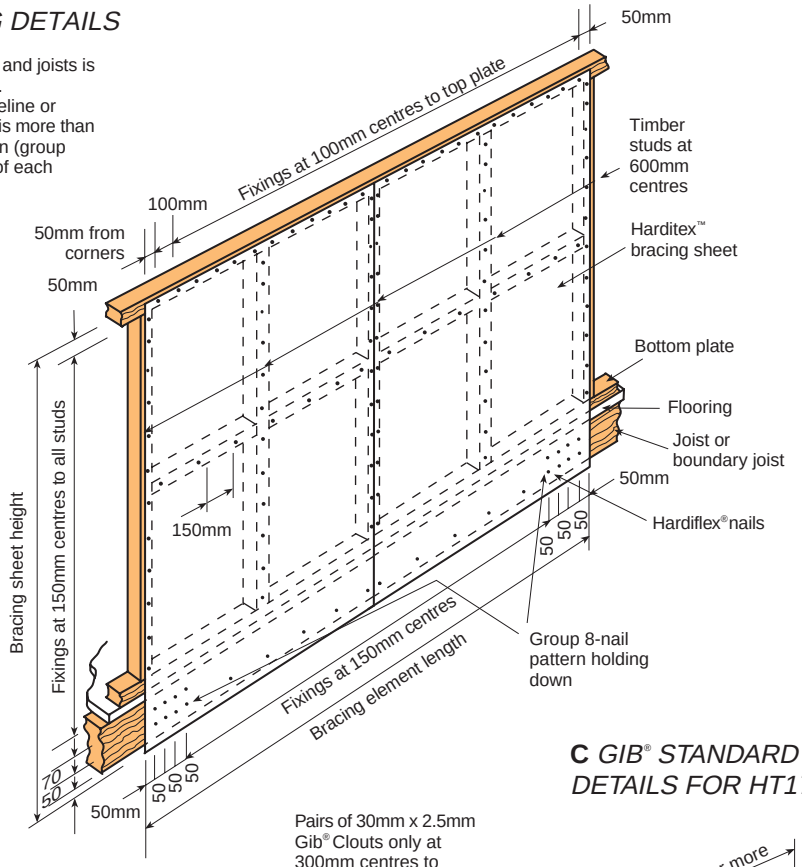
B
GIB® BRACELINE FIXING DETAILS

Notes:
1. All Gib® Braceline sheets to be fixed to Winstone Wallboards specifications, Gib® Bracing System Nov 1994.
2. All Gib® Braceline sheets to be stopped to Winstone Wallboards specifications, Gib® Stopping and Finishing Systems Nov 1992.

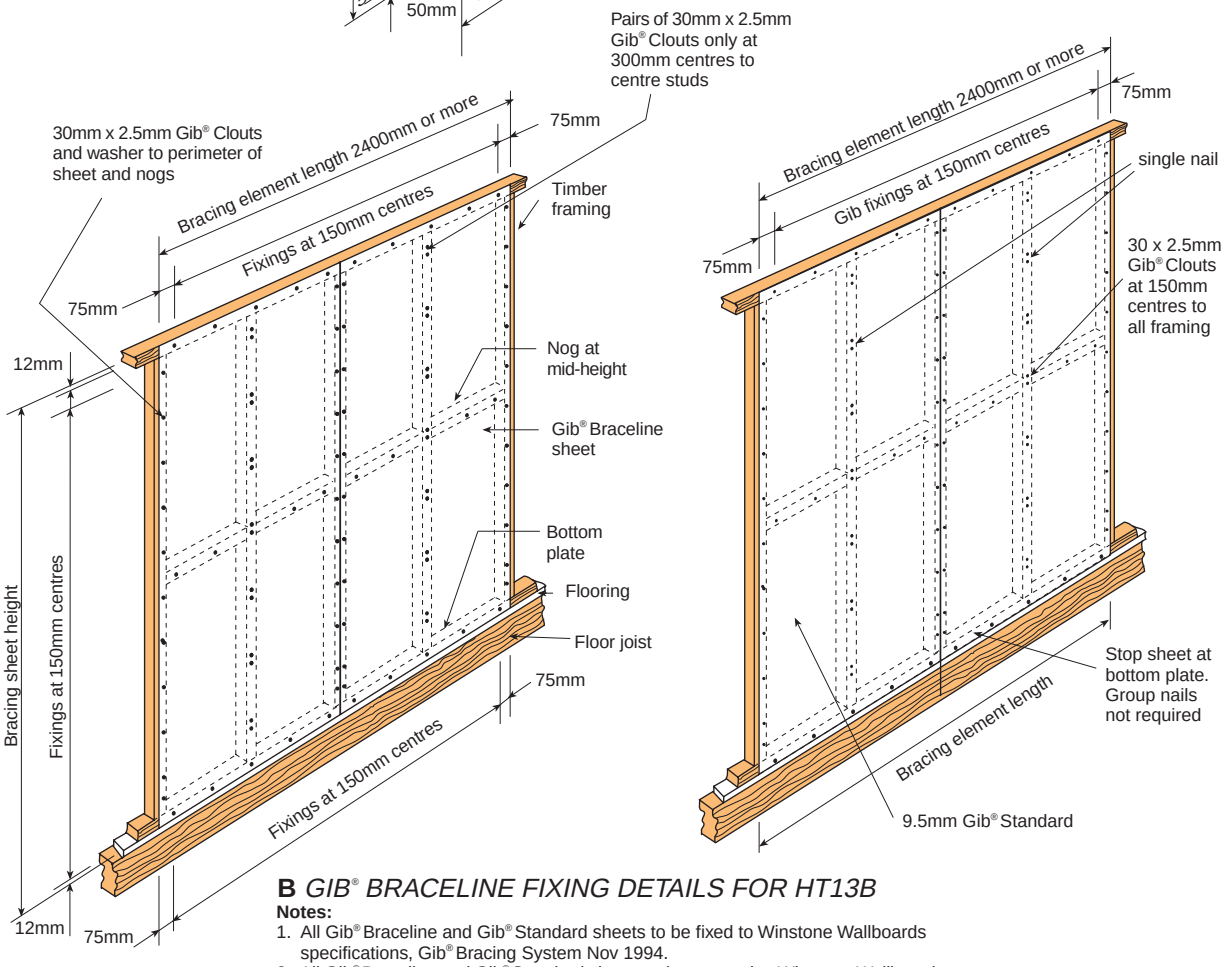
Fig. 52 *HARDITEX™/GIB® BRACELINE GROUP NAILING DETAIL TO TIMBER JOISTS* ***(System HT13B)***
HARDITEX™/GIB® STANDARD GROUP NAILING DETAIL TO TIMBER JOISTS ***(System HT17GB)***

A *HARDITEX™ FIXING DETAILS*

Notes:
1. End strap fixing between studs and joists is not required for these systems.
2. When the Harditex™/Gib® Braceline or Harditex™/Gib® Standard panel is more than 2400mm wide the 8-nail pattern (group nailing) is required at the end of each 2400mm element.



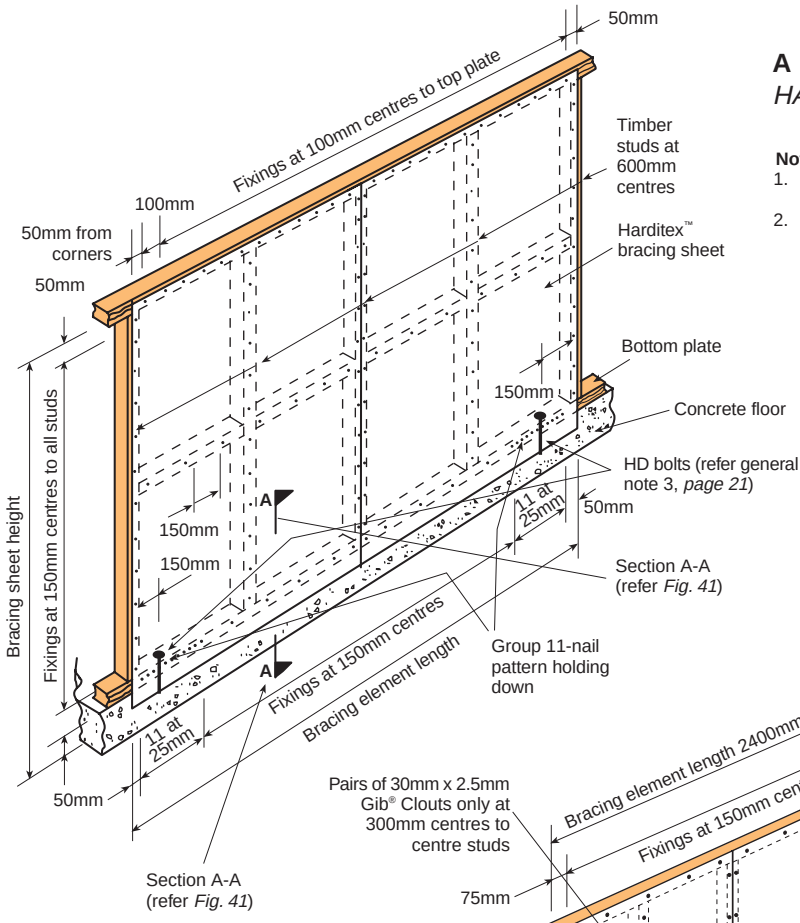
C *GIB® STANDARD FIXING DETAILS FOR HT17GB*



B *GIB® BRACELINE FIXING DETAILS FOR HT13B*

Notes:
1. All Gib® Braceline and Gib® Standard sheets to be fixed to Winstone Wallboards specifications, Gib® Bracing System Nov 1994.
2. All Gib® Braceline and Gib® Standard sheets to be stopped to Winstone Wallboards specifications, and Gib® Standard Stopping and Finishing Systems Nov 1992.

Fig. 53 *HARDITEX™/GIB® BRACELINE GROUP NAILING DETAIL ON CONCRETE FLOOR* ***(System HT14B)***

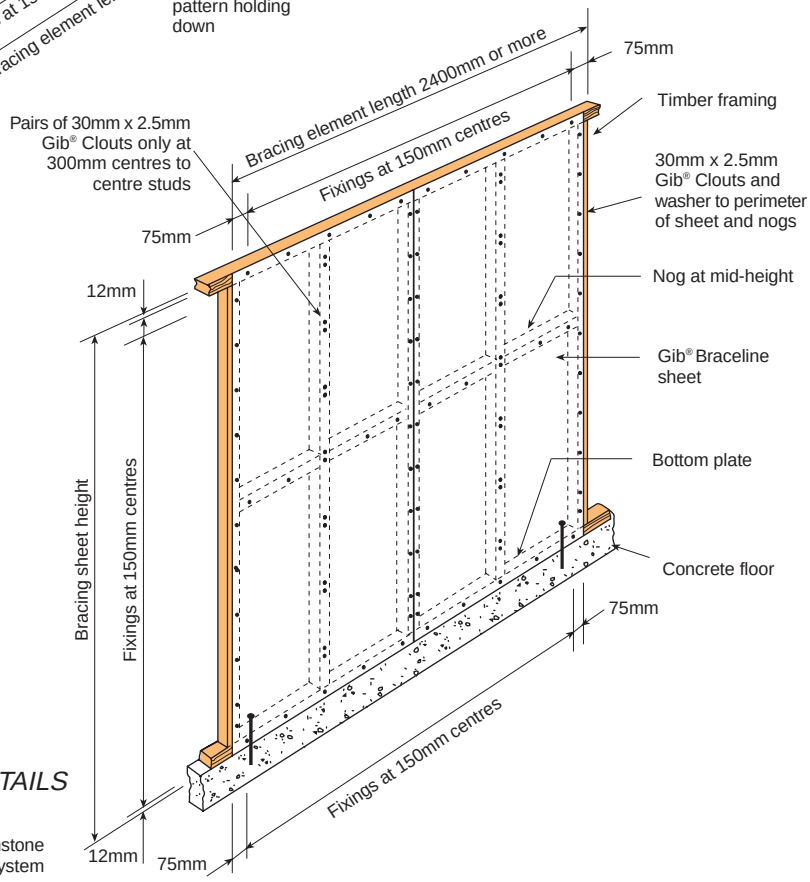


A

HARDITEX™ FIXING DETAILS

Notes:

1. End strap fixing between studs and joists is not required for these systems.
2. When the Harditex™/Gib® Braceline panel is more than 2400mm wide the 11-nail pattern (group nailing) and the HD bolts are required at the end of each 2400mm element length.



B

GIB® BRACELINE FIXING DETAILS

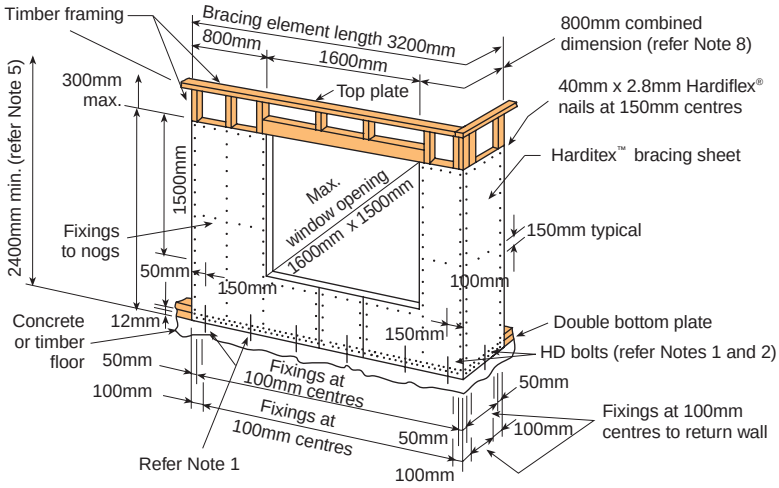
Notes:

1. All Gib® Braceline sheets to be fixed to Winstone Wallboards specifications, Gib® Bracing System Nov 1994.
2. All Gib® Braceline sheets to be stopped to Winstone Wallboards specifications, Gib® Stopping and Finishing Systems Nov 1992.

Fig. 54 *HARDITEX™/GIB® BRACELINE WINDOW OPENING PANEL*

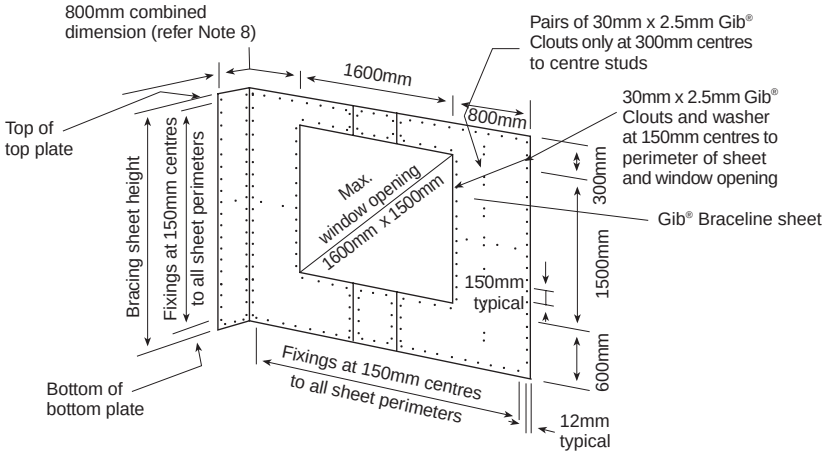
A

HARDITEX™ FIXING DETAILS TO TIMBER OR CONCRETE FLOOR DOUBLE BOTTOM PLATE ***(System HT15B)***



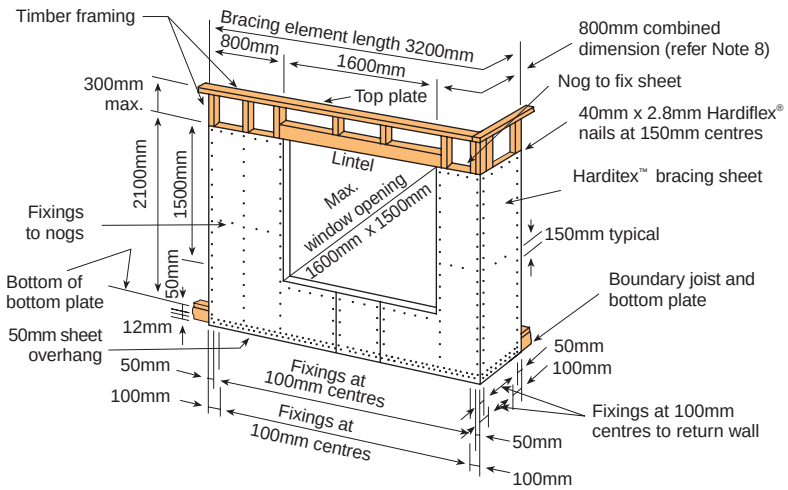
B

GIB® BRACELINE FIXING DETAILS ***(Systems HT15B, HT16B)***



C

HARDITEX™ FIXING DETAILS TO TIMBER FLOOR BOUNDARY JOISTS ***(System HT16B)***



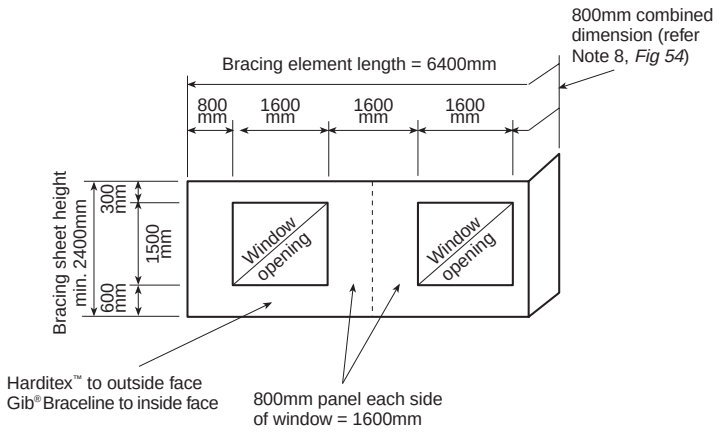
Notes to Fig. 54:

1. Double bottom plate fixing, *Fig. 54A*:
   - For concrete floors: HD bolts must be M12 hot-dipped galvanised with 50 x 50 x 3mm galvanised washers at 600mm centres. Fix as shown in Fig. 4.17 NZS 3604.
   - For timber floors: Coach screws into double bottom plate and floor joists (refer *Fig. 48*) for details). Bolts must be at 600mm centres.
   - The double bottom plate fixings are the HD bolts at 600mm centres. No other fixings are required.
   - The return wall is 400mm minimum; one HD bolt located in the centre of the panel is required.
2. Alternative when boundary joists are used and the bracing panel is taken over the joists. Fix as shown in *Fig. 54C*.
3. The Gib® Braceline must be fixed as shown in *Fig. 54B* for systems HT15B and HT16B.
4. Harditex™ sheet can be stopped a maximum of 300mm below top plate or continued up the top of the top plate as required.
5. Gib® Braceline sheets must be full height between bottom and top plate.
6. The minimum height for this bracing panel is 2400mm. The height can be greater than 2400mm (refer 'Bracing panel height' *page 21*.)
7. All Gib® Braceline sheets to be stopped to Winstone Wallboard specifications, Gib Board Stopping and Finishing Systems Nov 1992.
8. Window Panel Combination notes:
   - The maximum allowable window size is 1600mm wide x 1500mm deep. Any window this size or smaller can be used for the bracing calculation.
   - The minimum wall panel length to each side of a window opening must be 800mm. This can be either of the following:

     An in-plane wall 800mm long.

     An in-plane wall and a return wall to give 800mm combined length.
   - The minimum length of the in-plane wall or the return wall is to be each 400mm.
   - The total wall length including the window opening and the return wall is used for the bracing calculation.
   - The only exception to this is the example in *Fig. 56* where the middle window must be ignored as each window opening must have 800mm each side.
9. The return wall bracing units contribute to the wall at right angles to the in-plane wall.

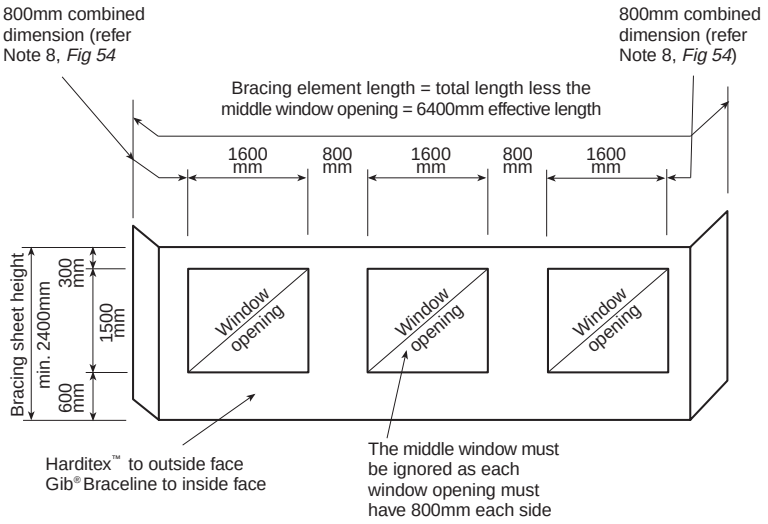
Fig. 55 *HARDITEX™/GIB® BRACELINE WINDOW OPENING PANEL – PANEL WITH TWO WINDOWS*



Notes:

1. The full length of this panel can be used for bracing values, e.g. for wind 75BU/metre x length (refer *Table 4*) = 75 x 6.4 = 480BU.
2. All fixing and framing details for these window panels are as given in *Fig. 54*.

Fig. 56 *HARDITEX™/GIB® BRACELINE WINDOW OPENING PANEL – PANEL WITH THREE WINDOWS*



Notes:

1. All fixing and framing details for these window panels are as given in *Fig. 54*.
2. The BU for this panel for wind is 75BU/metre (refer *Table 4*) x length = 75 x 6.4 = 480 BU.

Section 6: New Zealand Building Code compliance

New Zealand Building Code (NZBC)

Harditex™ must be used in accordance with this specification. It will then meet the relevant provisions of NZBC Clauses:

B1 Structure
B2 Durability
E2 External Moisture
F2 Hazardous Building Materials (Harditex™ is non-hazardous in terms of Clause F2).

It will also contribute towards the provisions of H1 Energy Efficiency when the details in this specification are used. (Refer *Fig. 57*.)

Durability

The Harditex™ sheet system meets the performance requirements of NZBC Clause B2.3.1(a) of 50 years as long as the integrity of the various coating systems is maintained. This is particularly relevant to the performance of the fixing and jointing systems and when used as the bracing system.

Harditex™ sheets must be jointed and coated within 3 months of erection.

In very severe coastal conditions in New Zealand hot-dipped galvanised nails and screws have a durability of 10 years. Therefore in these locations alternatives such as stainless-steel fixings must be used.

Very severe coastal conditions are defined as:

- Areas within 500 metres of surf beaches
- Areas within 200 metres of non-surf beaches.

NOTES:

1. *500 metres is a guide distance only. In some coastal areas salt spray may drift inland much further than 500 metres, therefore local corrosion hazards and prevailing on-shore winds must be taken into consideration.*
2. *Areas of high thermal activity must also be regarded as very severe conditions.*

To meet the 50-year bracing durability requirements, stainless-steel nails must be used for all bracing sheets. 40mm and 50mm x 2.8mm 316 grade stainless-steel nails area available from stockists of James Hardie products.

Serviceable life

Harditex™ is not susceptible to long-term moisture damage and when the jointing, sealing, flashing and coating details are maintained the Harditex™ is expected to have a serviceable life of at least 50 years.

BRANZ appraisal

Harditex™ has gained the following BRANZ Appraisal Certificates:

No. 229 (1995) James Hardie Wall Bracing Systems
No. 243 (1995) Harditex™ – Exterior Substrate for Coating Systems

Bracing systems

Harditex™ 7.5mm and 9mm sheets are suitable sheet materials for wall bracing in terms of NZS 3604. For full details of the Harditex™ bracing systems refer to *pages 19-33*.

Maintenance

Regular maintenance of the various jointing and coating systems is essential to ensure water ingress is prevented over the life of the building. In particular the following will need careful attention to maintain a waterproof state:

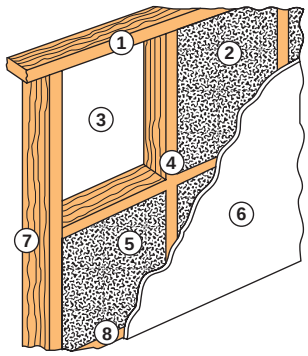
- PVC flashings and jointers
- Inseal and Butynol strips
- Sealants, coatings and any cracks at joints.

Regular maintenance is required to meet the stated durability in the New Zealand Building Code. Maintenance also has an effect on system performance, therefore it must be shown that regular maintenance has been carried out for product warranties to be upheld.

Maintenance definition

- A regular check every 12 months to confirm there is no deterioration of any component
- Washdown of the painted surfaces every 12 months
- Recoating of painted surfaces every 7 to 12 years

Fig. 57 *TIMBER-FRAMED WALL WITH FIBREGLASS BATTS*



CONSTRUCTION

1. Top plate
2. Fibreglass wall insulation batts R1.8
3. Building paper
4. Studs ex (100 x 50) at 600mm centres
5. One row nogs (1200mm centres)
6. Internal lining (9.5mm gypsum or 6mm Villaboard®)
7. External lining (7.5mm or 9mm Harditex™
8. Bottom plate

Note:
The construction shown above will give an R value of 1.77°Cm2/W.

Table 5: Fire-resistance ratings

Fire-resistance rating and frame type	Winstone Wallboards Ltd specification number	Fire-resistant linings required
15/15/15 timber	GBTL 15	One layer 9.5mm Gib® Standard each side frame
15/15/15 steel	GBSL 15	One layer 12.5mm Gib® Standard each side frame
30/30/30 timber	GBTL 30	One layer 9.5mm Gib® Fyreline each side frame
30/30/30 steel	GBSL 30a	One layer 16mm Gib® Fyreline each side frame
60/60/60 timber	GBTL 60	One layer 12.5mm Gib® Fyreline each side frame
60/60/60 steel	GBSL 60a	One layer 19mm Gib® Fyreline each side frame

Note: To ensure the Gib® Fyreline is protected from the weather once erected the following are essential:
Fix the battens, building paper and Harditex™ immediately the Gib® Standard or Gib® Fyreline is erected.
The Harditex™ must be coated promptly to stop any water ingress onto the Gib® Standard or Gib® Fyreline.

The time cycle will depend on the paint system used. Check with the paint manufacturer for the life expectancy of the system.

Energy efficiency

A timber-framed wall clad with 7.5mm or 9mm insulated Harditex™ (refer *Fig. 57*) will exceed the 1.5°Cm²/W requirement of thermal resistance as cited by Acceptable Solution E3/AS1 and therefore the requirements of NZBC Clause E3 should be met in housing if adequate insulation is provided.

Fire-resistance ratings (load bearing)

Refer to *Table 5*.

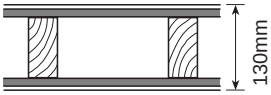
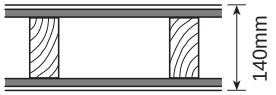
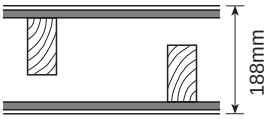
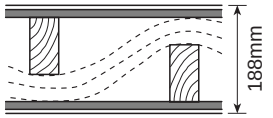
A load-bearing 30/30/30 fire-resistance rating is available (refer BRANZ test report 2454). This system comprises 7.5 or 9mm Harditex™ on 100 x 50 frame with R1.8 fibreglass batts and 12.5mm Gib® Fyreline. Contact the James Hardie Helpline on 0800 808 868 for further details.

Fire-resistance ratings can be achieved by fixing Harditex™ sheets to the following specifications:

- Fix Winstone's Gib® Fyreline in strict accordance with the specification number shown in the Gib® Fire Rated Systems, July 1997.
- Batten over the outside layer of Gib® Fyreline at the same framing centres as for the fire-rated specification. Refer also to *page 9* of this brochure for the battening specifications. Refer also to Winstone Wallboards Ltd Information Bulletin No. 13 March 1994.
- Place heavy-duty breather-type building paper complying with paragraph E2/AS1 2.5.3 of the New Zealand Building Code over the battens.
- Fix the Harditex™ in accordance with the instructions in this brochure.

A comprehensive list of fire-resistance ratings is available from James Hardie. Phone the James Hardie Helpline: 0800 808 868.

Table 6: Acoustic ratings for timber frame (load bearing)

Acoustic (STC)	Detail	Basic configuration rating
43		7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 9.5mm standard-grade gypsum wallboard underlay both sides of frame 100 x 50mm nominal timber studs at 450mm maximum centres
47		7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 12.5mm fire-grade gypsum wallboard underlay both sides of frame 100 x 50mm nominal timber studs at 600mm maximum centres
50		7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 12.5mm fire-grade gypsum wallboard underlay both sides of frame 100 x 50mm nominal timber studs staggered at 300mm maximum centres in 150mm nominal timber plates
55		7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 12.5mm fire-grade gypsum wallboard underlay both sides of frame 100 x 50mm nominal timber studs staggered at 300mm maximum centres in 150mm nominal timber plates Two layers of 25mm acoustic infill in cavity approx. weight 48kg/m³

Acoustic ratings

The acoustic ratings in *Table 6* can be achieved using Harditex™ as the outside cladding – for full details of these systems refer to James Hardie Building Products.

A comprehensive list of acoustic ratings is available from James Hardie. Phone the James Hardie Helpline: 0800 808 868.

NOTE: The specifications in Table 6 *will require battening when the Harditex™ is fixed over gypsum boards as exterior cladding. The STC ratings will be enhanced by this battening, therefore the ratings given will be on the conservative side.*

Section 7: Finishing the system

A number of reputable exterior finishing systems have been developed for use with Harditex™ cladding sheets. These are ideal for residential and light commercial projects.

This brochure describes three basic components:

- Harditex™ sheets
- Architectural shapes
- Coating systems

Harditex™ sheets

For description refer to *page 4*.

Architectural shapes

Three-dimensional shapes of expanded polystyrene (EPS) can be fixed directly onto Harditex™ base sheets quickly and easily, giving greater design flexibility. These polystyrene shapes produce a wide range of architectural trim details for windows, arches, cornices and columns. Phone the James Hardie Helpline: 0800 808 868

Pre-meshed and plastered shapes are also available from Hitex Plastering Ltd, phone (09) 274 0246.

This work is carried out by applicators independently licensed by the selected system manufacturers (refer *page 40*).

Instead of constructing costly shapes of wood or wire lath, aesthetic detail can be achieved very economically. Sculptured architectural shapes can be accurately cut to a range of designs and thicknesses.

The shaped polystyrene is adhered to the Harditex™, covered with fibreglass mesh, plastered and primed, ready for coating.

For methods of adhering and finishing the polystyrene shape apply to the chosen jointing and coating manufacturer.

Jointing and coating systems

The minimum film dry thickness will vary with the type of texture and finish chosen. (Refer to the chosen coating applicator for details.)

The systems suitable for use with Harditex™ are 100% acrylic or pure elastomeric high-build texture coatings or flexibly modified plasters. These are generally fade resistant, water resistant and together with the tape-reinforced joints are flexible enough to accommodate thermal expansion and contraction. The finishing systems offer a variety of colours and textures; from earthy terracotta shades, through to fresh light pastels. Smooth finishes must be avoided. The medium to heavy textures chosen may vary between manufacturers.

For full technical details of the coating system of your choice apply to the appropriate coating manufacturer. A list of reputable coating manufacturers is given on *page 40*.

The joint and coating systems used must be from the same manufacturer to ensure compatibility and system warranties.

System essentials

When horizontal recessed-edge joints are installed the timber framing and floor joists must be thoroughly dry before jointing and coating is undertaken. Failure to comply with this will result in downward shrinkage of the framing and joists which can result in horizontal sheet joint pouting.

Do not use dark colours as they can cause excessive heat build-up on east, west and north-facing walls. Colours must have a light-reflective value (LRV) of 40% minimum regardless of gloss level, i.e. colours tinted from Ultra Deep, Accent and some Mid and Deep tones are not suitable.

Control and expansion joints must be designed and built into the system.

Decking bearers

When timber bearers are fixed directly over the Harditex™ cladding, the Harditex™ sheet must be fully protected by a paint coating before fixing the bearer.

Fencing

When Harditex™ is used in applications such as fences or screens it is essential that the timber framing and the back of the sheet are sealed from the weather. Therefore, for fence applications it is essential that sheets are applied to the Harditex™ specification on both sides of the framing to completely seal the back face of the sheets. The bottom of the sheets must also be kept 20mm clear of concrete foundations or mowing strips.

Architectural details

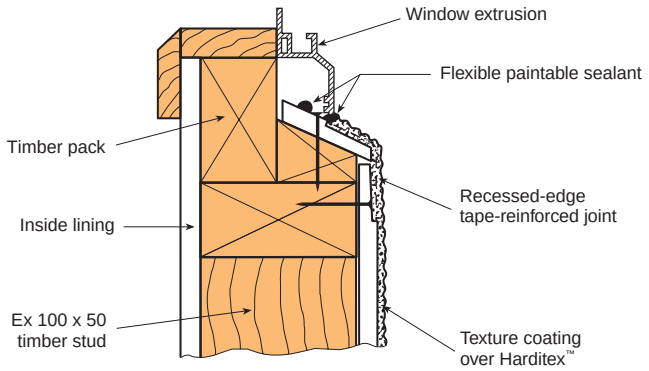
Windows and corners

Refer to *Figs 58 to 62* for suggested details for deep reveal windows.

Transitions

Refer to *Figs 63 to 69* for suggested transition details for various Harditex™ cladding applications.

Fig. 58 SILL DETAIL (ALTERNATIVE 1)



Note: The sill area must be coated with a waterproofing membrane such as AGA Superflex 1 before coating commences. Failure to do this can allow water penetration through the coating due to the near-horizontal sill surface. This can then cause long-term coating breakdown. Ensure the applied coating is compatible with the waterproofing membrane used.

Fig. 59 SILL DETAIL (ALTERNATIVE 2)

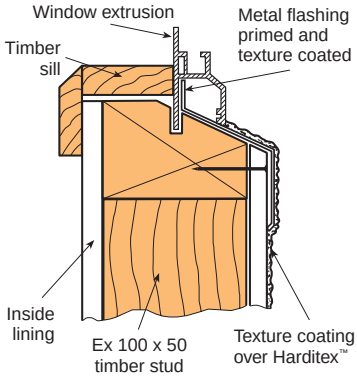


Fig. 60 SILL DETAIL (ALTERNATIVE 3)

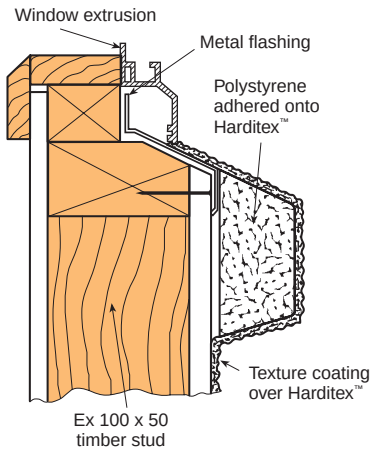
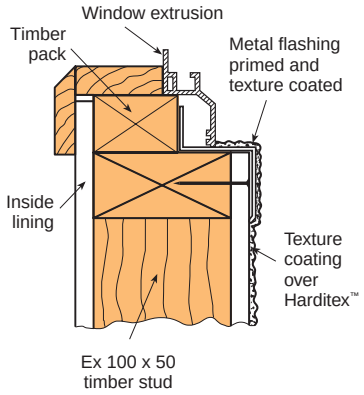


Fig. 61 JAMB DETAIL (ALTERNATIVE 1)



Notes:
1. The jamb detail can also be formed using a Harditex™ return similar to that shown in *Fig. 58*.
2. The planted polystyrene detail can also be used (refer *Fig. 60*).

Fig. 62 JAMB DETAIL (ALTERNATIVE 2)

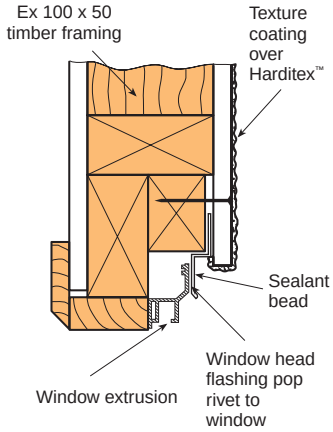


Fig. 63 ROUNDED CORNER DETAIL

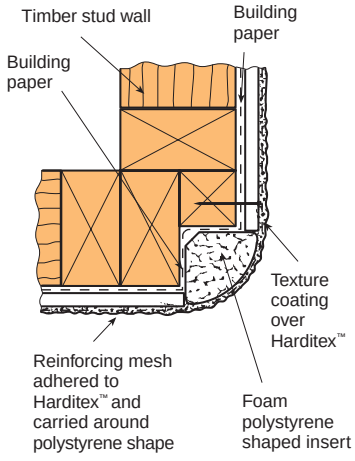


Fig. 64 HARDITEX™ TO SOFFIT DETAIL

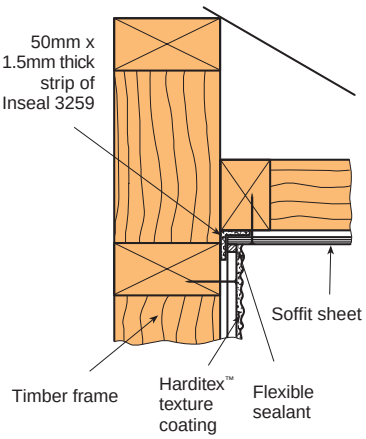
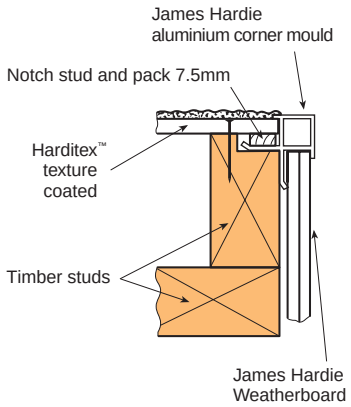


Fig. 65 CORNER DETAIL JAMES HARDIE WEATHERBOARD TO HARDITEX™



Note: Use flexible sealant in the corner mould for high wind exposures.

Fig. 66 BRICK VENEER TO HARDITEX™ EXTERNAL CORNER DETAIL

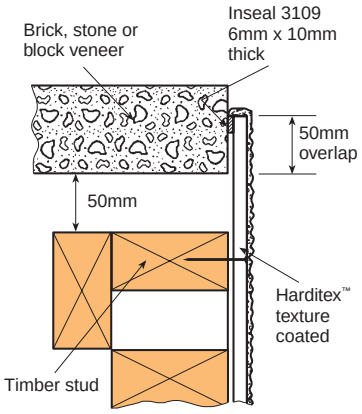
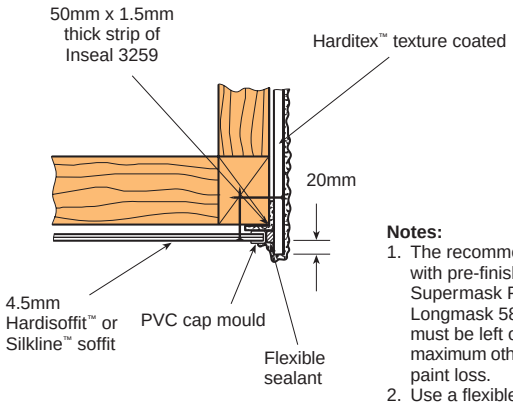
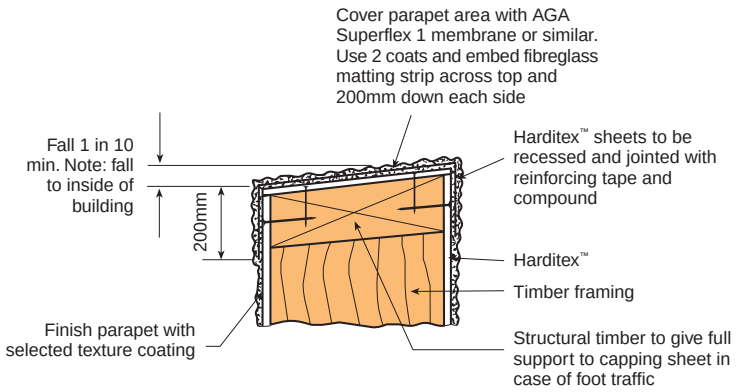


Fig. 67 SOFFIT DRIP-EDGE DETAIL



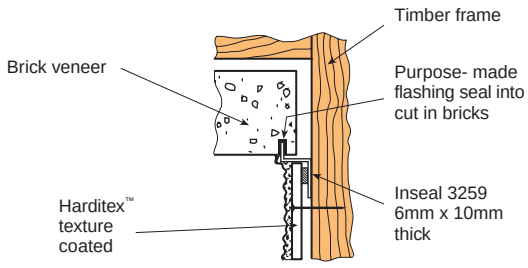
Notes:
1. The recommended masking tapes for use with pre-finished soffits are Sellotape Supermask PVC Blue code 5850 or Longmask 5855 paper tape. These tapes must be left on the soffit for only seven days maximum otherwise tape removal may cause paint loss.
2. Use a flexible sealant between PVC and Harditex™ for high wind exposure.

Fig. 68 PARAPET DETAIL



Notes:
1. Ensure the final texture coating is compatible with the Superflex 1 membrane or similar used.
2. The membrane is used as a back-up waterproofing to the texture coating.
3. Refer to selected membrane manufacturer's instructions regarding the correct methods of application.

Fig. 69 BRICK VENEER TO HARDITEX™ INTERNAL CORNER DETAIL



Harditex™ jointing and coating systems

The following organisations have authorised the listing of their names as independent providers of products and services which may be used in conjunction with Harditex™ and Harditex™ Premium. These organisations will provide contact details of their authorised jointing and coating applicators throughout New Zealand.

Providing the Harditex™ and/or Harditex™ Premium is installed in full accordance with the current published Harditex™ technical literature then these businesses should provide a warranty covering the jointing and texture coating of the system.

James Hardie Building Products warranty the Harditex™ and Harditex™ Premium products provided these have been installed in full accordance with the current published Harditex™ literature.

COMPANY	JOINTING SYSTEMS	COATING SYSTEMS
Fosroc Ltd Wellington (04) 568 8046 Auckland (09) 273 9292	Flexipaste and Taping Paste Taping Paste and Liquid	• Esterno • Flexiform • Graffiato and Colourkote External Silk • Flexiform
Resene Paints Ltd Wellington (03) 577 0500	Jointflex	• Resitex • Thixalon 5
Nuplex Industries Ltd Auckland (09) 579 2029	SJ Jointing System	• Flexicote
Equus Industries Ltd Blenheim(03) 578 0214	Chevaline Superfil-2	• Chevaline Spraytex G • Chevaline Arcutex • Chevaline Covertex
Hitchins-Gunac Ltd Auckland(09) 360 3246	Formwall 660 Gap Filler and Formwall 665 Flushing Compound	• Formwall Varitex • Formwall 612 Topcoat
Courtaulds Coatings Auckland(09) 828 3009	Armawall Filler	• Armawall Trowel On 2mm • Armawall Roma • Armawall Travertine 2mm
Plaster Systems Ltd Auckland (09) 444 6440	Multiplast Multiplast Plaster and Resin and Multiplast Finishing Compound	• Multiplast Plaster and Wattyl Solarguard Finish • Ezytex Sponge • Colorplast Sponge • Formstone Acrylic Plaster • Multiplast Texture
Coastal Coatings Ltd Tauranga (07) 575 7266	Acryltex Texture Plaster	• Acryltex Texture Coat followed by 3 coats Taubmans Semi Gloss Acrylic
Alchemis Ltd Auckland (09) 274 6652	Alchemix Aquafill	• Alchemix Aquatex Pretexture followed by 2 coats Alchemis Body Coat
Special Finishes Auckland (09) 818 9595	Flexicure 500 Jointing Coat	• Flexiscribe followed by one coat Colour Trend Hi Build colour • 2 coats Stipletex
Ultralite Texture Coatings Ltd Silverdale, Auckland (09) 426 2242	Ultralite Smooth Patch	• Ultralite trowel coat followed by Ultralite flex coat
ICI Paints (Dulux) Wellington (04) 568 4259	Acra Patch 500	• Acra Prime 501 • Acra Tex Membrane 353 • Acra Shield 355 • Acra-Glaze 356
Aston Acrylics (Styrocrete Holdings Ltd) Tauranga (07) 578 5347	Styrocrete Jointing compound	• Styrocrete acrylic pigmented texture system
Granosite Wattyl NZ Ltd (09) 828 4009	Granoflex HT and Granopatch Smooth	• Granoskin decorative membrane • Granotex • Granopearl
Levene & Co (09) 273 7045	Flexicure	Levene Elastomeric Texture Coat Fine, Medium or Coarse

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JAMES HARDIE TECHNICAL INFORMATION

1028 June 1998

HARDITEX™
TECHNICAL INFORMATION

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Wellington
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Lower Hutt.
Phone: 04 568 3961
Fax: 04 568 5050

Christchurch

51 Buchanans Road,
Sockburn,
PO Box 11106
Christchurch.
Phone: 03 342 8890
Fax: 03 342 6176

For more information call the James Hardie Helpline (see below) toll free.

Prior to working with this product it is important that you refer to

'Working Safer with Silica-based Products.'

For more information or a copy of this leaflet, contact:

James Hardie Helpline

0800 808 868

Monday to Friday 7.30am to 6.00pm

James Hardie Building Products

"BUY N.Z. MADE" & Keep Your Country Working

TELARC REGISTERED SUPPLIER

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HARDITEX™

TECHNICAL INFORMATION

June 1998

Harditex™ is the ideal lightweight cladding for a monolithic finish, yet it provides you with the comfort and peace of mind that comes with the stability and strength of James Hardie fibre cement. The only limiting factor is your imagination.

JAMES HARDIE TECHNICAL INFORMATION