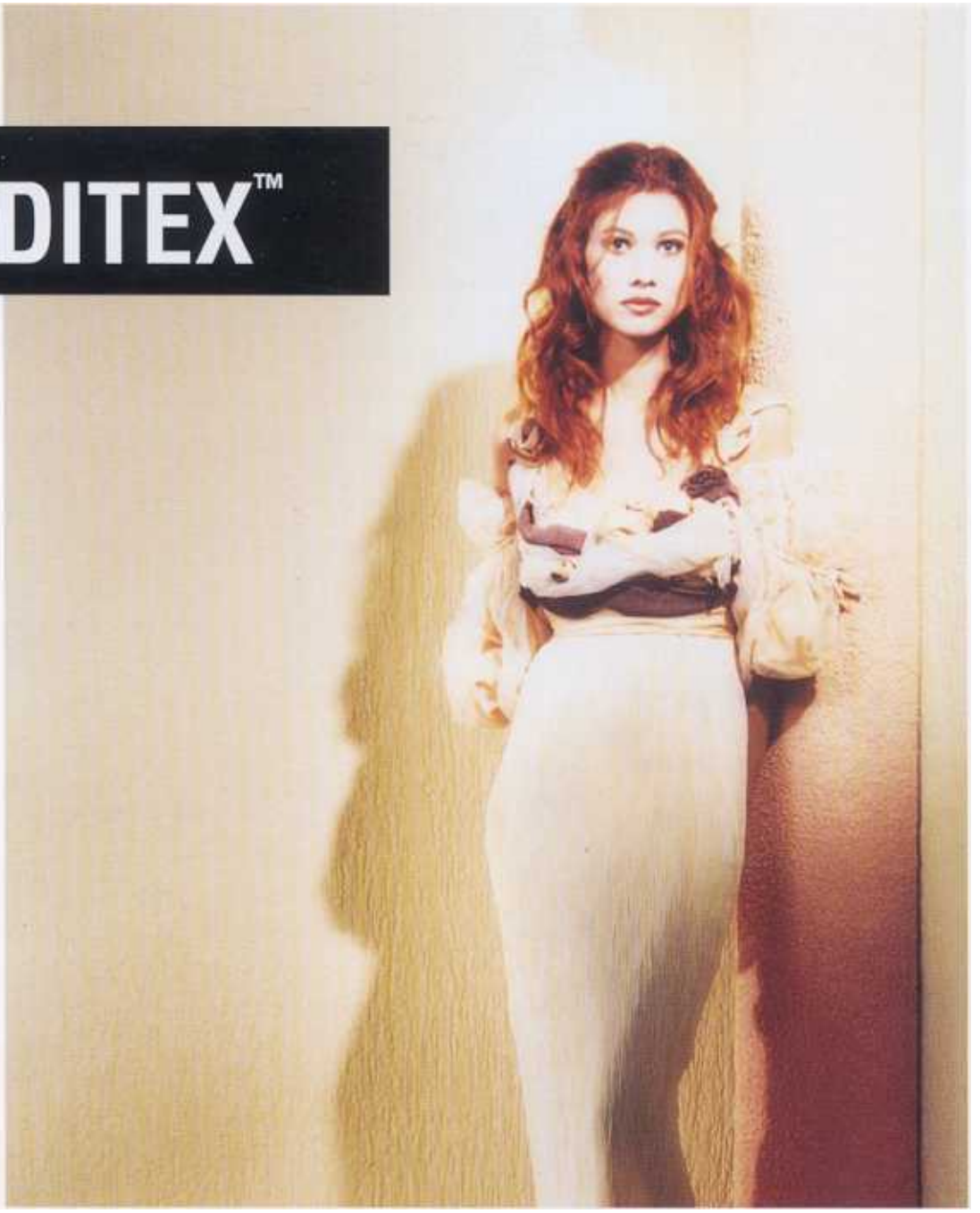
James Hardie
Building Products

HARDITEX™



February 1996

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

Introduction

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

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. 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. 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 generally licensed by the coating manufacturer. Section 3 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 three distinct sections:

SECTION 1: The framing and installation of the James Hardie Harditex™ sheets.

SECTION 2: Requirements for complying with the New Zealand Building Code including fire resistance, acoustic and bracing ratings.

- Providing the sheets are installed 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 of 15 years.
- The specifications given under Section 1 must be followed to ensure the sheet performance of the Harditex™ sheets is covered by the warranty.

SECTION 3: The joint and coating systems applied by specialist independent contractors.

- The proprietary joint and coating procedures are outside the control of James Hardie, therefore all warranties for performance must be given by the independent joint 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. For more information or a copy of this leaflet, contact the James Hardie Helpline on 0800 808 868.

SECTION 1: INSTALLATION

General information

Product description

Harditex™ is a sheet material manufactured 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 on the face of the sheets, by a pink colour tint throughout the thickness and by the name printed on the sheet. 7.5mm Harditex™ has the name printed on the reverse face of the 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 this 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 joint and coating systems is available from James Hardie.

A Harditex™ installation video is available on request from James Hardie.

Product information

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.

Harditex™ fibre cement sheets are highly resistant to permanent water damage and will not rot.

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.

Sheet sizes

Harditex™ sheet lengths and widths are given in the table below. *NOTE:* All dimensions are nominal.

Harditex™ sheet sizes

Thickness (mm)	Width (mm)	Length (mm)			
		1800	2400	2700	3000
7.5	900			✓	
7.5	1200	✓	✓	✓	✓
9	1200		✓	✓	✓

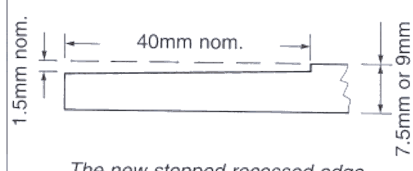
All these specifications can be used for 7.5mm- and 9mm-thickness Harditex™.

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.)

Refer also to 'Framing and fixing', pages 5-12.

Fig. 1 *SHEET EDGE FINISH – STEPPED RECESS*



The new stepped recessed edge

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

Sheet mass and moisture content

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

Harditex™ sheets must be dry before fixing to framing (refer also to Fig. 2).

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 (EMC). The sheet is at EMC 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 AS1530 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.

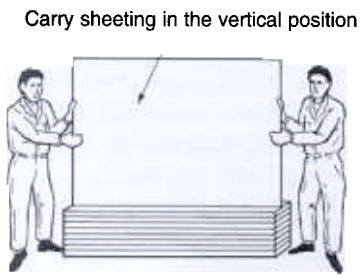
In terms of the Building Code of Australia, Harditex™ is deemed to be non-combustible.

Working instructions

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.

Fig. 2 CORRECT SHEET HANDLING



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

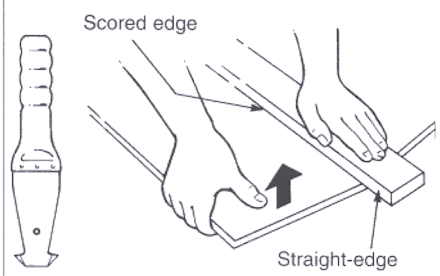
Cutting

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.)

Fig. 3 SCORE-AND-SNAP METHOD

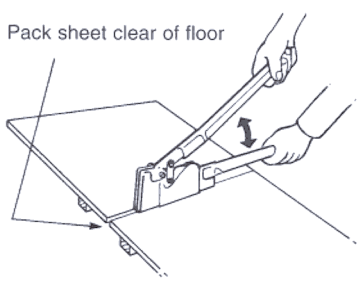


- Preferably score from the face side of the sheet.
- Position straight-edge along the line of the cut.
- Score against straight-edge and repeat the action to obtain adequate depth for a clean break – normally one-third of the sheet thickness.
- Snap upwards to achieve break.
- Clean up edges with a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

Hand guillotine

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

Fig. 4 HAND GUILLOTINE METHOD

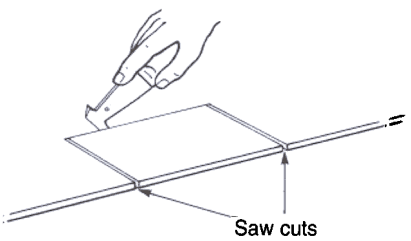


Hand sawing

Hand sawing is suitable for general cutting operations and for small cuts, notchings or small penetrations. 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. 5 HAND SAWING METHOD



Power sawing, site recessing and hole forming

Safety precautions

When cutting, drilling or grinding, safety glasses and a dust mask should always be worn. This can be either a disposable P2 dust mask or a half mask with a disposable cartridge. The mask should fit properly and be approved for use with dust. The mask should 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.

Power sawing

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

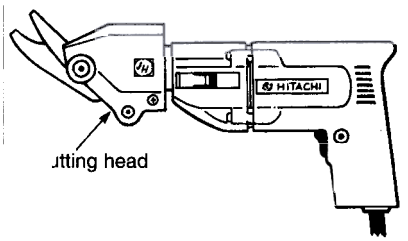
Clamp a straight-edge to the sheet and run the saw base plate along the straight-edge when making the cut.

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™, enquire at a James Hardie sales office.

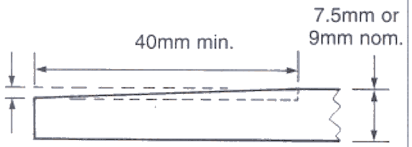
Fig. 6 *HARDISHEAR™ POWER CUTTER*



Site recessing

Where it is necessary to produce a ground recess detail for small volumes on site, use a portable angle grinder fitted with a strong, thick carborundum blade or similar. Run down the edge at an acute angle to the face to produce a taper approximately 40mm wide but not exceeding 1.5mm at its deepest point. (Refer Fig. 7.)

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



Note: A stepped recess can be formed using the diamond saw method.

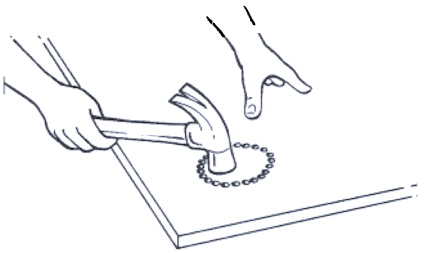
When larger volumes of site grinding and/or an accurate site stepped recess are required use a 100mm-diameter diamond dry-cutting saw. Run the saw on its side down the sheet and with a combination of cutting and grinding a neat stepped recess can be formed. Planers with hardened steel blades can also be used.

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 rasp. (Refer Fig. 8.)

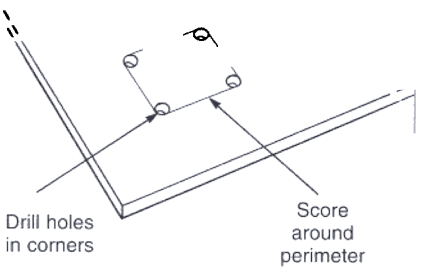
Large rectangular openings, such as for wall ventilators, can be made by the following method:

Fig. 8 *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. 9 *RECTANGULAR HOLE FORMING*



- Mark out the hole on the face side of the sheet.
- Drill a hole in each corner as shown in Fig. 9.
- 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. 9.)

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.

Framing and fixing

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™ does have substantial sheet bracing performance (refer to page 15).
- When the wall height exceeds the sheet length and horizontal joints need to be introduced, all timber framing must be thoroughly dry to minimise vertical shrinkage.

NOTE: Only kiln-dried or thoroughly air-dried timber must be used for these applications.

- Unless kiln-dried timber is utilised for the floor joists and wall framing in a two-storey construction, a horizontal relief joint must be used. Deep timber floor joists can shrink significantly therefore this aspect must be considered in the design of applications with two or more storeys.
- All sheets must be installed vertically for timber frame construction as this method gives the best overall performance. Sheets can be laid vertically or horizontally for steel frame construction.
- 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.
- 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.

General framing and fixing requirements

NOTE: For Harditex™ bracing systems framing and fixing requirements refer to pages 15-16.

Correct design of the framework and careful consideration of the sheet set-out 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 relief joints and control joints at the design stage.

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

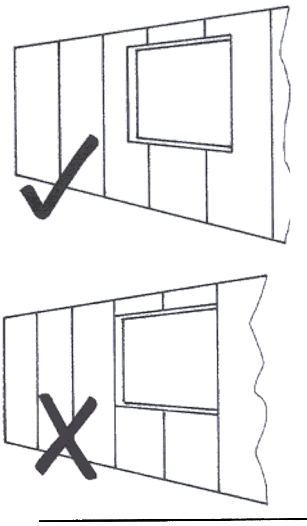
All studs and nogs must be checked with a long straight-edge for line and face accuracy to ensure the timber stud wall has a true and accurate outside face before the Harditex™ sheet is fixed.

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

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 sides of the window or door, then cut away waste. (Refer Fig. 10.)

***Fig. 10** SHEET LAYOUT FOR OPENINGS*

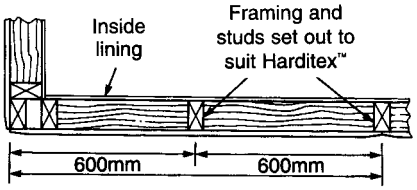


An alternative method to accommodate this possibility is to provide an expressed joint at window edges flashed with Inseal or a sealant-filled joint. (Refer Figs 15 and 16.)

Frame set-out

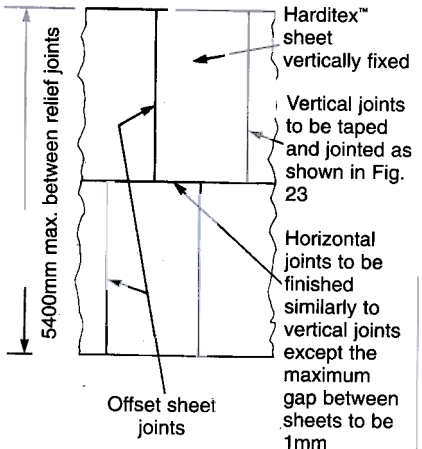
It will be more economical when the timber or steel framing is pre-cut or set out to suit the exterior cladding rather than the interior lining. For a typical example of this refer Fig. 11.

***Fig. 11** FRAME AND STUD SET-OUT*



1200mm-wide Harditex™ sheet to save wastage

Fig. 12 OFFSET SHEET SET-OUT



Notes:
1. When horizontal sheet joints are used for timber frame only kiln-dried timber must be used.
2. When floor joists occur at the horizontal sheet joint zone then relief joints must be used (refer Figs 17, 18 and 19).

When Hardiflex™ is fixed more than one sheet high on large walls the joints must be offset (refer Fig. 12).

Flashings

The tops of windows and doors must be flashed with a head flashing (refer Fig. 13). Use pre-shaped aluminium flashings. The sides of the windows can be sealed with Inseal 3109 (U100) strips or a paintable silicone.

When aluminium joinery is used sill flashings give good long-term protection.

Ground clearance

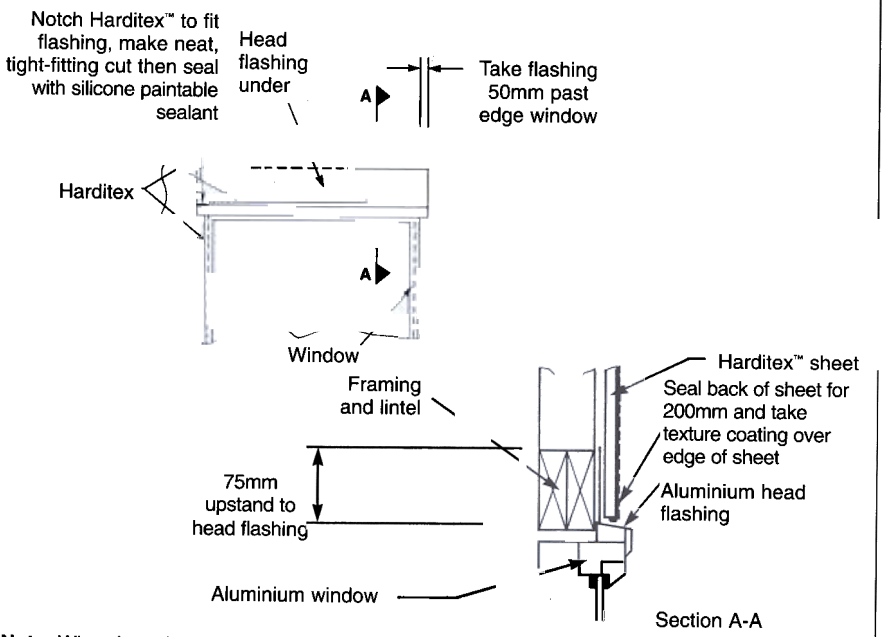
The concrete slab floor-to-ground dimension must be 150mm minimum to comply with Clause E1/AS1 2.0.1(a) of the New Zealand Building Code.

In all cases the Hardiflex™ sheets must be kept clear of the unpaved ground (clay or topsoil) by 255mm. For footpaths or paved areas the clearance is 150mm. These dimensions comply with Clause 4.2.5(b) of the New Zealand Building Code. Moisture will thus be prevented from entering the sheet and causing long-term coating breakdown. (Refer Fig. 14.)

Fencing

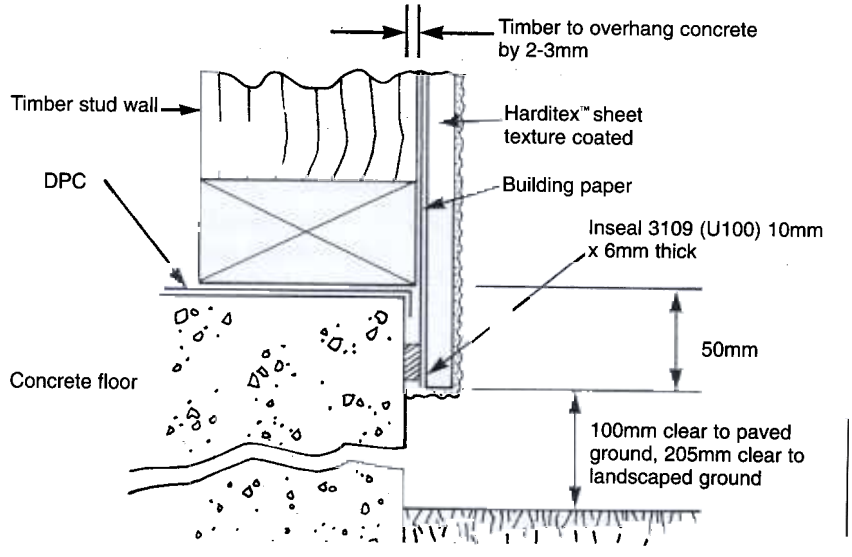
When Hardiflex™ is used in applications such as fences or screens it is essential that the timber framing and the back of the sheet are sealed from the weather. Therefore, for fence applications it is essential that sheets are applied to the Hardiflex™ specification on both sides of the framing to completely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

Fig. 13 WINDOW OR DOOR HEAD DETAIL



Note: When Inseal 3109 10mm x 6mm is used between the Hardiflex™ and the flashing the upstand can be reduced to 45mm.

Fig. 14 HARDIFLEX™ OVERHANG DETAIL TO CONCRETE OR BLOCKWORK BASE



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

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.

Battening 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/m² 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.

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.

Kiln-dried timber must be used to allow the sheets to be laid horizontally.

NOTE: The framing is to be closed up to 400mm centres for curved applications to give extra support to the curve. Commence fixing from the centre of the sheet and work outwards to avoid any possibility of drumminess.

Jointing systems

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

Control 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.

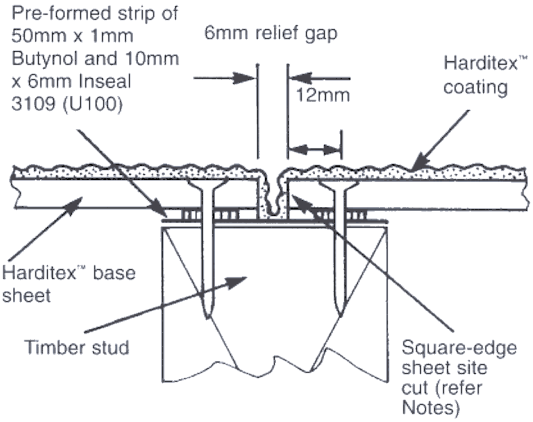
Relief joints

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

Vertical and horizontal relief joints must be provided at 5400mm maximum centres.

Provide a maximum 6mm gap between the sheets.

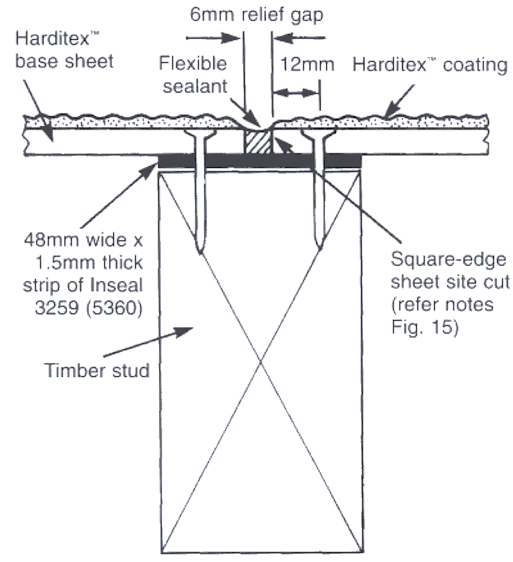
Fig. 15 *VERTICAL BUTYNOL INSEAL RELIEF JOINT (ALTERNATIVE 1)*



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 in Figs 15 and 16. Refer also to the site-cutting recommendations on page 3. The frame set-out and joint positioning in the wall will need to allow for this reduced sheet width.

Fig. 16 *VERTICAL SEALANT RELIEF 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.

External and internal corners have the jointing and coating continuous around the corner or are reinforced with a perforated corner angle (refer Fig. 25). Expressed external and internal corners can be used. Details are similar to those shown in Figs 15 and 16.

Relief joints must be located at 5400mm centres from corners. When an opening is in the vicinity of a relief joint then the edge of the opening is an ideal location for it.

For details of alternative vertical relief joints refer Figs 15 and 16.

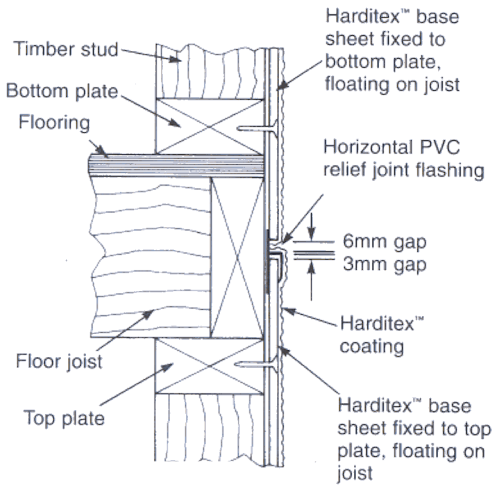
For details of alternative horizontal relief joints refer Figs 17, 18 and 19.

Control joints

Vertical structural control joints must be provided where walls exceed 10800mm in length. These control 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.

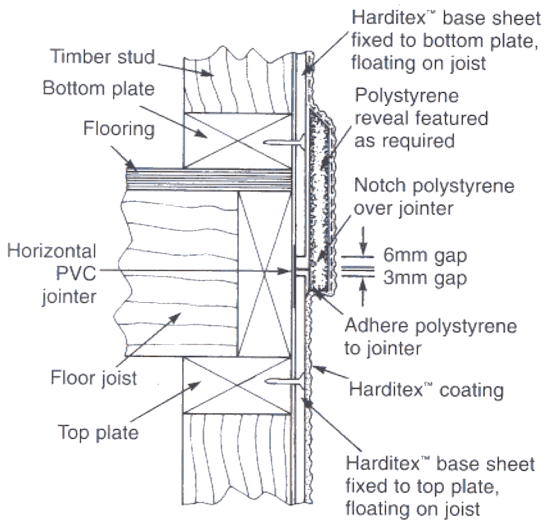
A well designed long wall will therefore have full control joints at 10800mm centres with intermediate relief joints at 5400mm centres maximum from a control joint. (Refer Fig. 20.)

***Fig. 17** HORIZONTAL FLASHING RELIEF JOINT (ALTERNATIVE 1)*



Notes:
1. The PVC horizontal jointer is available from James Hardie stockists.
2. The jointer colour is off-white.
3. The horizontal jointer must be tacked into place before the top sheet is installed.
4. Apply sealant to the ends of the PVC jointer to stop water penetration.

***Fig. 18** HORIZONTAL REVEAL RELIEF 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. 19** HORIZONTAL OVERLAP RELIEF JOINT DETAIL (ALTERNATIVE 3)*

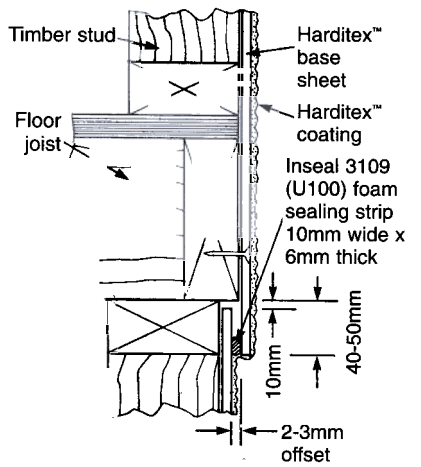
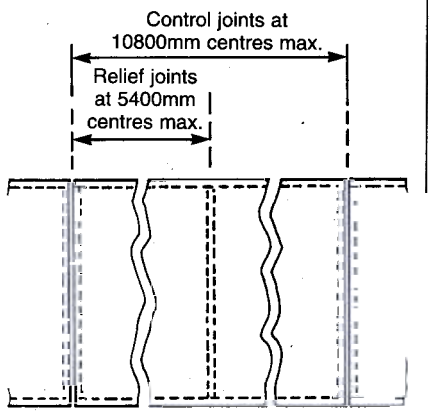


***Fig. 20** RELIEF JOINT AND CONTROL JOINT SET-OUT*



Note: Internal and external corners must be flush jointed and coated and relief and control joints spaced from them.

NOTE: These control joints must be used on commercial and industrial applications where long wall lengths are frequently required. This can be achieved by panelising the Harditex™ support framework off the main structural frame. These details are difficult to achieve on domestic construction therefore walls greater than 10800mm should be avoided.

For details of alternative vertical control joints refer Figs 21 and 22.

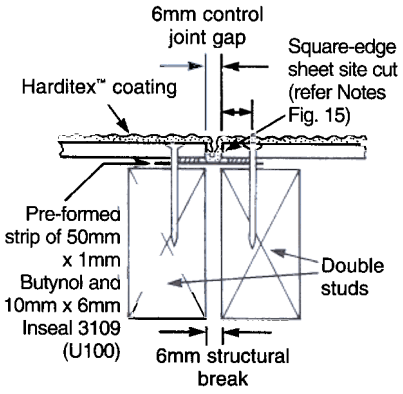
Base sheet jointing details

The recessed-edge sheet joint is formed between each edge of the Harditex™ sheet for both vertical and horizontal joints (refer Fig. 23) and at internal and external corners.

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

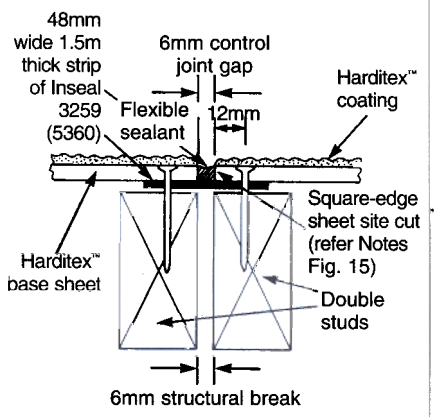
NOTE: The details in this brochure are generally drawn for timber frame although steel frame construction can also be used.

Fig. 21 VERTICAL BUTYNOL INSEAL CONTROL JOINT (ALTERNATIVE 1)



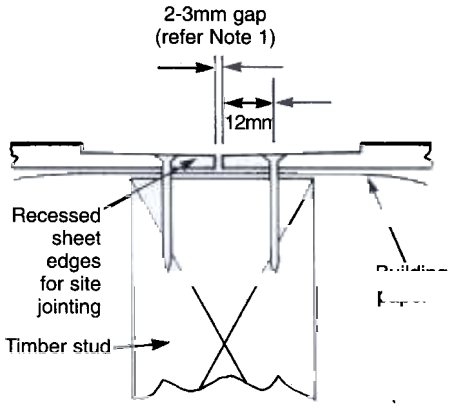
Note: Refer to Fig. 15 for general notes relating to this as the details are the same except for the double studs.

Fig. 22 VERTICAL SEALANT CONTROL JOINT (ALTERNATIVE 2)

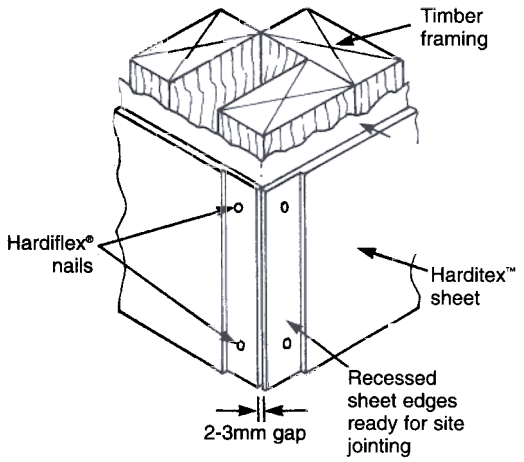


Note: Refer to Fig. 16 for general notes relating to this as the details are the same except for the double studs.

Fig. 23 RECESSED-EDGE SHEET JOINT DETAIL



Notes:
1. Use a 1-2mm gap for narrow timber and steel frame and horizontal joints.
2. 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.
3. When the sheet recessed edge is cut away, site grinding of the edge to form a recessed joint is recommended before the sheet is fixed. (Refer Fig. 7.)



Note: This external corner detail 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. 23.
- 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. 25 for finishing detail. The PVC angle is available from James Hardie stockists.

Corner joints

For external corners refer to Figs. 24 and 25.

At internal corners adhere a strip of Inseal 3259 in position before fixing sheets. (Refer Fig. 26.) The sheets can then be finished with the standard tape-reinforced flexible jointing system. (Refer Fig. 23.)

Fig. 25 *PVC CORNER FINISHING*

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

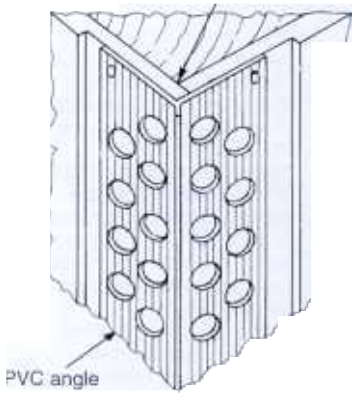
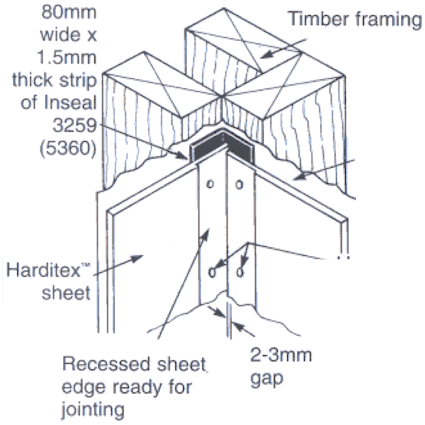


Fig. 26 *RECESSED-EDGE INTERNAL CORNER DETAIL*



Note: The internal corners can be jointed with flushing and finishing compounds and reinforcing tape continued around the corner as described in Fig. 23.

Timber frame

All timber framing must be in accordance with NZS 3604:1990 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.

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.

Kiln-dried timber is required to 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 5, for further information.

Timber framing to be either ex 50mm wide or, when kiln-dried is used, 35mm wide minimum finished size 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 1200mm centres. (Refer Fig. 27.)

Nail at 150mm centres to the perimeter of sheets and intermediate studs and nogs (refer Fig 27). 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.

A breather-type building paper 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.

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

Fix in conjunction with the dot pattern on the sheet which is set out for normal vertical sheet fixing. Use 40mm x 2.5mm galvanised flat-head Hardiflex® nails (refer Fig. 28) for timber framing.

Fig. 27 *VERTICAL SHEET FIXING*

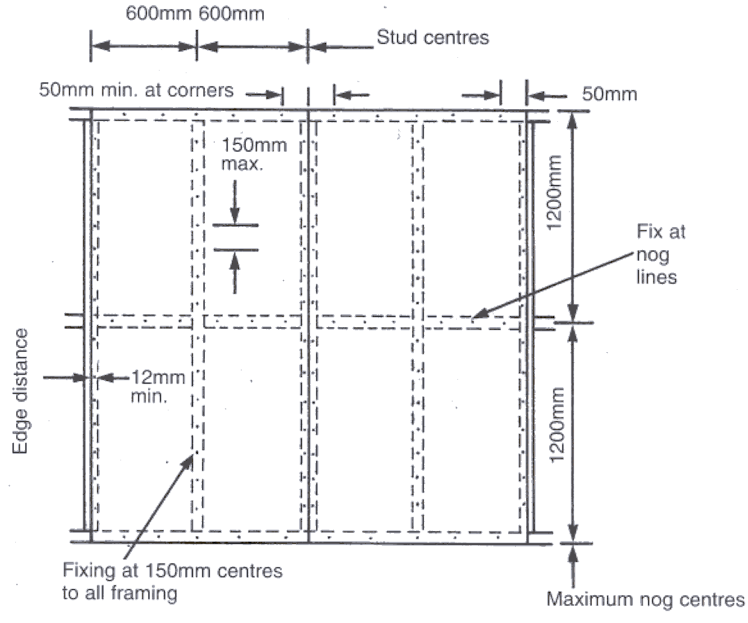
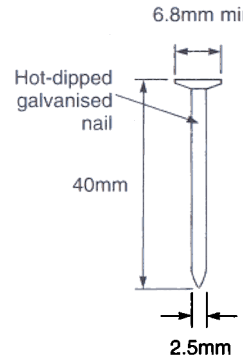


Fig. 28 *HARDIFLEX® NAIL*



Hot-dipped galvanised nails 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 James Hardie stockists must be considered.

Fig. 29 *FIXING TO STEEL FRAME*

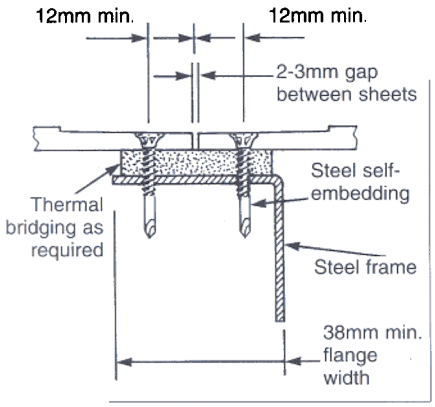
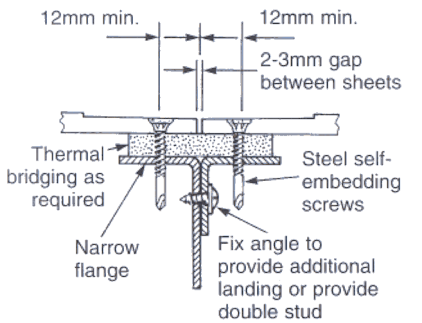


Fig. 30 *FIXING TO NARROW STEEL FLANGES*



Steel frame

Steel framing for Harditex™ non-bracing cladding applications can be non-load bearing or load bearing.

Load-bearing steel studs must have sufficient strength and thickness to resist all vertical and horizontal loads.

Steel framing members of load-bearing construction must be fabricated from light-gauge sheet steel 1.1mm to 1.6mm thick.

Steel framing for non-load-bearing construction must be a minimum of 0.55mm thick.

Studs must be spaced at a maximum of 600mm centres with continuous top and bottom plates and nogs at 1200mm maximum centres. The frames must be firmly secured together and must not rely on the sheeting for stability.

When the Harditex™ sheets are fixed vertically a minimum flange width of 38mm is required to adequately fix the sheets with the correct edge distances. (Refer Fig. 29.)

When flange widths less than 38mm are used the Harditex™ sheets can be laid horizontally. A widening angle must then be fixed to the studs and nogs at sheet end and side joints. (Refer Figs 30 and 31.)

Thermal bridging

A steel-framed wall clad with Harditex™ may require a thermal break fixed to the outside face to achieve the 1.5R value required by the Building Code.

The thermal bridging must be 10.5mm Triple S or high-density polystyrene strips (refer Figs 29 and 30).

Fasteners to steel frame

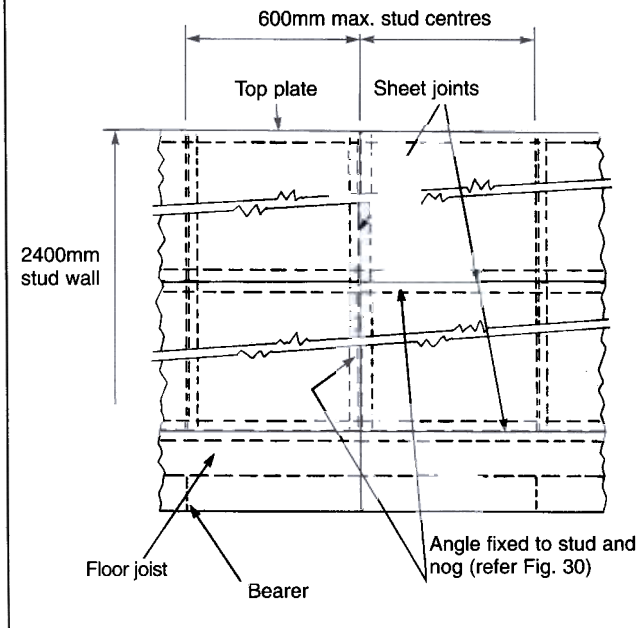
Fix Harditex™ to steel frame using the fastener shown in Fig. 32.

Screw-driving technique

Use a screw gun with high torque, a maximum speed of 2500 rpm, a variable speed control and a depth-control head attachment.

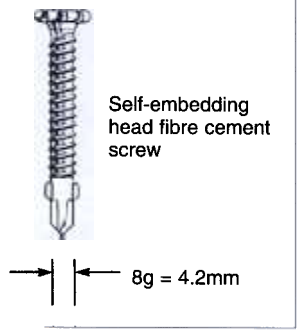
As soon as the screw penetrates the steel the revs must be dropped to very slow (10-100 rpm) to bed the fixing into the Harditex™. Also use an adjustable depth-locating nose piece to stop over-driving.

Fig. 31 *HORIZONTAL FRAME AND SHEET SET-OUT TO NARROW-FLANGE STEEL FRAMING*



Notes:
1. The Harditex™ sheets can be laid horizontally.
2. Offset sheet jointing is not required for this method.
3. The angle is required at all sheet end joints and at horizontal sheet joints at nogs.

Fig. 32 *STEEL FRAME FIBRE CEMENT SCREW*



NOTE: It is important that slow revs are used to bed the screw into the Harditex™ otherwise sheet damage can occur. This aspect is essential when the Triple S thermal bridging is used under the Harditex™.

Methods for fixing sheets to steel frame

Correct method: For the correct sheet installation sequence refer Fig. 33. Here the first sheet is screwed to the open side of the stud flange. The flange deflects at first, but is then pulled tight as the screw takes up the slack.

It is important to fully screw off the sheet on this side of the stud before continuing. Ensure the stud is adequately supported to avoid it twisting.

The next sheet is screwed to the web side of the stud. Not only is the deflection at this part of the flange very small, but the previously installed sheet helps keep the assembly rigid during the installation of the second sheet.

Incorrect method: When the incorrect fixing procedure is used (refer Fig. 34) the outer side of the flange can deflect away leaving a permanent step to the outside face of the sheets.

The stud must be firmly supported while the correct method (refer Fig. 33) is used. When adequate stud support is not given, twist can take place resulting in a permanent lipped distortion (refer Fig. 34).

Fig. 33 *CORRECT FIXING METHOD*

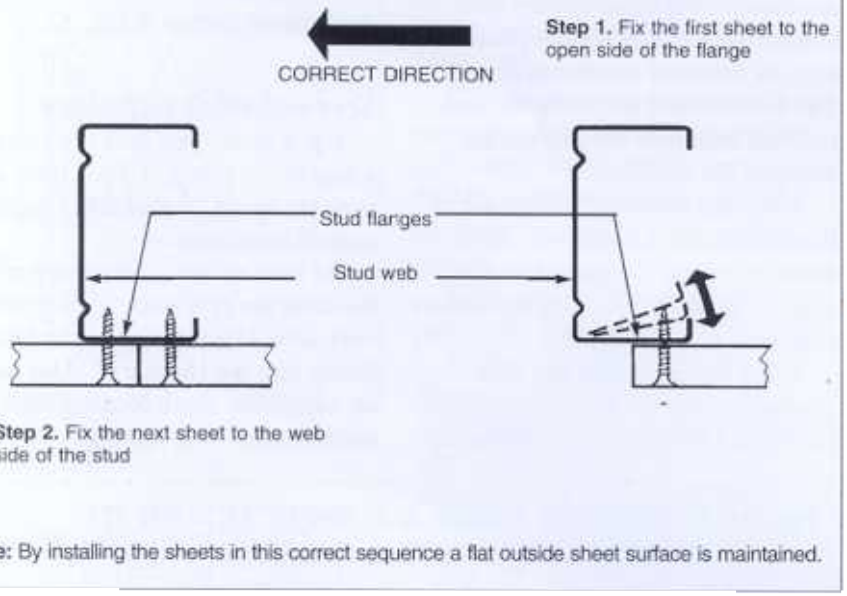
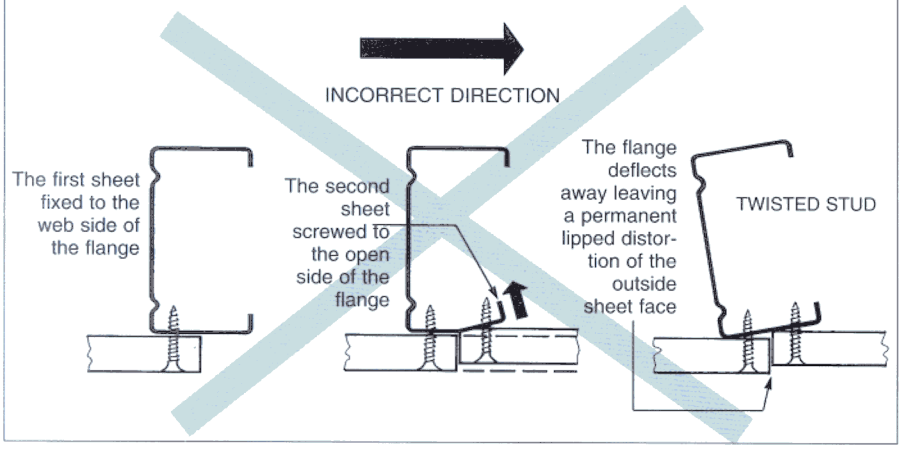


Fig. 34 *INCORRECT FIXING RESULTING IN TWISTED*



SECTION 2: NZ 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. 35.)

Durability

The Harditex™ sheet system meets the performance requirements of NZBC Clause B2.3(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 zinc screws have a durability of 10 years. Therefore in these locations alternatives such as stainless-steel fixings must be considered.

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 are available from James Hardie stockists.

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.

BTL (BRANZ) appraisal

Harditex™ has gained the following BTL Appraisal Certificates:

No. 229 (1995) James Hardie Wall Bracing Systems

No. 243 (1995) Harditex™ - Exterior Substrate for Coating Systems

Maintenance

Routine 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 and maintenance:

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

Energy efficiency

A timber-framed wall clad with 7.5mm or 9mm Harditex™ (refer Fig. 35) will exceed the 1.5°Cm²/W requirement of Clause H1 Energy Efficiency as cited by Acceptable Solution E3/AS1.

Fire-resistance ratings (load bearing)

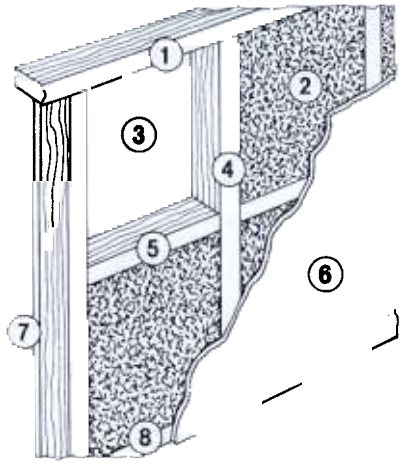
Refer to Table 1.

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

- Fix Winstone's Fyreline in strict accordance with the specification number shown in the Gib Fire Rated Systems November, 1992.
- Batten over the outside layer of Fyreline at the same framing centres as for the fire-rated specification. Refer also to page 7 of this brochure for the battening specifications. Refer also to Winstone Wallboards Information Bulletin No. 13 March 1994.
- Place heavy-duty breather-type building paper 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.

Fig. 35 TIMBER-FRAMED WALL WITH FIBREGLASS BATTS



CONSTRUCTION
1. Top plate
2. Fibreglass Wall Pink 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.

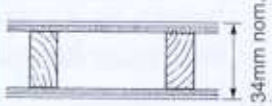
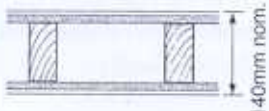
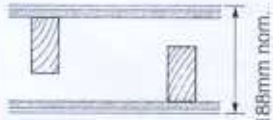
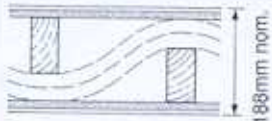
Table 1: Fire-resistance ratings

Fire-resistance rating and frame type	Winstones specification number	Fire-resistant linings required
15/15/15 timber	GBTL 15	One layer 9.5mm standard Gib board each side frame
15/15/15 steel	GBSL 15	One layer 12.5mm standard Gib board 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 standard Gib or Gib Fyreline is erected.
- The Harditex™ must be coated promptly to stop any water ingress onto the Gib board or Fyreline.

Table 2: Acoustic ratings for timber frame (load bearing)

Acoustic rating (STC)	Detail	Basic configuration
43		7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 9.5mm standard-grade gypsum wallboard underlay both sides 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 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 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 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

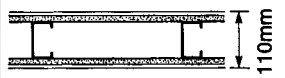
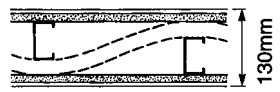
Acoustic ratings

The acoustic ratings in Tables 2 and 3 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 Tables 2 and 3 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.

Table 3: Acoustic ratings for steel frame (non-load bearing)

Acoustic rating (STC)	Detail	Basic configuration
37	 78mm	7.5mm Harditex™ outside face 6mm Villaboard® inside face 64mm steel stud framing at 600mm centres
40	 82mm	9mm Harditex™ outside face 9mm Villaboard® inside face 64mm steel stud framing at 600mm centres
43	 98mm	7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 9.5mm standard-grade gypsum wallboard underlay both sides frame 64mm minimum steel studs at 600mm centres
45	 103mm	7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 12.5mm fire-grade gypsum wallboard underlay both sides frame 64mm minimum steel studs at 600mm centres
46	 110mm	7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 16mm fire-grade gypsum wallboard underlay both sides frame 64mm minimum steel studs at 600mm centres
48	 114mm	9mm Harditex™ outside face 9mm Villaboard® inside face 16mm fire-grade gypsum wallboard underlay both sides frame 64mm minimum steel studs at 600mm centres
56	 130mm	7.5mm or 9mm Harditex™ outside face 6mm Villaboard® inside face 12.5mm fire-grade gypsum wallboard underlay both sides frame 64mm minimum steel studs staggered at 300mm centres between 92mm track plates 25mm acoustic infill in cavity

Bracing systems

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 BTL (BRANZ) testing and are suitable for use in conjunction with NZS 3604:1990.

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: 1990 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 relief and control joints). Refer to pages 7-9 for full details of relief and control joints.

When bracing panels contain control or relief 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. 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 to achieve the fixing as detailed.

BUILDING CODE

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 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 43, 47, 48 and 49.)

Bracing

Harditex™ will provide bracing for buildings designed and constructed in accordance with NZS 3604:1990. (NZS3604 is cited in Approved Document B1/AS1 Clause 4.0.)

For verification of this aspect of the product refer to BTL 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 36 to 57 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. 50 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 3604:1990. The maximum height for all these bracing panels is 4800mm.

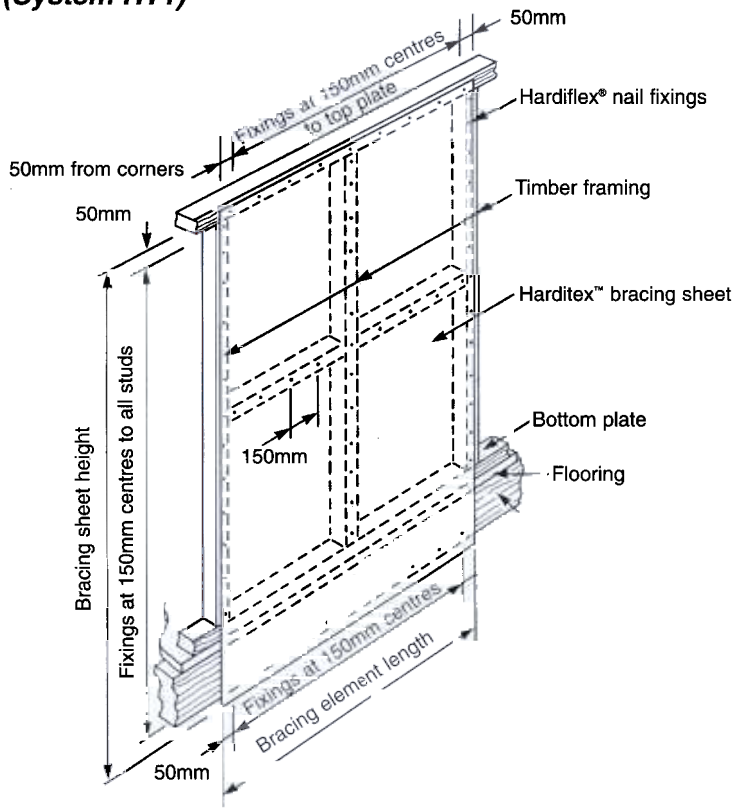
GENERAL NOTES FOR ALL BRACING FIGURES

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™/Braceline ratings for all figures refer to Table 4.
3. Where HD 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 3604:1990.

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

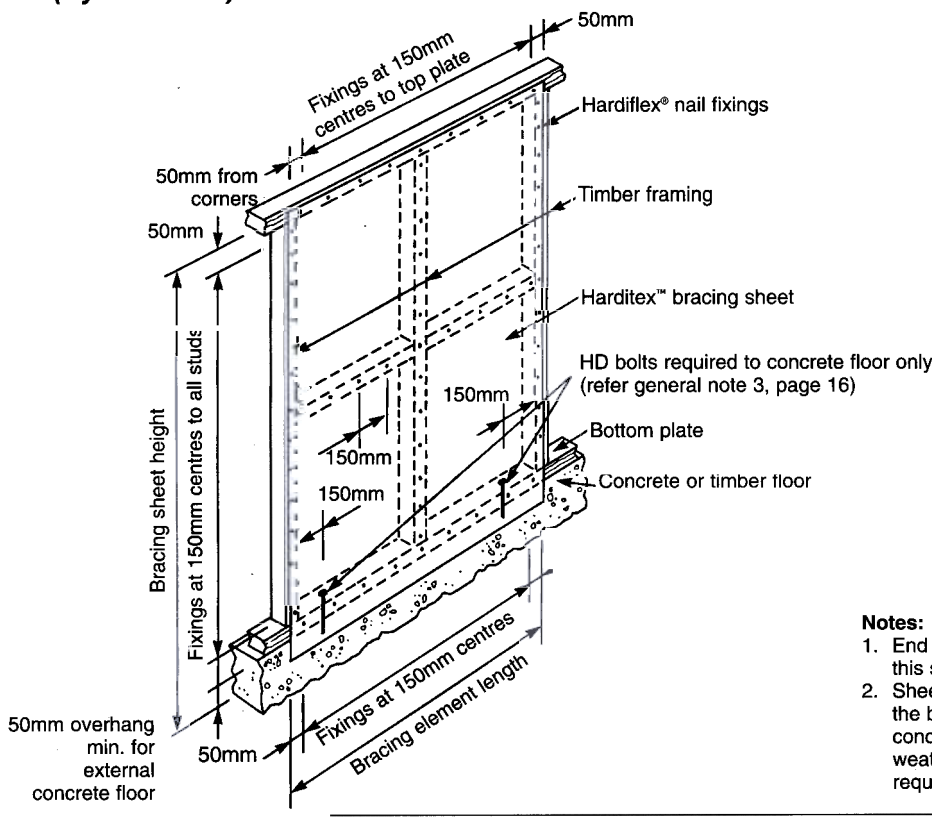
System number	Bracing element length (mm)	End straps	Bracing details	NZS 3604:1990 rating in bracing units per metre of element length	
				Wind	Earthquake
HT1	1200 or more	Not required	Refer Figs 36 and 37 HD bolts to concrete floor	100	90
HT2 HT3	900 - 1200 1200 or more	Required (refer Figs 43 or 47)	Refer Figs 38 and 39 HD bolts to concrete floor	100 115	100 100
HT4 HT5	1200 - 2400 2400 or more	Not required	Refer Fig. 40	130 130	110 120
HT6 HT7 HT8	900 -1200 1200 - 2400 2400 or more	Not required	Refer Figs 41 and 42 HD bolts to concrete floor	100 115 120	80 90 100
HT9	600	Required (refer Fig. 43)	Refer Fig. 44	93	98
HT10	600	Required (refer Figs 48 and 49)	Refer Figs 45 and 46 HD bolts to concrete floor Coach bolts to timber floor	93	98
HT11B	900 or more	Not required	Refer Fig. 51 Use coach screw to joists Braceline on inside face Harditex™ on outside face	191	168
HT12B	900 or more	Not required	Refer Fig. 52 HD bolts to concrete floor Braceline on inside face Harditex™ on outside face	191	168
HT13B	2400 or more	Not required	Refer Fig. 53 Braceline on inside face Harditex™ on outside face	190	162
HT14B	2400 or more	Not required	Refer Fig. 54 HD bolts to concrete floor Braceline on inside face Harditex™ on outside face	190	162
HT15B	3200 or more (window panel)	Not required	Refer Figs 55A, 55B, 56 and 57 HD bolts/coach screws to floor Braceline on inside face Harditex™ on outside face	75	63
HT16B	3200 or more (window panel)	Not required	Refer Figs 55B, 55C, 56 and 57 Braceline on inside face Harditex™ on outside face	75	63

Fig. 36 HARDITEX™ TO TIMBER JOISTS WITHOUT END STRAPS (System HT1)



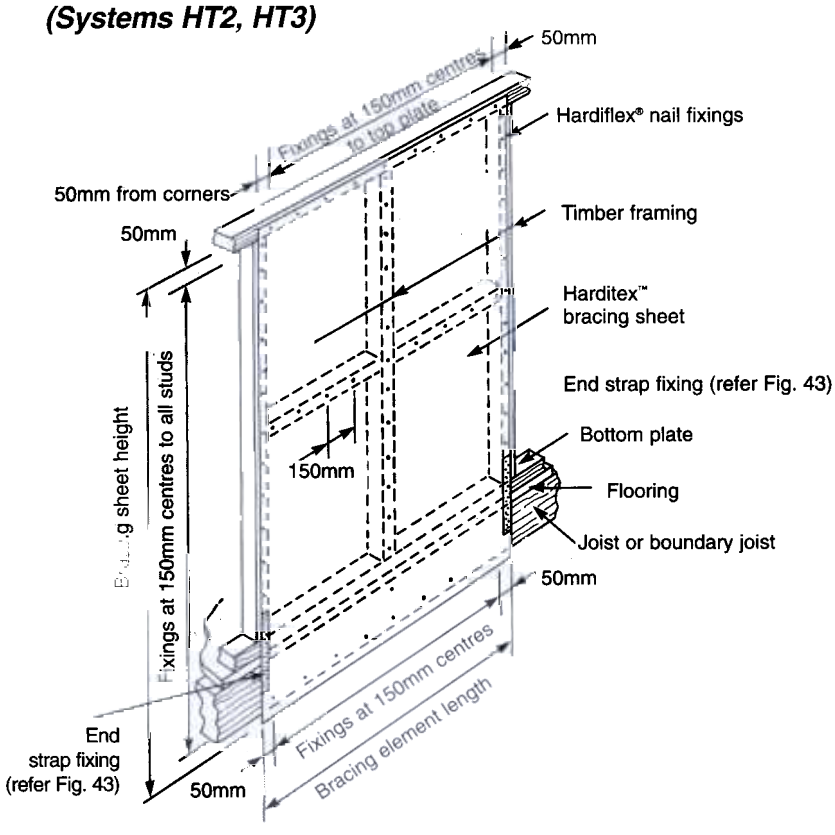
Note: End strap fixing between studs and joists is not required for this system.

Fig. 37 HARDITEX™ TO TIMBER OR CONCRETE FLOORS WITHOUT END STRAPS (System HT1)



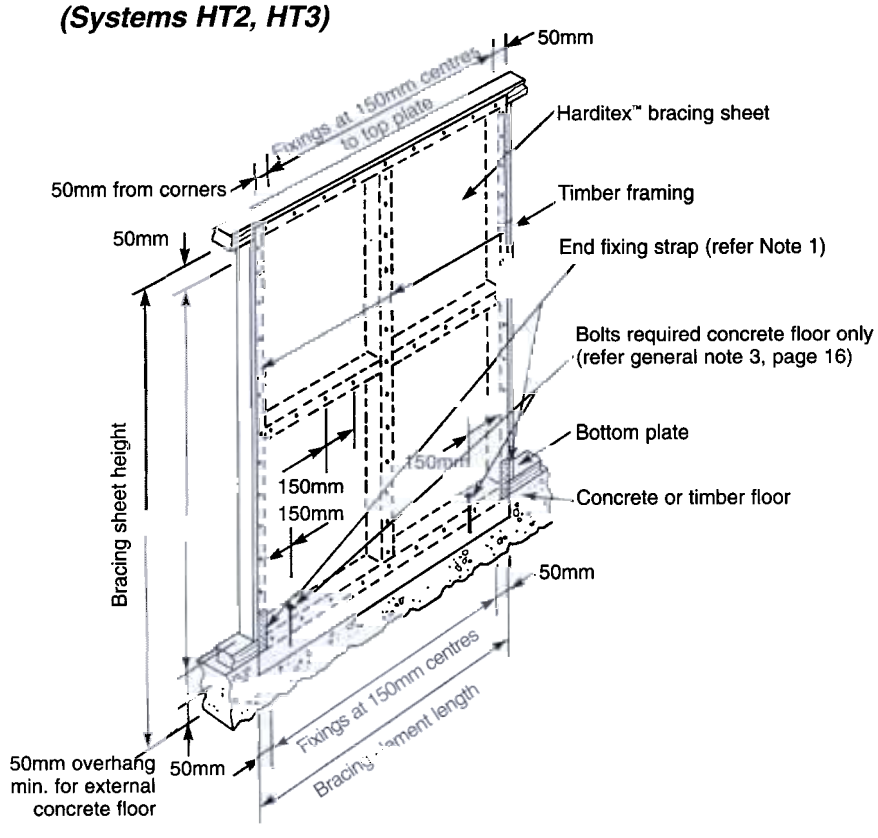
Notes:
1. End strap fixing to studs is not required for this system.
2. Sheet can finish flush with underside of the bottom plate for timber floors or for concrete floors when the 50mm external weathering overhang is not required.

***Fig. 38** HARDITEX™ TO TIMBER JOISTS WITH END STRAPS (Systems HT2, HT3)*



Note: Galvanised-steel end fixing straps to be as detailed in Fig. 43.

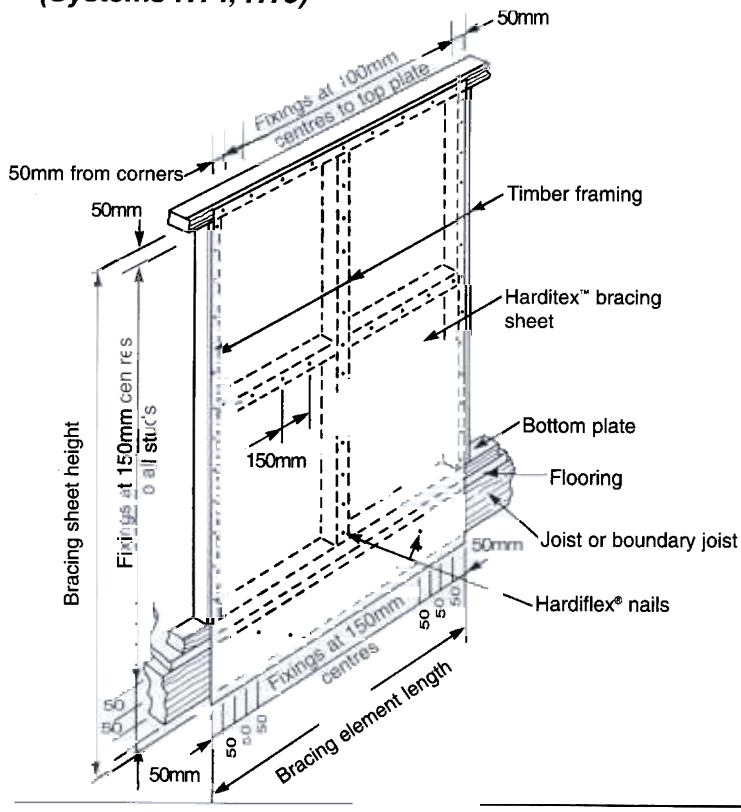
***Fig. 39** HARDITEX™ ON TIMBER OR CONCRETE FLOORS WITH END STRAPS (Systems HT2, HT3)*



Notes:

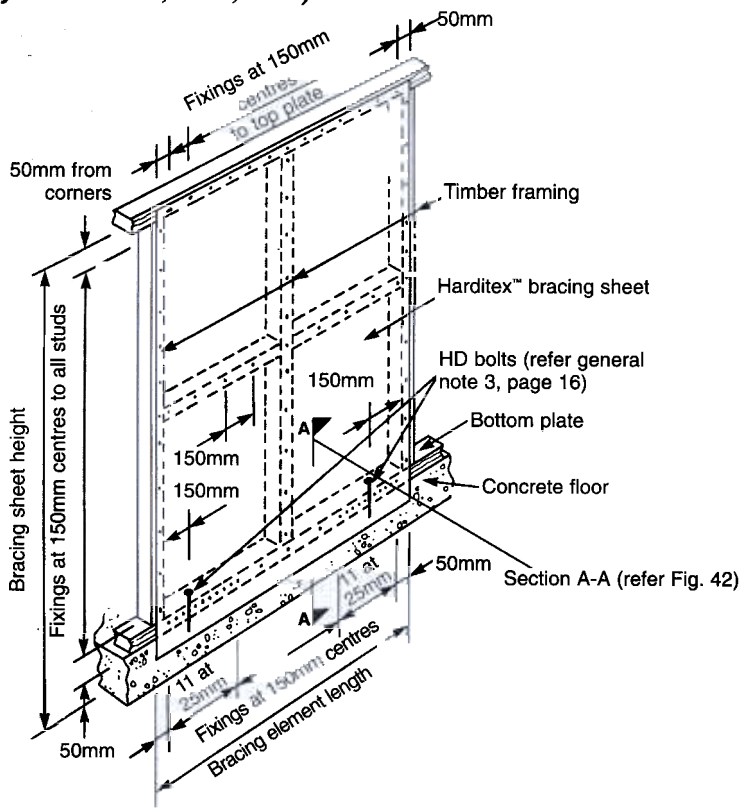
1. Galvanised-steel end fixing straps must be used as detailed in Fig. 43 for timber floors and Fig. 47 for concrete floors.
2. Sheet can finish flush with underside of bottom plate for timber floors or for concrete floors when the 50mm external weathering overhang is not required.

Fig. 40 HARDITEX™ GROUP NAIL FIXING TO TIMBER JOISTS (Systems HT4, HT5)



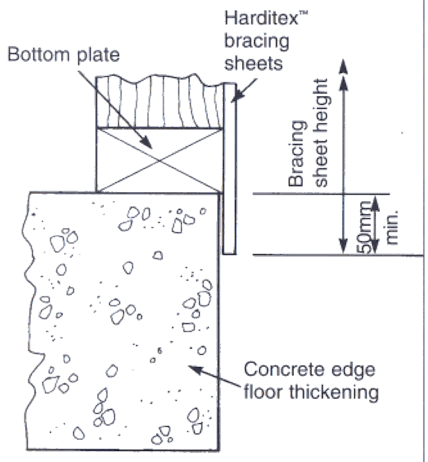
Notes:
1. End strap fixing between studs and joists is not required for these systems.
2. When the Harditex™ bracing panel is more than one sheet wide the eight-nail pattern (group nails) is required to each sheet edge.

Fig. 41 HARDITEX™ GROUP NAIL FIXING FOR CONCRETE FLOORS (Systems HT6, HT7, HT8)



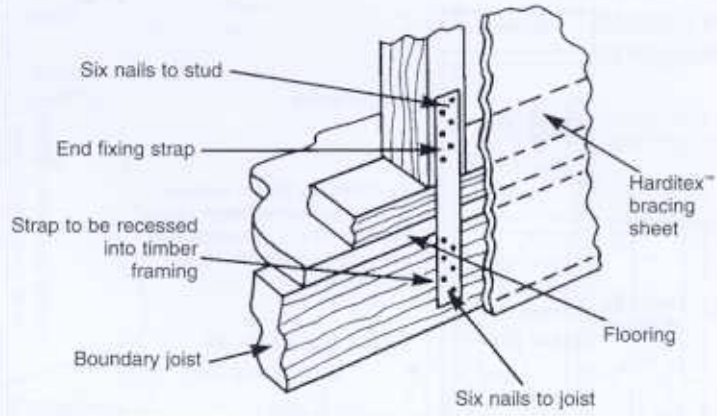
Notes:
1. End strap fixing between stud and bottom plate is not required for this system.
2. When the Harditex™ bracing panel is more than one sheet wide the 11-nail pattern (group nails) and the HD bolts are required to each sheet edge.

Fig. 42 SECTION A-A



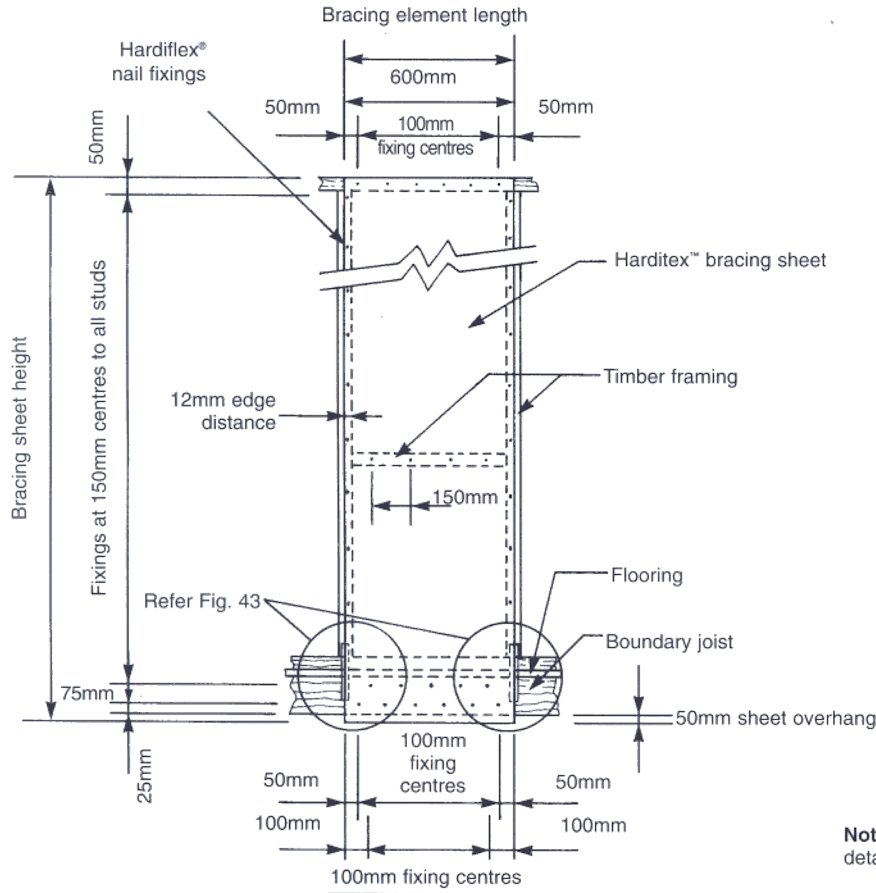
Note: The 50mm sheet overhang is essential for this detail to develop the nail holding.

Fig. 43 END FIXING STRAP TO TIMBER FLOOR



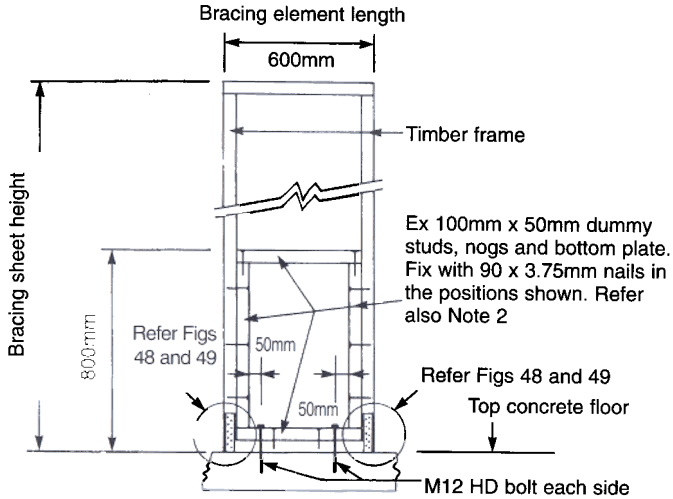
Notes:
1. The strap must be 25mm x 1mm galvanised steel capable of carrying a tension force of 6KN (capacity load as defined in NZS 3604:1990).
2. Strap nails must be 40 x 2.5mm diameter galvanised.

Fig. 44 600MM-WIDE HARDITEX™ TO TIMBER FLOOR – BOUNDARY JOISTS (System HT9)

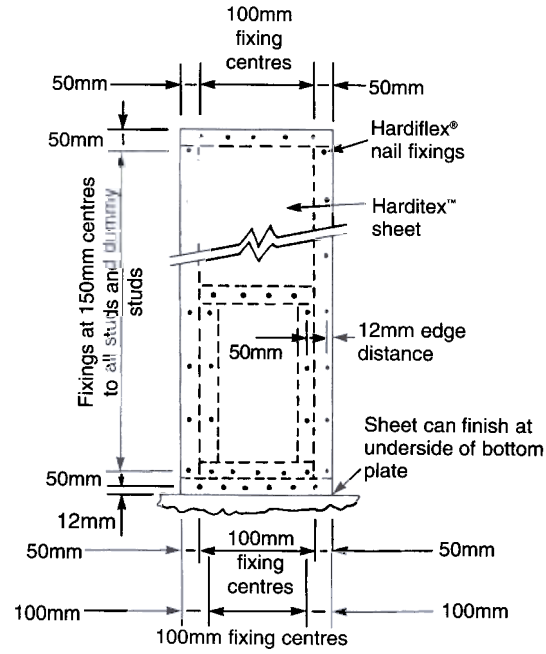


Note: Galvanised-steel fixing straps must be as detailed in Fig. 43.

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



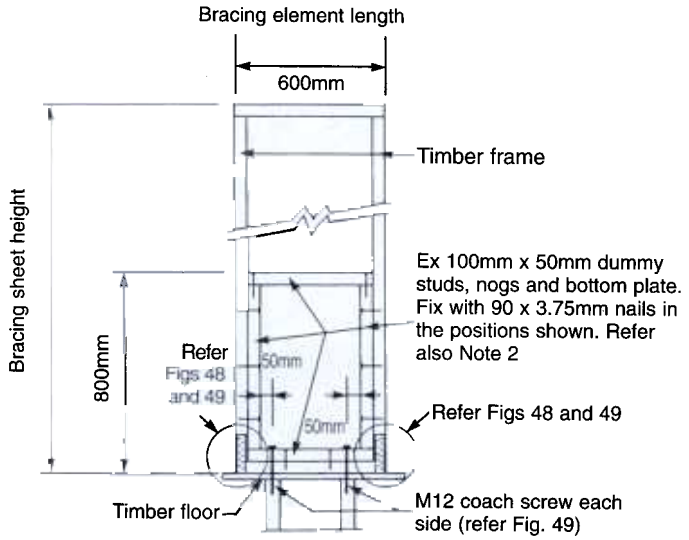
Frame-fixing and holding-down elevation



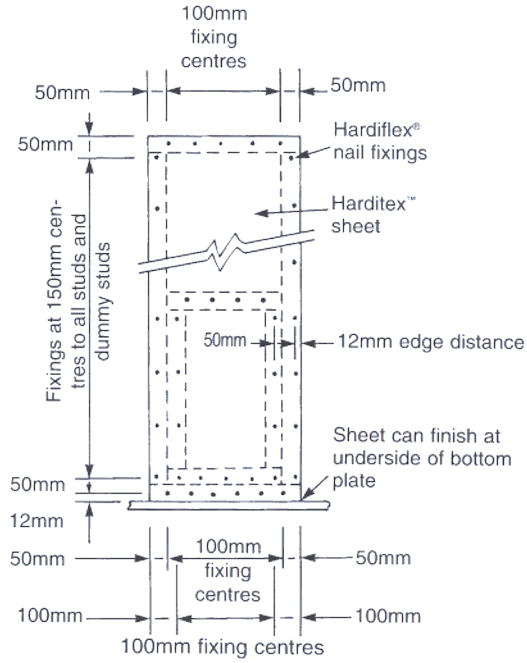
Sheet-fixing elevation

Notes:
1. Galvanised-steel end fixing straps must be as detailed in Figs 48 and 49.
2. The dummy studs are nailed to the main studs with three 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 2/90 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. 42.)

Fig. 46 600MM-WIDE HARDITEX™ TO TIMBER FLOOR ***(System HT10)***



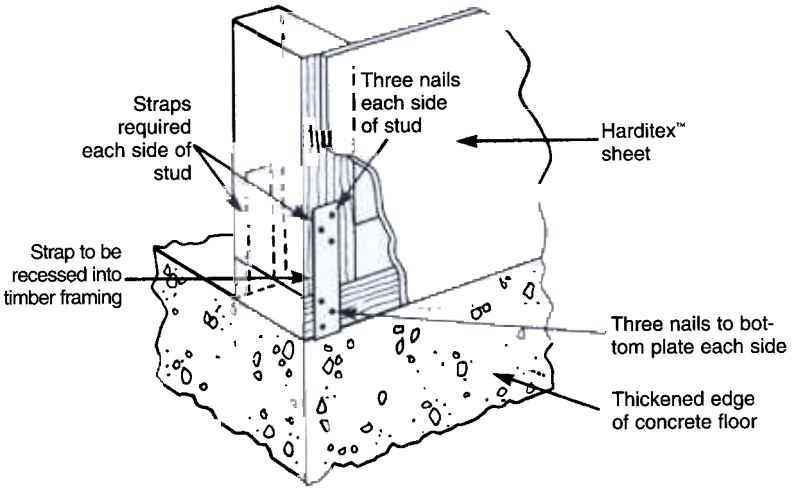
Frame-fixing and holding-down elevation



Sheet-fixing elevation

Notes:
1. Galvanised-steel end fixing straps must be as detailed in Figs 48 and 49.
2. The dummy studs are nailed to the main studs with three 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.

Fig. 47 END FIXING STRAP TO BOTTOM PLATE ON CONCRETE FLOOR



Notes:
1. The two 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. (Three nails each end of a 25mm x 1mm strap give 3KN capacity and six nails each end of strap give 6KN capacity.)
2. Strap nails must be 40 x 2.5mm diameter galvanised.

Fig. 48 END FIXING STRAP DETAIL FOR CONCRETE AND TIMBER FLOORS – 600MM-WIDE PANEL

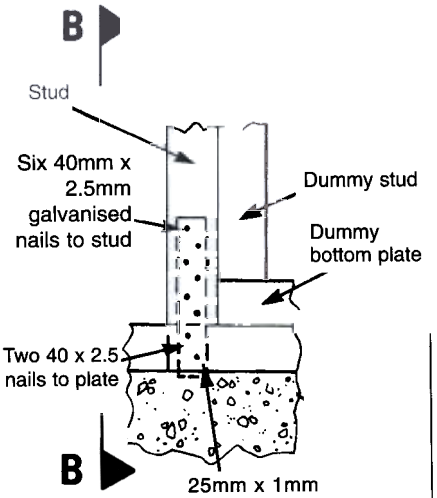


Fig. 49 SECTION B-B

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 3604:1990.

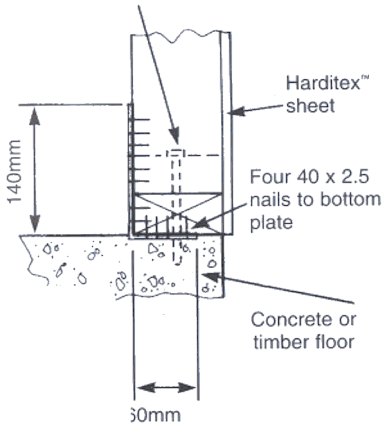
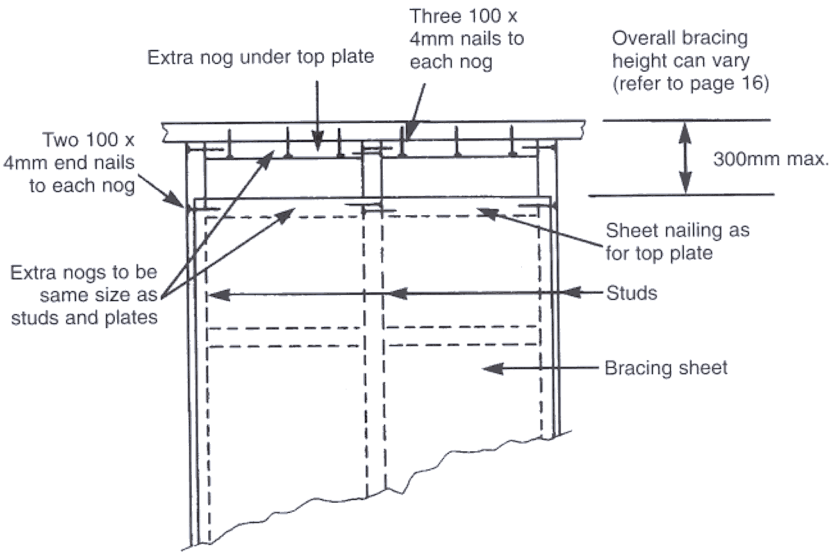
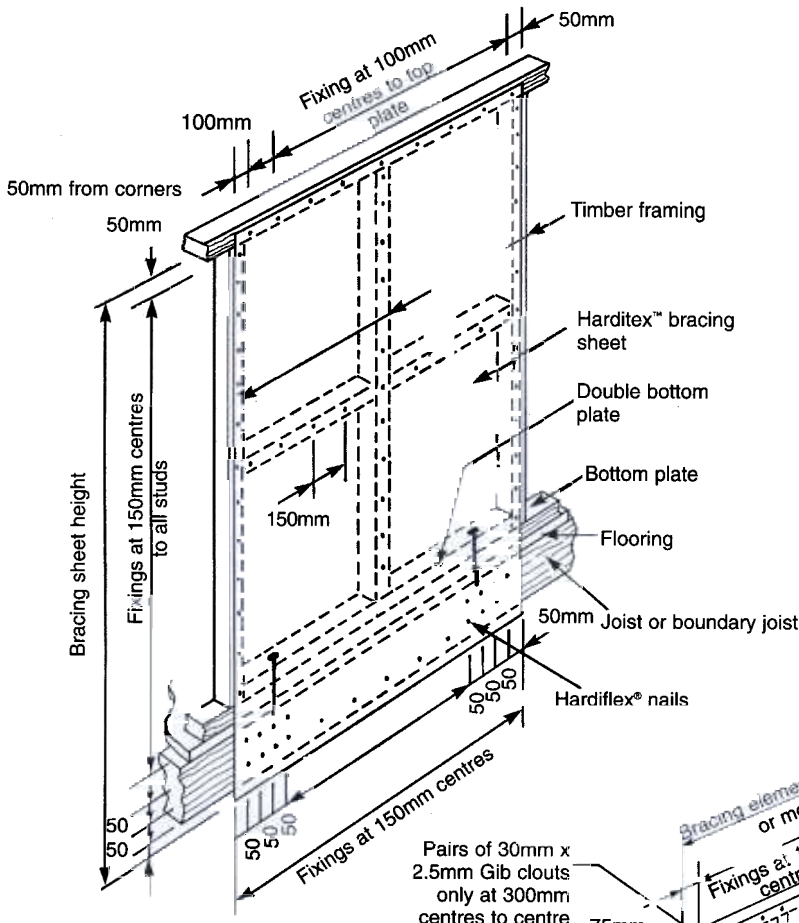


Fig. 50 DETAIL WHEN BRACING SHEET STOPPED BELOW TOP PLATE



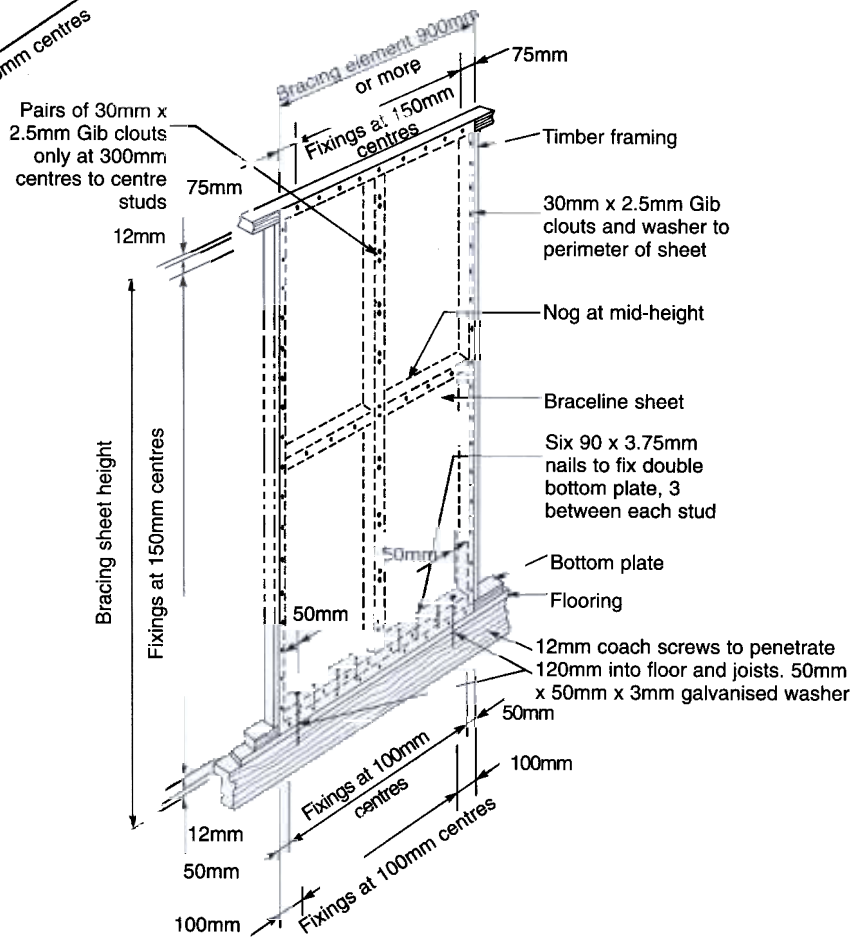
Notes:
1. All sheet nails must be as shown for the various bracing systems.
2. The full bracing values for full-height sheets for each system can be used when this detail is followed.
3. This detail must be used instead of the detail shown in Fig. K1, NZS 3604:1990.

Fig. 51 HARDITEX™ / BRACELINE GROUP NAILING DETAIL TO TIMBER JOISTS (System HT11B)



A
HARDITEX™ FIXING DETAILS

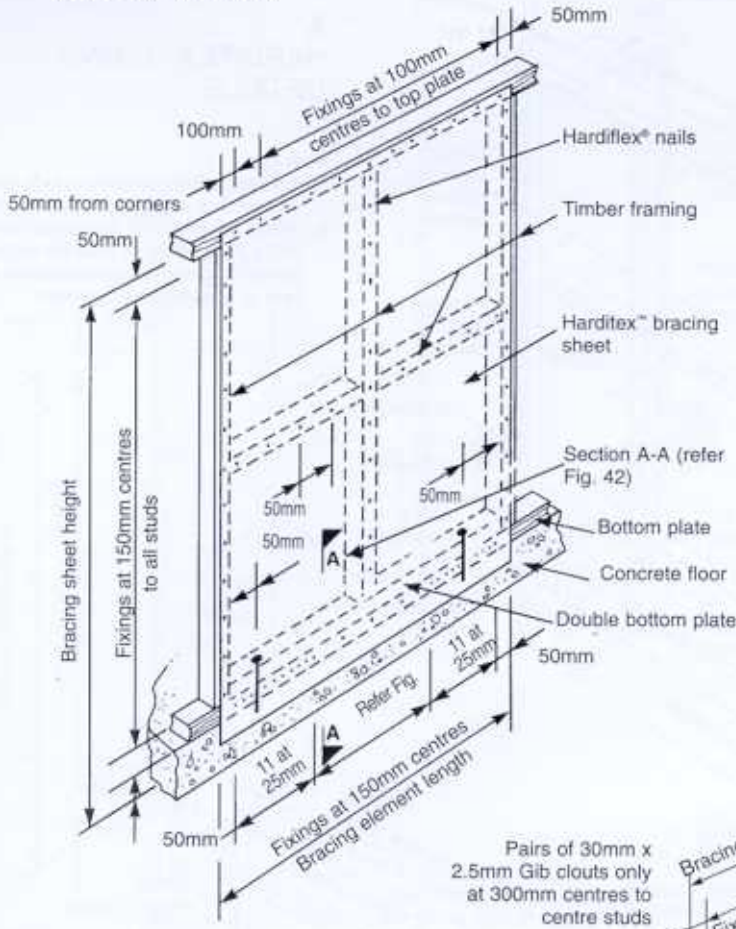
Notes:
1. End strap fixing between studs and joists is not required for this system. Use coach screws as detailed.
2. When the Harditex™/Braceline panel is more than one sheet wide the eight-nail pattern (group nailing) and the coach screws are required to each sheet edge.



B
BRACELINE FIXING DETAILS

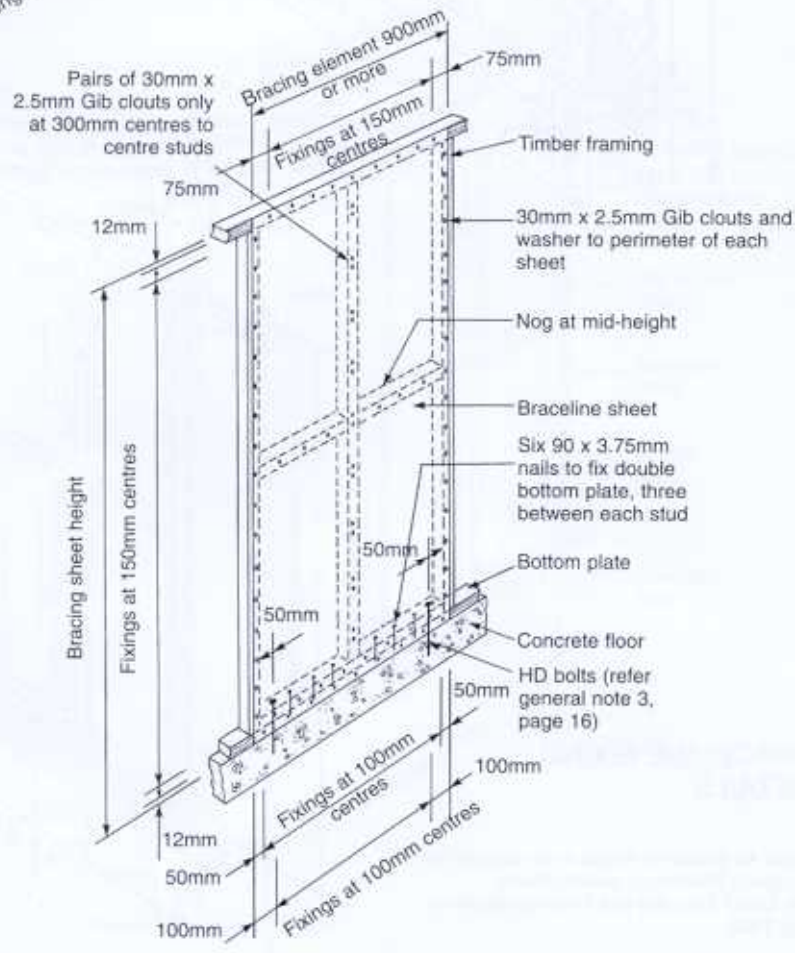
Note: All Braceline sheets to be stopped to Winstone Wallboards specifications, Gib Board Stopping and Finishing Systems Nov 1992.

Fig. 52 HARDITEX™ / BRACELINE GROUP NAILING DETAIL ON CONCRETE FLOOR (System HT12B)



A
HARDITEX™ FIXING DETAILS

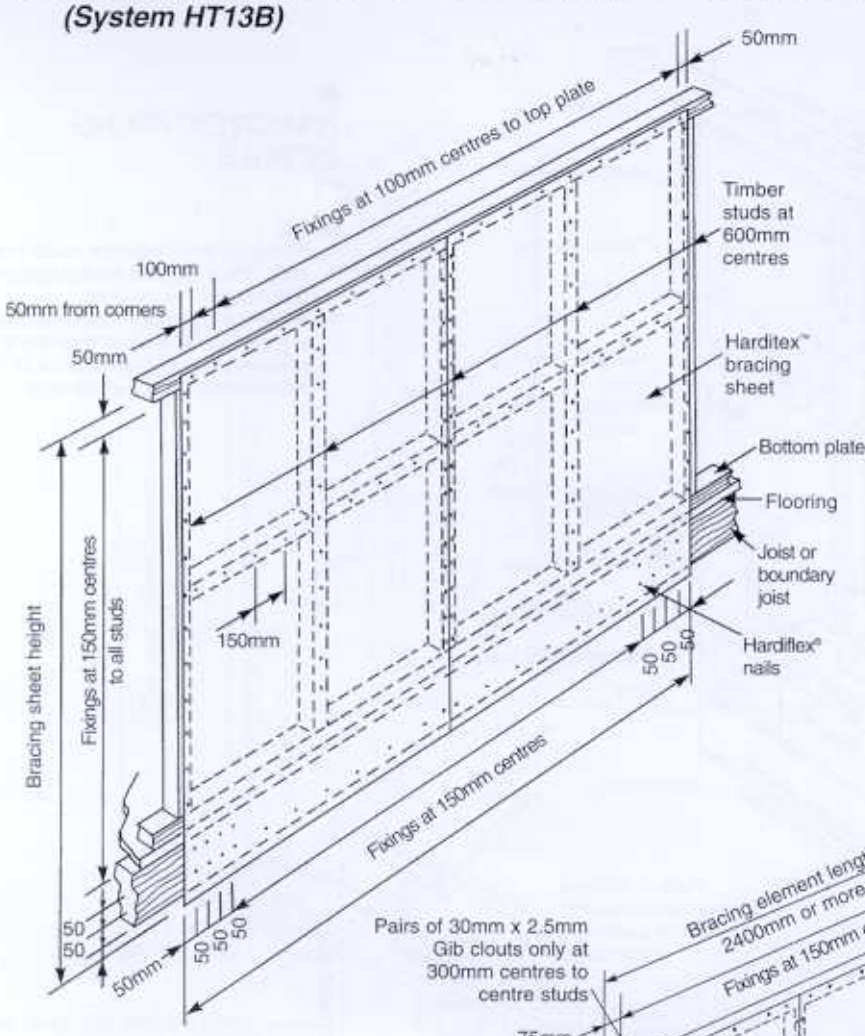
Notes:
1. End strap fixing between studs and joists is not required for this system. Use HD bolts as detailed.
2. When the Harditex™/ Braceline bracing is more than one sheet wide the 11-nail pattern (group nailing) and the HD bolts are required to each sheet edge.



B
BRACELINE FIXING DETAILS

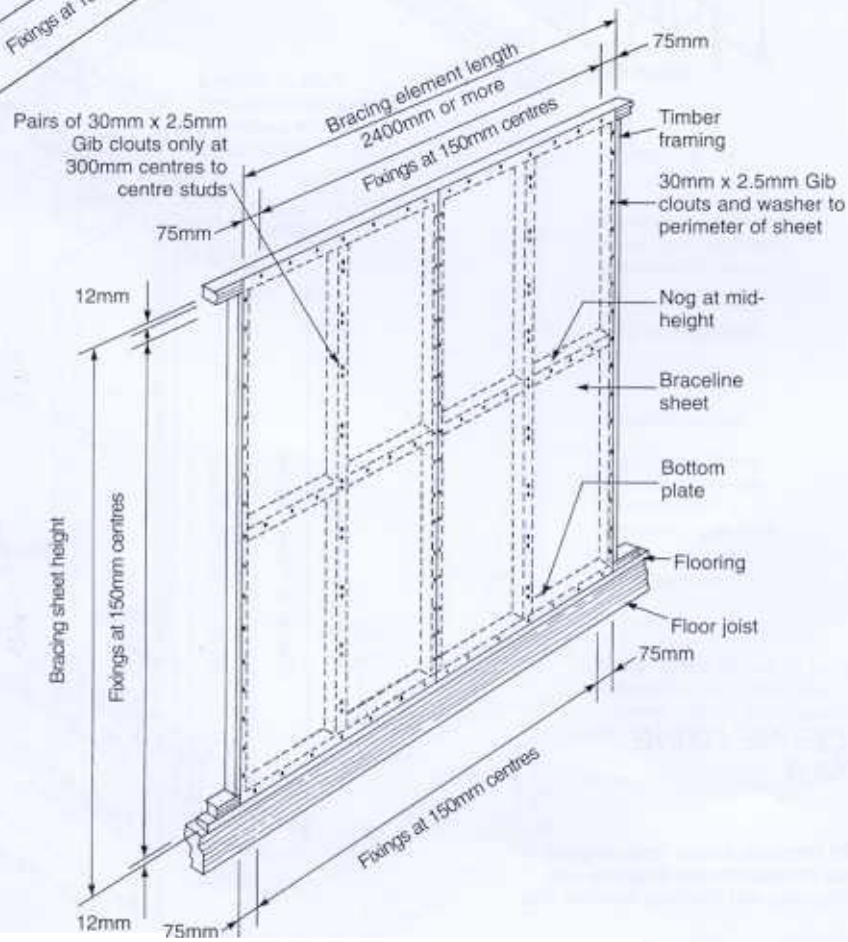
Note: All Braceline sheets to be stopped to Winstone Wallboards specifications, Gib Board Stopping and Finishing systems Nov 1992.

Fig. 53 *HARDITEX™ / BRACELINE GROUP NAILING DETAIL TO TIMBER JOISTS*
(System HT13B)



A
HARDITEX™ FIXING DETAILS

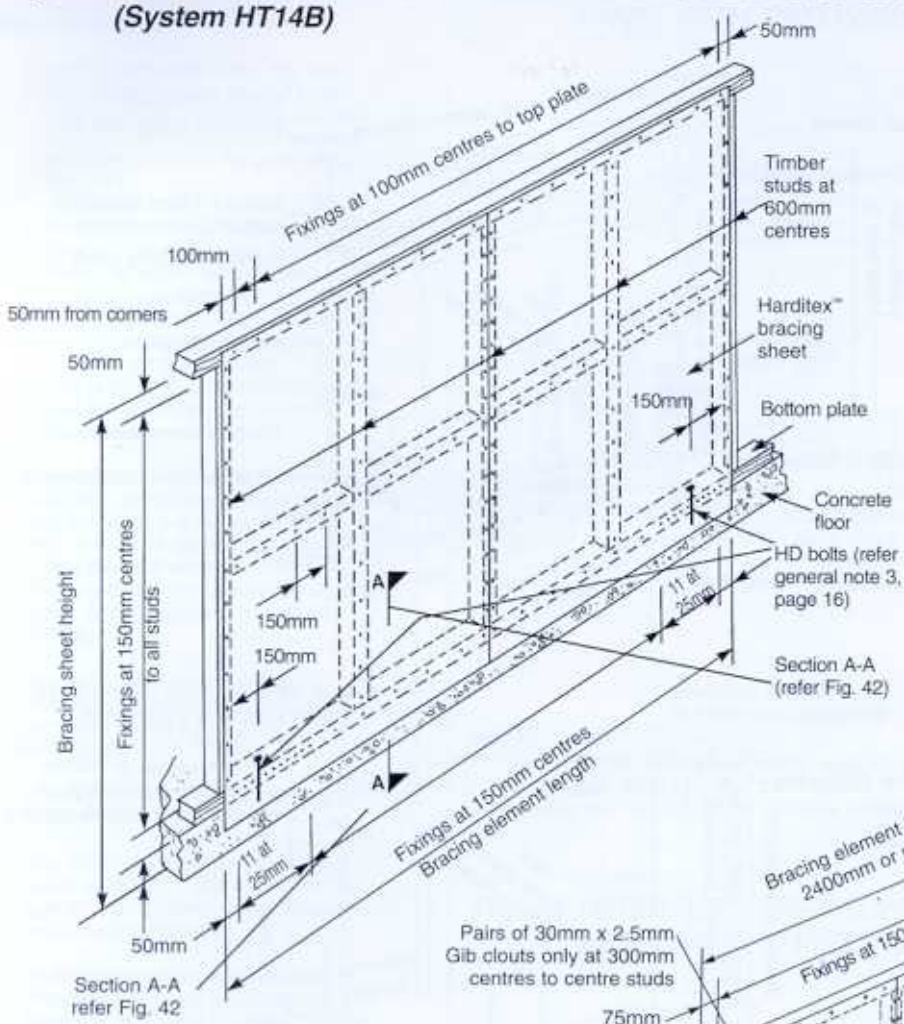
Notes:
1. End strap fixing between studs and joists is not required for this system.
2. When the Harditex™/Braceline panel is more than 2400mm wide the eight-nail pattern (group nailing) is required at the end of each 2400mm element.



B
BRACELINE FIXING DETAILS

Note: All Braceline sheets to be stopped to Winstone Wallboards specifications, Gib Board Stopping and Finishing Systems Nov 1992.

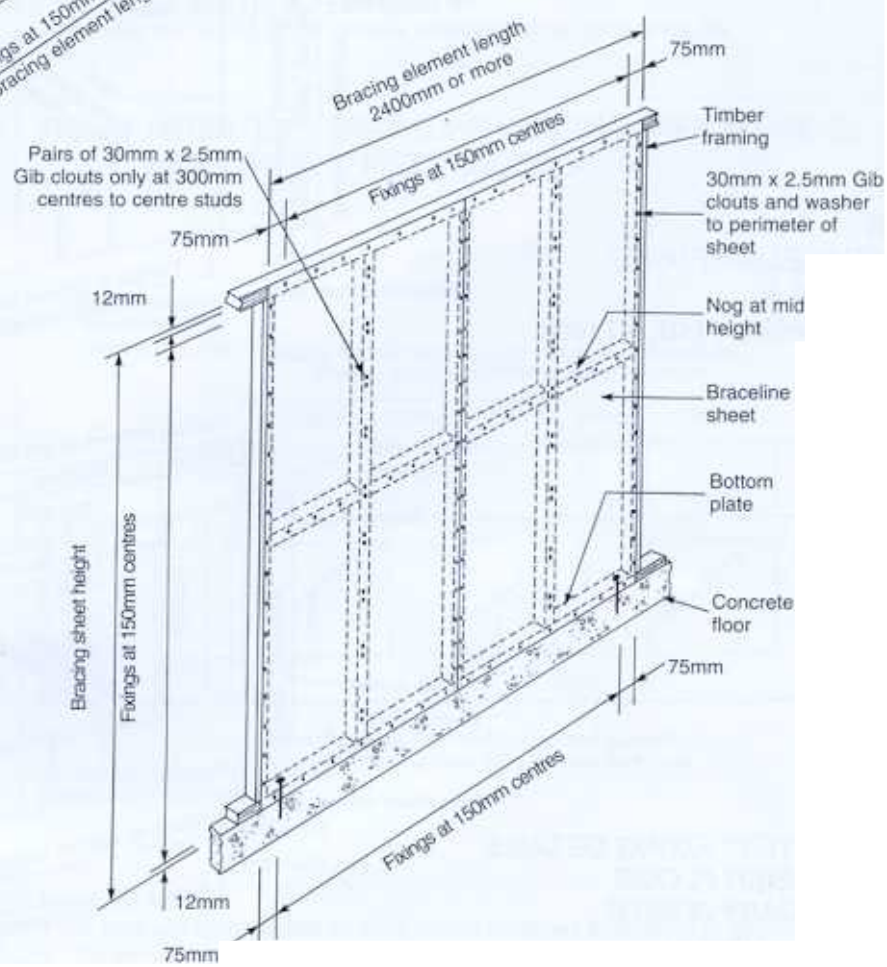
Fig. 54 HARDITEX™ / BRACELINE GROUP NAILING DETAIL ON CONCRETE FLOOR (System HT14B)



A
HARDITEX™ FIXING DETAILS

Notes:

1. End strap fixing between studs and joists is not required for this system.
2. When the Harditex™/Braceline bracing 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.

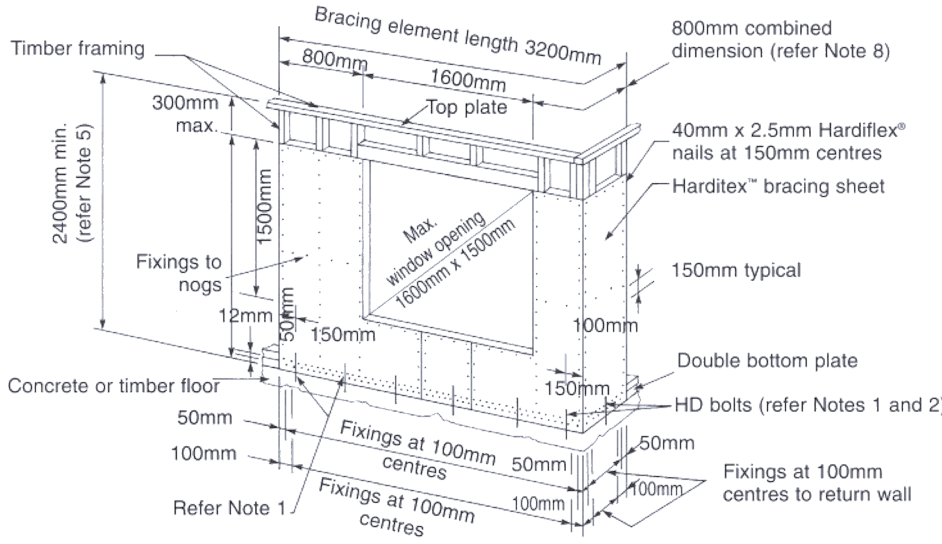


B
BRACELINE FIXING DETAILS

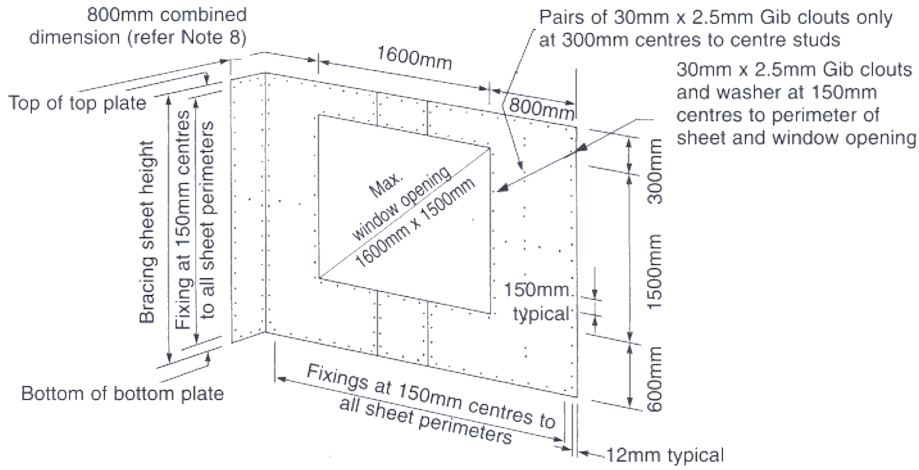
Note: All Braceline sheets to be stopped to Winstone Wallboards specifications, Gib Board Stopping and Finishing Systems Nov 1992.

Fig. 55 HARDITEX™ / BRACELINE WINDOW OPENING PANEL

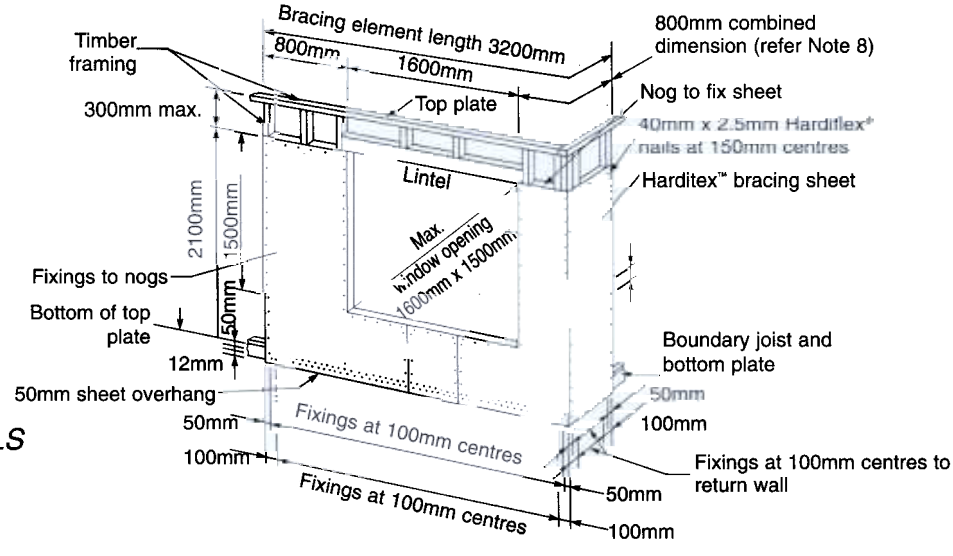
A
HARDITEX™ FIXING DETAILS TO TIMBER OR CONCRETE FLOOR DOUBLE BOTTOM PLATE
(System HT15B)



B
BRACELINE FIXING DETAILS
(Systems HT15B, HT16B)



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



Notes to Fig. 55:

Double bottom plate fixing, Fig. 55A:
- 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 3604:1990.
- For timber floors: Coach screws into double bottom plate and floor joists (refer Fig. 49 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.

Alternative when boundary joists are used and the bracing panel is taken over the joists. Fix as shown in Fig. 55C.

The Braceline must be fixed as shown in Fig. 55B for systems HT15B and HT16B.

Harditex™ sheet can be stopped a maximum of 300mm below top plate or continued up the top of the top plate as required.

Braceline sheets must be full height between bottom and top plate.

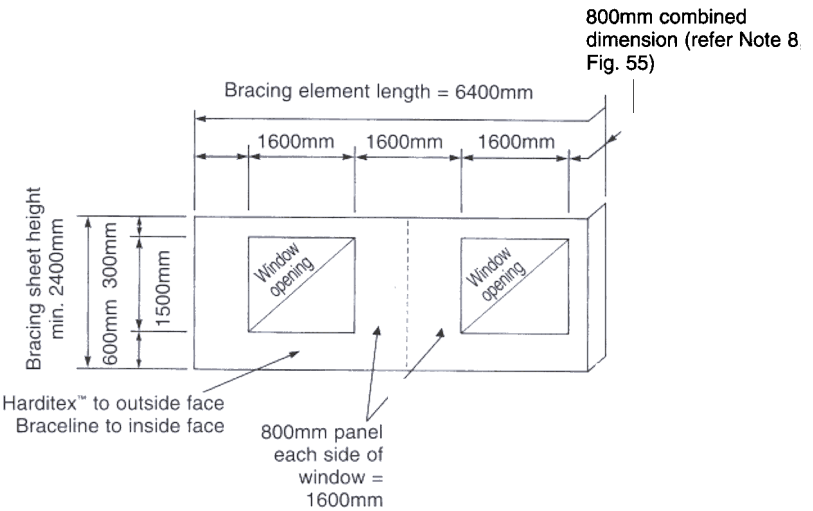
The minimum height for this bracing panel is 2400mm. The height can be greater than 2400mm (refer 'Bracing panel height' page 16.)

All Braceline sheets to be stopped to Winstone Wallboard specifications, Gib Board Stopping and Finishing Systems Nov 1992.

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. 57 where the middle window must be ignored as each window opening must have 800mm each side.

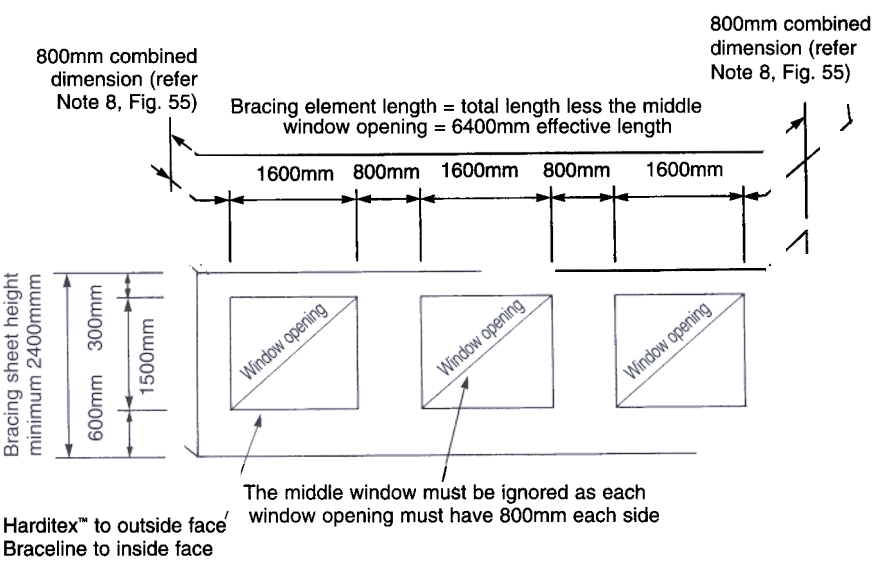
9. The return wall bracing units contribute to the wall at right angles to the in-plane wall.

Fig. 56 HARDITEX™ / 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 given in Fig. 55.

Fig. 57 HARDITEX™ / BRACELINE WINDOW OPENING PANEL – PANEL WITH THREE WINDOWS



Notes:
1. All fixing and framing details for these window panels are as given in Fig. 55.
2. The BU for this panel for wind is 75BU/metre (refer Table 4) x length = 75 x 6.4 = 480 BU.

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 2.

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.

This work is carried out by applicators independently licensed by the selected system manufacturers.

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 jointing and coating manufacturer of your choice.

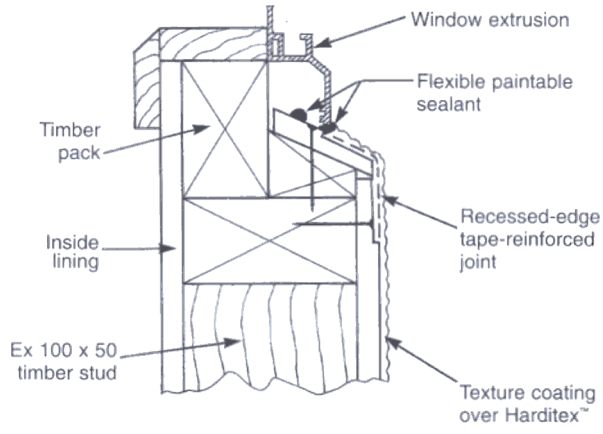
Joint and coating systems

The minimum film dry thickness is 300 microns.

The systems suitable for use with Harditex™ are 100% acrylic or pure elastomeric high-build texture coatings or flexibly modified plasters. These are 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 available from James Hardie on request. Phone the James Hardie Helpline: 0800 808 868.

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)

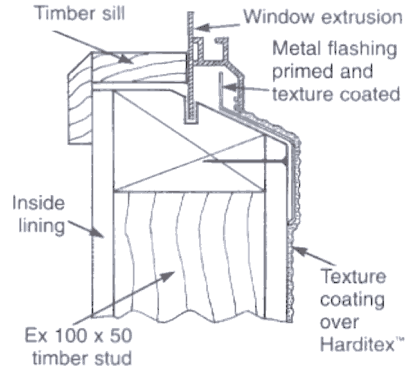


Fig. 60 SILL DETAIL (ALTERNATIVE 3)

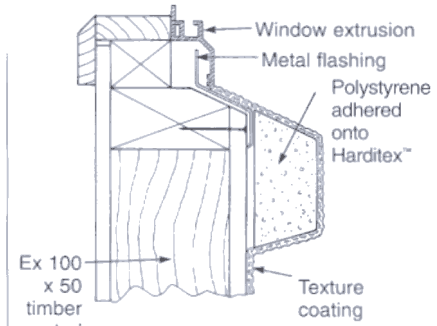
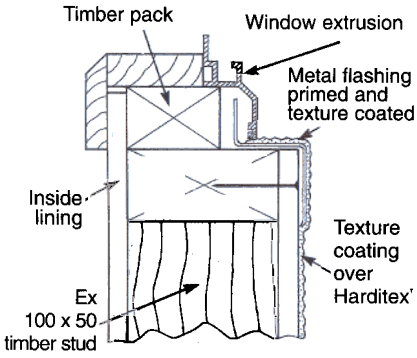


Fig. 61 *JAMB DETAIL (ALTERNATIVE 1)*



Notes:
1. The jamb detail can also be formed using a Harditex™ return similar to that shown in Fig. 59.
2. The planted polystyrene detail can also be used (refer Fig. 60).

Fig. 62 *JAMB DETAIL (ALTERNATIVE 2)*

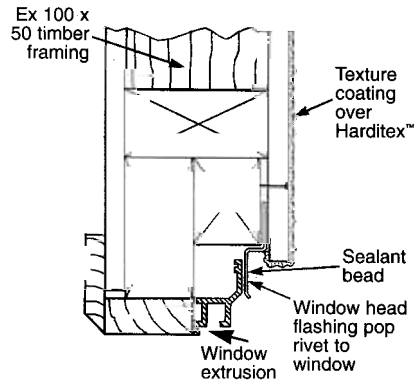
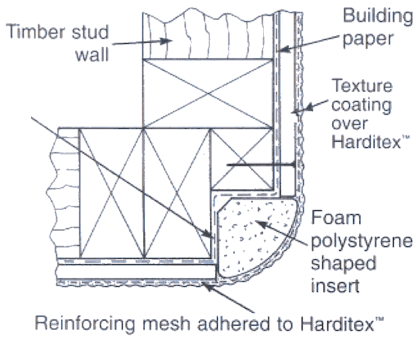


Fig. 63 *ROUNDED CORNER DETAIL*



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 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 relief joints must be designed and built into the system.

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. 64 *HARDITEX™ TO SOFFIT DETAIL*

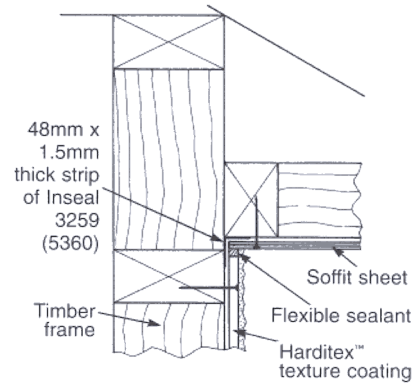
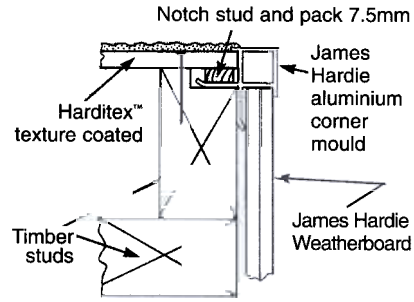


Fig. 65 *CORNER DETAIL JAMES HARDIE WEATHERBOARD TO HARDITEX™*



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

Fig. 66 *BRICK VENEER TO HARDITEX™ EXTERNAL CORNER DETAIL*

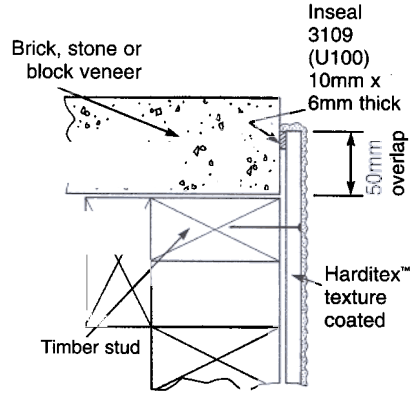
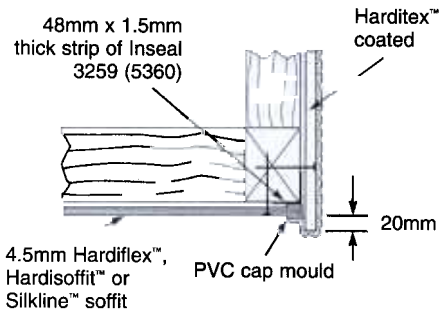


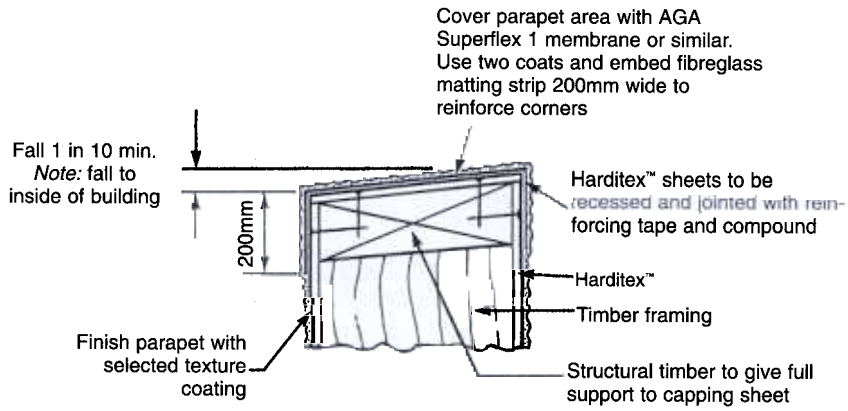
Fig. 67 SOFFIT DRIP-EDGE DETAIL



Notes:

1. The recommended masking tapes for use with pre-finished soffits are Sellotape Vinyl Blue Tape and 3M Scotch brand 2090 long mask. 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.

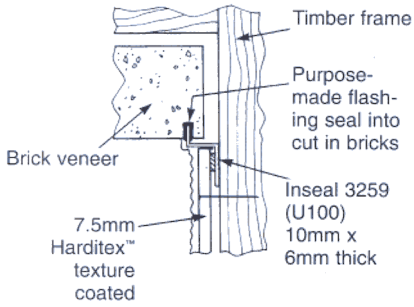
Fig. 68 PARAPET DETAIL



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



For further details on material covered in this brochure or for information on any other James Hardie building products, call the

James Hardie Helpline
0800 808 868

JAMES HARDIE TECHNICAL INFORMATION

For more information call the

James Hardie Helpline
Toll Free 0800 808 868

Monday to Friday from 7.30am to 6.00pm

HARDITEX™

4004/February 1996

Auckland

Head Office:
50 O'Rorke Road,
PO Box 12 070 Penrose,
Auckland.
Phone: 09 579 9919
Fax: 09 579 7210

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

Wellington

28 Victoria St
Petone
PO Box 30 482, Lower Hutt
Wellington.
Phone: 04 568 4134
Fax: 04 568 2070

Christchurch

51 Buchanans Road,
Sockburn,
PO Box 325,
Christchurch,
Phone: 03 342 6384
Fax: 03 342 6391

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

JAS-ANZ

James Hardie
Building Products