# TECHNICAL INFORMATION

# HARDIBACKER

## BRACING SYSTEMS AND SUBSTRATE FOR PLASTER WALLS

4002-4/95

James Hardie
Building Products

NOTE:
The solid plaster system described in this brochure is there purely as a guide to good trade practice. James Hardie Building Products accepts liability only for the soundness of the Hardibacker substrate.

# HARDIBACKER

***Bracing systems and substrate for plaster walls***

## *Contents*

# *Introduction*

*Innovative design challenges the performance of structural materials, frequently extending their application beyond traditional realms. The use of solid plaster is a fashionable and flexible method of exerting individuality in building design.*

*Hardibacker not only provides the ideal backing sheet for solid plaster but has the added advantage of giving excellent bracing performance.*

*Hardibacker's BRANZ appraisal certificate confirms its exceptional resistance to wind and earthquake forces. By providing the specifier with a sound structural environment, Hardibacker acts as the basis for creating visually compelling designs.*

*Dimensional stability is a key benefit as Hardibacker has a high level of tolerance to moisture movement, resistance to shrinking and swelling, essential for exterior cladding. For your convenience, Hardibacker comes in two standard sheet sizes. It can be identified by its pale blue colouring and the Hardibacker name imprinted on the sheet surface.*

*Hardibacker meets the performance requirements necessary for 50 years' serviceable life. Therefore Hardibacker can be expected to meet the design life of the building and protect the owner's investment.*

*These attributes make Hardibacker the solution of choice for all solid plaster substrate requirements.*

This specification is used to install and determine the bracing ratings of Hardibacker as a backing sheet for plaster to timber framed walls. It can be used as a non-bracing backing sheet for plaster on steel frame.

Bracing ratings have all been determined by BTL (BRANZ) tests and are suitable for use in conjunction with NZS 3604:1990.

## Product description

Hardibacker 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.

The product is identified by its name 'Hardibacker' embossed on the face of the sheets and also by a blue colour tint.

## Hardibacker uses

Hardibacker is a durable multi-purpose external wall cladding used for:

*Timber frame:* All or part of the external wall bracing required by NZS 3604:1990.

Hardibacker can be used as a bracing sheet for non-plastered buildings. It can also be used in conjunction with 6mm Hardibrace for enhanced bracing ratings.

*Timber or steel frame:* A rigid backing (a substrate) for solid plaster exterior wall covering

A substrate for alternative proprietary high-build plaster coatings.

The construction of arches, buttresses, columns, parapets, spandrils and many other architectural features that are to be subsequently plastered.

It is also used under lightweight, flexible claddings needing a backing to reduce impact damage, reduce noise of rain or hail on the cladding or to resist wind and/or rain penetration.

## New Zealand Building Code (NZBC)

Hardibacker must be used in accordance with this specification. It will then meet the relevant provisions of the following NZBC Clauses:
B1 Structure
B2 Durability
E2 External Moisture
F2 Hazardous Building Materials (Hardibacker is not 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. 20).

Hardibacker is often used on both faces of barriers to decks to meet NZBC F4 safety needs (and allow finishes to blend with the building).

### Durability

Hardibacker cladding and bracing system meets the performance requirements of NZBC Clause B2.3.(a) of 50 years as long as the integrity of the coating system is maintained. This is particularly relevant to the performance of the fixing and jointing systems.

### Serviceable life

Fibre cement sheets are expected to have a serviceable life similar to that of light timber frame building construction.

### Maintenance

Routine maintenance of the solid plaster, 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 - sealants, coatings and any cracks in the solid plaster.

### Moisture

Hardibacker is strongest when dry but wetting is not generally of concern under intended conditions of use:

- Temporarily exposed/partially protected by building paper with some alternate wetting and drying during construction.
- In a dry state in completed walls, OR with reasonable expectation that any design, covering or installation defect (or improper maintenance) resulting in wetting or damage to other materials or finishes ...will be seen, investigated and remedied long before Hardibacker is significantly affected.

### BTL (BRANZ) appraisal

Hardibacker has gained the following BTL Appraisal Certificates:
No. 229 (1995) James Hardie Wall Bracing Systems
No. 240 (1995) Hardibacker - Substrate for Solid Plaster Walls.

### Installation - technical details

Hardibacker must be fixed in accordance with the following instructions.

# *Framing*

The Hardibacker Bracing Systems described in this brochure apply only to timber frame construction, and are not to be used for steel frame construction.

Steel frame construction can be used for non-bracing solid plaster applications and can be load bearing or non-load bearing.

The timber framing must be in accordance with NZS 3604:1990 Code of Practice for Light Timber Frame Buildings.

Narrow-width kiln-dried timber framing can be used for both bracing and non-bracing constructions and the full bracing values shown in Table 1 can be used.

*Sheet and frame fixing tolerances are a minimum when 35mm kiln-dried timber or steel frame is used, therefore setting out must be accurate when using this framing.*

The studs for steel and timber frame must be spaced at 600mm maximum centres, between continuous top and bottom plates with nogs at 800mm maximum centres.

*Note:* The extra nogs are required for securing the reinforcing mesh.

Timber must be selected to minimise shrinkage. Framing must not have a moisture content in excess of 24% for non-centrally heated and 18% for centrally heated buildings. Kiln-dried timber framing is now a desirable option.

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

Steel framing members must be fabricated from light-gauge sheet steel 0.55mm to 1.6mm thick.

### Fixing to timber framing

Hardibacker sheets for bracing applications must be fixed vertically with all sheet edges on framing.

For non-bracing applications the sheets can be fixed vertically or horizontally.

On walls more than 1 sheet in height, Hardibacker sheets to be laid in a staggered pattern.

To achieve the bracing ratings shown in Table 1, 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 2/900mm wide sheets.

Always ensure the sheet join is on the centre line of the stud 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 must be used at the end of each element length.

Fix all Hardibacker sheets to timber framing with 40 x 2.5mm hot-dipped galvanised Hardiflex nails.

Nail at 200mm centres 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 Hardibacker sheet surface. Do not punch as this can weaken the nails' holding.

Fix all Hardibacker sheets from the centre, working towards the outside to avoid drumminess.

Certain bracing applications require the use of end strap fixing. These must be rebated into the framing behind the sheets. (Refer Table 1 and Figs 6 and 7.)

## Fixing to steel framing

When the Hardibacker sheets are fixed vertically a minimum flange width of 38mm is required to adequately fix the sheets with the correct edge distances. Refer Fig. 1.

***Fig. 1*** *Fixing to steel frame*

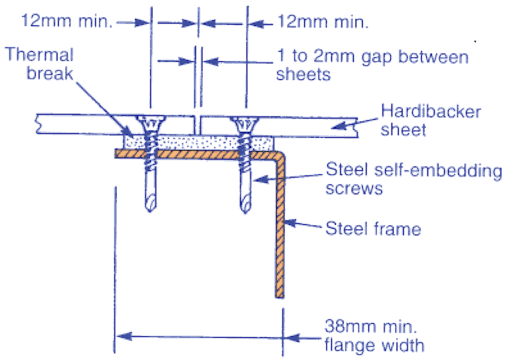
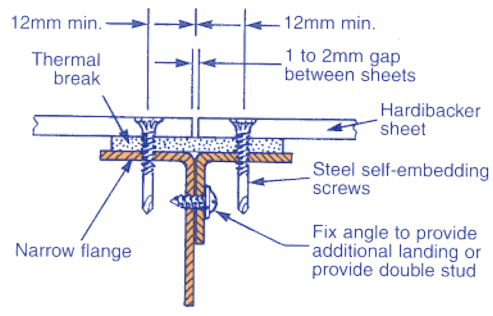



***Fig. 2*** *Fixing to narrow steel flanges*




Hardibacker sheet must not be fixed directly to drawn steel or hot rolled sheet sections which must first be battened out with timber battens of a minimum of ex 40mm thickness. Refer also to Fig. 5 for thermal break requirements.

When flange widths less than 38mm are used the sheets must be laid horizontally (as shown in Fig. 3) or alternatively they can be fixed vertically to the following requirements:

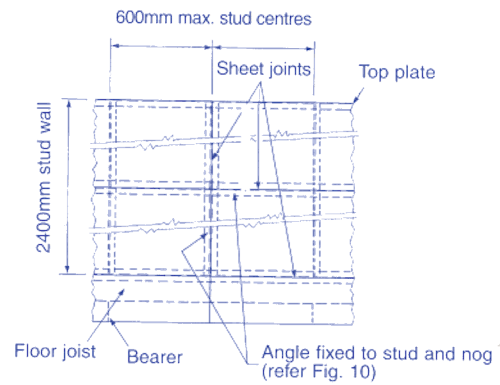
1. Use double studs at all joints
2. Use the additional landing angle (as shown in Fig. 2) for all sheet joints.

When the horizontal fixing method is used a widening angle must be fixed to the studs and nogs at sheet end and side joints. (Refer Figs 2 and 3.)

## Fixings for steel frame

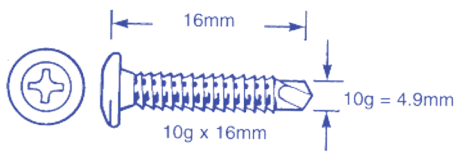
Use only waferhead type screws for fixing Hardibacker to steel frame. (Refer Fig. 4.)

***Fig. 3*** *Horizontal frame and sheet set out to narrow flanges*




*Notes:*
1. Staggering of sheet joints is not required for this method.
2. The angle is required at all sheet end joints and at horizontal sheet joints at nogs.

***Fig. 4*** *Waferhead Teks screw*




*Notes:*
1. Fixing 4.5mm Hardibacker to steel frame use 10g x 16mm Waferhead Teks screws.
2. Fixing 4.5mm Hardibacker over 12mm Triple S use 10g x 30mm Waferhead Teks.

***Screw driving technique***

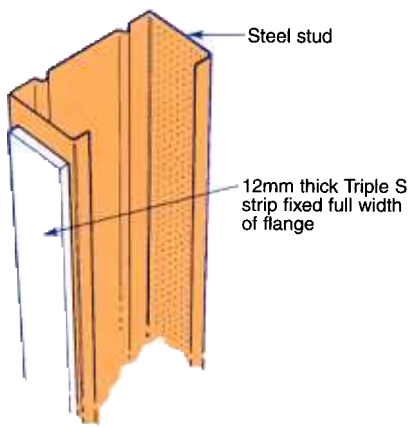
Drive the Teks screw through the Hardibacker and into the steel at high speed (2500 rpm).

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

*Note:* It is important that slow revs are used to bed the screw onto the Hardibacker otherwise sheet damage can occur. This technique is essential when the Triple S is used under the Hardibacker.

A steel-framed wall clad with 4.5mm thickness Hardibacker and 21mm of solid plaster will require a thermal break fixed to the outside face to achieve the 1.5 R value. (Refer Fig. 5.)

***Fig. 5*** *Thermal bridging to steel studs*




*Notes:*
1. The strips of thermal bridging can be adhesive bonded to the steel frame.
2. High density 'S' grade polystyrene can also be used as an alternative to Triple S.

## Sheet Sizes

Hardibacker sheets are 4.5mm thick. Lengths and widths of sheets are given in the chart below:

| Width (mm) | Length (mm) | |
|---|---|---|
| | 2400 | 2700 |
| 1200 | ✓ | ✓ |

## Handling and storage

The product must be stacked on a smooth level surface. Edges and corners must be protected from damage. Storage must be under cover and the sheets kept dry prior to fixing. The sheets must be carried on edge.

## Loads

The total cladding system (Hardibacker and solid plaster) with nominal 21mm plaster weighs approximately 45 kg/m$^2$. Providing these weights are adhered to, the system can be classified as a lightweight cladding by the requirements of NZS 3604:1990.

## Sheet mass and moisture content

The approximate mass of Hardibacker (based on Equilibrium Moisture Content) is 7kg/m$^2$.

Hardibacker sheets must be dry before fixing to framing.

*Note:* Dry Hardibacker 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 85% relative humidity.

## Impact resistance

Hardibacker in conjunction with a solid plaster system has adequate resistance to hard and soft body impacts likely to occur during normal residential use.

## Bracing

Hardibacker will provide bracing for buildings designed and constructed in accordance with NZS 3604. For verification of this aspect of the product refer to BTL Appraisal Certificate No. 229 (1995) Fibre Cement Wall Bracing Systems.

Hardibacker when used as the required bracing must also be used with the appropriate fixings as set out in Table 1. Refer also to Figs 6 to 10 for Hardibacker sheet bracing details.

Hardibacker meets the wall bracing element requirements of NZS 3604. (NZS 3604 is cited in Approved Document B1/AS1 Clause 4.0).

The bracing values given in Table 1 are derived from the Hardibacker sheet only and do not utilise any bracing contribution from the solid plaster or from the internal linings.

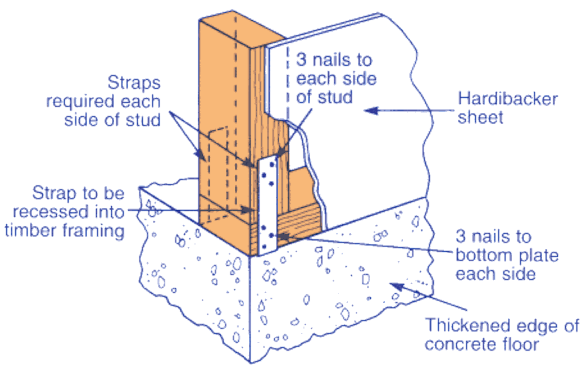
When increased bracing ratings are required, 6mm Hardibrace can be used in conjunction with the Hardibacker.

The Hardibrace can be substituted for the Hardibacker sheet and the increase in thickness can be taken up in the mesh placement and the plaster.

**Table 1:** Bracing Ratings for Hardibacker 4.5mm thick

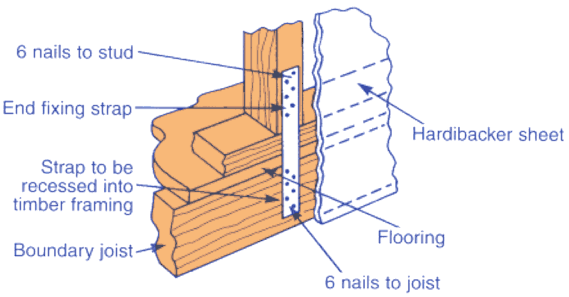
| System number | Bracing element length (mm) | End straps | Bracing details | NZ 3604 : 1990 rating in bracing units per metre of element length | |
|---|---|---|---|---|---|
| | | | | Wind | Earthquake |
| HBK1 | 1200 | Not required | Refer Figs 8 and 9 | 85 | 70 |
| HBK2 | 1800 | Not required | Refer Figs 8 and 9 | 90 | 75 |
| HBK3 | 2400 or more | Not required | Refer Figs 8 and 9 | 105 | 80 |
| HBK4 | 900 or more | Required (refer Figs 6 and 7) | Refer Figs 8 and 9 | 110 | 85 |

***FIG. 6*** *End fixing strap to bottom plate on concrete floor*



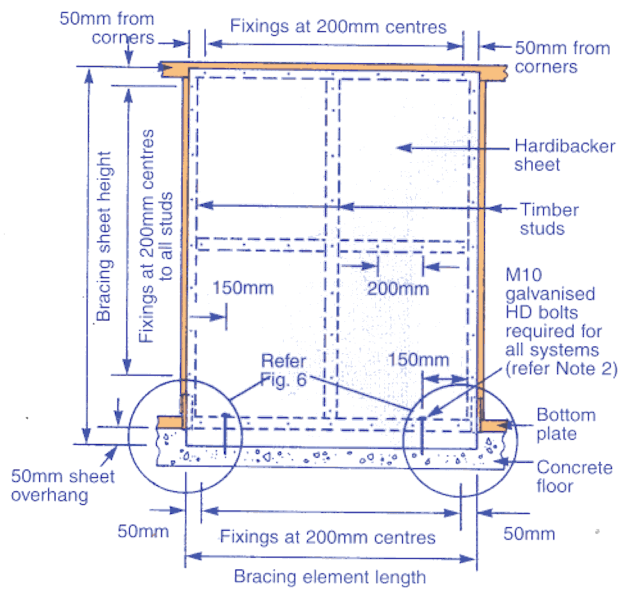

*Notes:*
1. The 2 straps combined must be capable of carrying a tension force of 6KN (capacity load as defined in NZS 3604). This is achieved by a 25mm x 1mm strap each side and each of 3KN capacity. (3 nails each end of a 25mm x 1mm strap give 3KN capacity and 6 nails each end of strap give 6KN capacity.)
2. Strap nails must be 40 x 2.5mm diam. galvanised.

***Fig. 7*** *End fixing strap to timber floor*



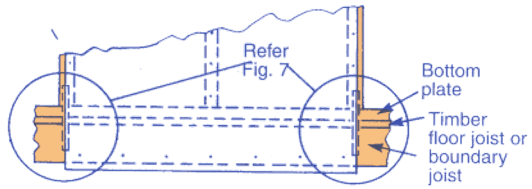

*Notes:*
1. The strap must be 25mm x 1mm galvanised steel capable of carrying a tension force of 6KN (capacity load as defined in NZS 3604).
2. Strap nails must be 40 x 2.5mm diam. galvanised.

***FIG. 8*** *Hardibacker on concrete slab with and without straps (refer Table 1)*



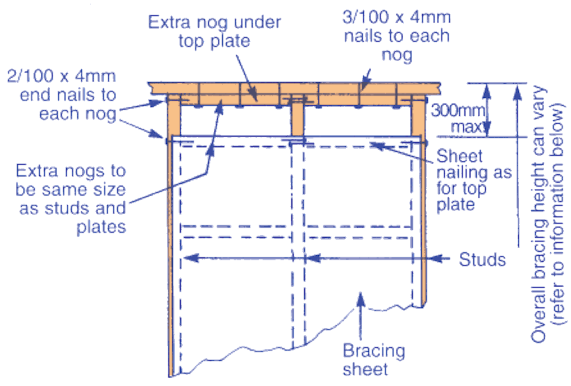

*Notes:*
1. For Hardibacker bracing ratings refer Table 1.
2. HD bolts must be M12 hot-dip galvanised with 50 x 50 x 3mm galvanised washers fixed as shown in Fig. 4.17 NZS 3604:1990.
3. Sheet can finish flush with bottom of bottom plate for concrete floors where required.

***Fig. 9*** *Hardibacker to timber floor with and without straps (refer Table 1)*




*Note:* All fixings centres to be as shown in Fig. 8.

***Fig. 10*** *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 3604:1990.

### Sheets stopped below top plate

Where bracing sheets are stopped below the level of the top plate refer to Fig. 10 for details.

### Bracing panel height

Bracing panel heights are normally 2400mm high and all bracing ratings given in Table 1 are for this panel height. When other heights are required refer to Clause K.7 NZS 3604:1990. The maximum height for these bracing panels is 4800mm.

# *Temporary weathering*

Hardibacker can be used to provide temporary weather protection of the walls, allowing internal work and finishing to be undertaken before the completion of the solid plaster. The building paper must be erected over the Hardibacker during this temporary weathering period.

The plaster must be finished and coated within 3 months of the Hardibacker sheet erection.

# *Relief joints*

Relief joints must be located so the maximum distance between joints is 4 metres vertically or horizontally as required by NZS 3604:1990.

Where possible use full-height openings to panelise the plasterwork.

Ensure that the distance between a window and a corner or between 2 openings does not exceed 4m (10m² at 2.4 stud height). Also use relief joints to cater for movement of timber and plaster.

Provide horizontal PVC flashing-relief joint at intermediate timber floor level as in Fig. 13.

Check position of vertical relief joints shown on drawings or determine the best positions with designer or owner, e.g. short joints in line with jambs of openings or hidden, if possible, by down pipes, vent pipes or other features should cracking occur.

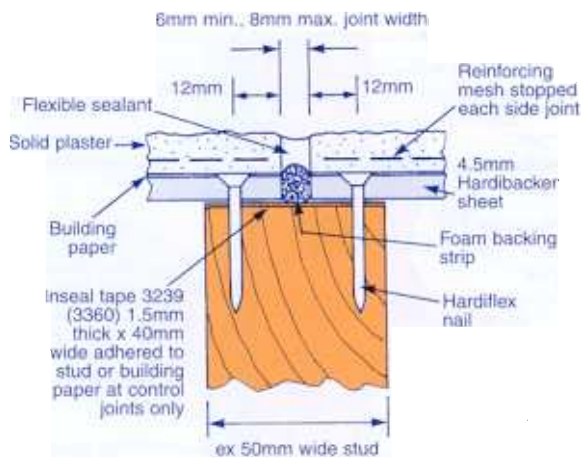
Cut or form vertical relief joints as shown in Fig. 11, e.g. in the plaster base coats. Prime and fill with suitable sealant in accordance with the manufacturer's instructions. Protect with plaster finish over the sealant, or alternatively, leave the sealant joint exposed.

A PVC relief joint moulding is available from James Hardie stockists (refer Fig. 12).

When an opening is in the vicinity of a relief joint then the edge of the opening is the ideal location for the relief joint.

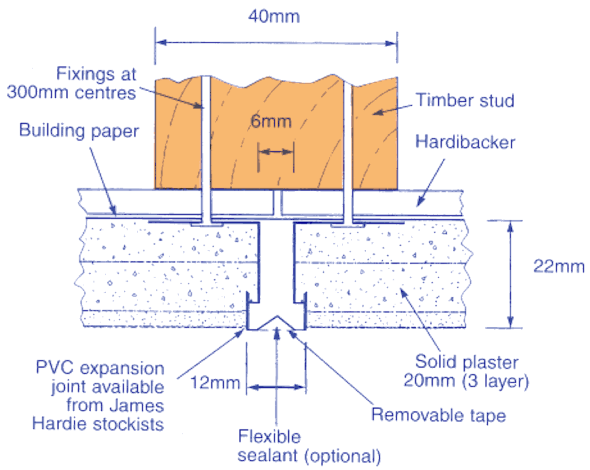
At all internal and external corners the mesh and plaster is to be continuous around the corner.

***Fig. 11*** *Vertical solid plaster relief joint*




*Notes:*
1. Vertical joints can be either formed or cut when the plastering is complete.
2. Seal relief joints with good quality flexible paintable silicone sealant such as Expandite Silaflex MS.
3. Clean and prime the joints and apply strictly in accordance with the sealant manufacturer's instructions.
4. The Hardibacker sheet, building paper and reinforcing mesh must be stopped at the relief joint (as shown above).

*Fig. 12 Alternative relief joint detail*

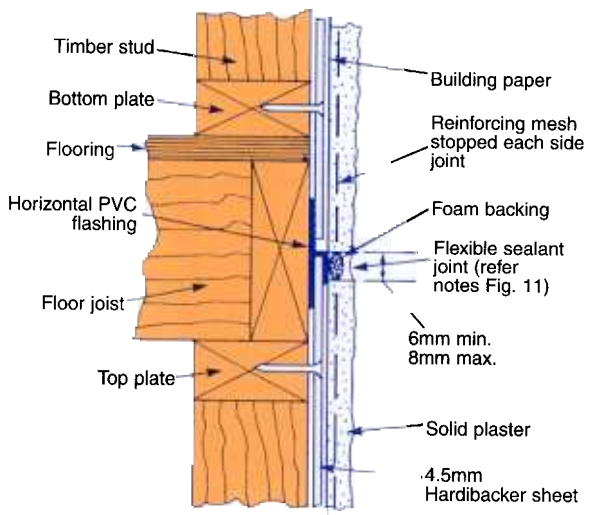



# Control joints

Control joints are used when there is a complete separation of the framing to allow for structural movement. Form a 6mm structural gap by providing double studs and a break in the structural frame. These are generally required only on large commercial buildings and must be provided at 12,000mm centres.

Form the control joint as Fig. with double studs gapped 6 to 8mm.

*Fig. 13 Horizontal solid plaster relief joint (to allow for vertical shrinkage)*




*Note:* For multi-storey construction locate the horizontal relief joint adjacent to the floor joist as shown above. This is because the floor joists can have significant drying shrinkage. Do not fix the Hardibacker sheet to the floor joist when floor joist shrinkage is anticipated.

# Building paper

Used in accordance with Acceptable Solution E2/AS1 Paragraph 2.3, Hardibacker is an alternative to the 'rigid backings' specified in Paragraph 2.3.3. of the NZBC, i.e. building paper over the face of the sheets must be fixed before the mesh and plaster is applied.

*Note:* An additional layer of building paper is not required under the sheet.

A suitable building paper must comply with NZS 2295. The building paper must be run horizontally and lapped 75mm at joints, with the direction of lap ensuring water is shed to the outer face of the paper.

Adequately mark the position of the framing lines on the face of the building paper to later assist the reinforcement fixing.

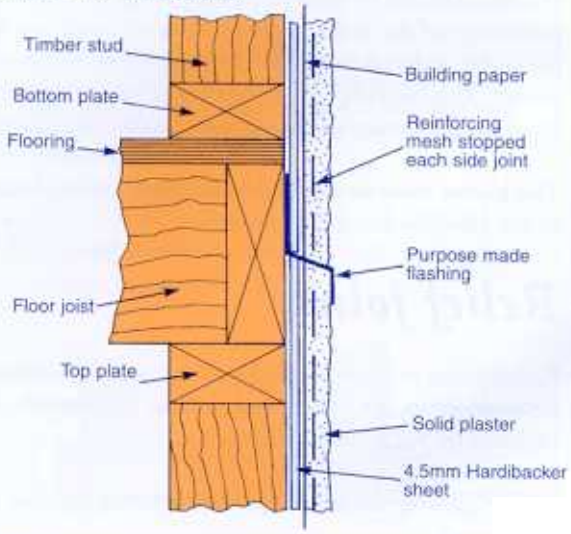
Some proprietary plaster systems require the plaster to adhere to the Hardibacker. In these cases fix the building paper under the Hardibacker sheet before fixing.

# Solid plaster

Hardibacker is a popular rigid backing for solid plaster and proprietary plaster coatings and has the following advantages:

- Economy and ease of fixing to timber or steel frame.
- Provides sheet bracing.
- Gives a true straight backing to plaster.
- Application of wet plaster is easier than on non-rigid backings.

*Fig. 14 Horizontal solid plaster relief joint (vertical shrinkage not anticipated)*




*Note:* Use when vertical shrinkage is not anticipated, i.e. when kiln-dried framing or steel frame is used.

- Ease of construction to form arches, columns, parapets, spandrils and other architectural features.

Apply solid plaster finishing coats only after all framing and internal linings have been completed.

An approved plastering system is to be applied which is either proprietary or in accordance with NZS 4251:1974

For successful plastering a sound knowledge of materials is essential. Of particular importance is the selection and fixing of reinforcement, the selection of plaster mixes, the location of control joints, and curing. Dry timber framing is also an important factor (refer to the Framing section of this specification).

The solid plaster must be finished and detailed to be waterproof.

Useful guidance can be found in BS 5262:1991

## Reinforcement

Fix reinforcement for solid plaster in accordance with NZS 3604:1990 and NZS 4251:1974 Code of Practice for solid plaster. Alternative proprietary solid plaster reinforcing mesh systems can be used.

The mesh must be spaced in the plaster between 6mm and 9mm from the Hardibacker surface as required by Clause 7.4.4 NZS 4251:1974.

To achieve this spacing and to adequately tension the mesh, use the HBK PVC angle. Refer to Fig. 17 for fixing details.

*Fig. 15 Hardibacker for base detail*

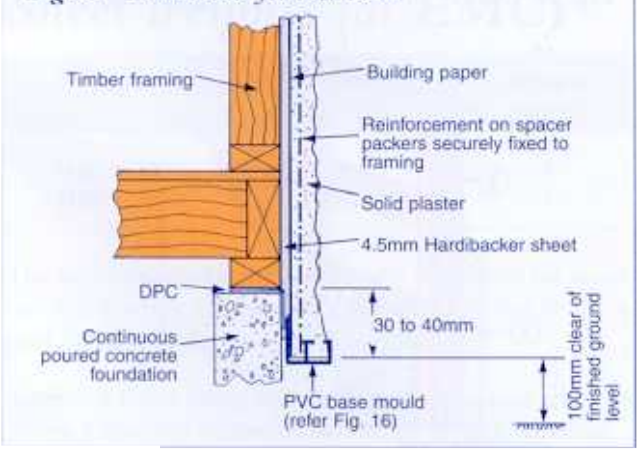
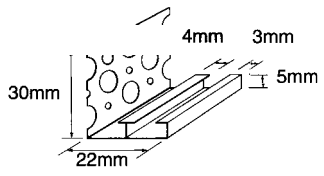



*Fig. 16 PVC base mould*




*Note:* PVC base mould available from James Hardie stockists.

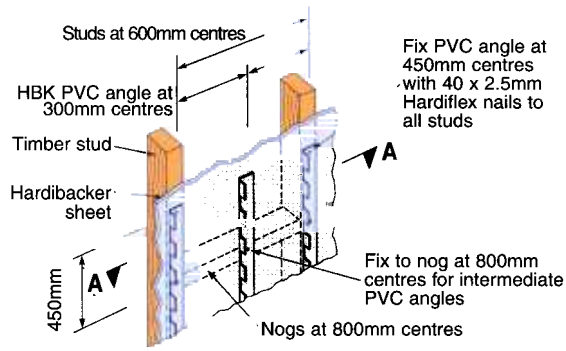
The HBK PVC angle is fixed down each stud line at 600mm centres and intermediate between studs at 300mm centres fixed to each nog line. Fix to reference marks previously set out on the building paper face.

## Fixing of reinforcement

Use 40mm x 2.8mm galvanised large-head clouts with 9mm diameter flat heads, to secure the reinforcing. Nail through or alongside every 4th hole in the spacers (150mm spacing) down each stud line and nail fix the mesh at 150mm along nogs. Slightly skew nail from centre of sheet outwards to make taut. (Refer Figs 17 and 18).

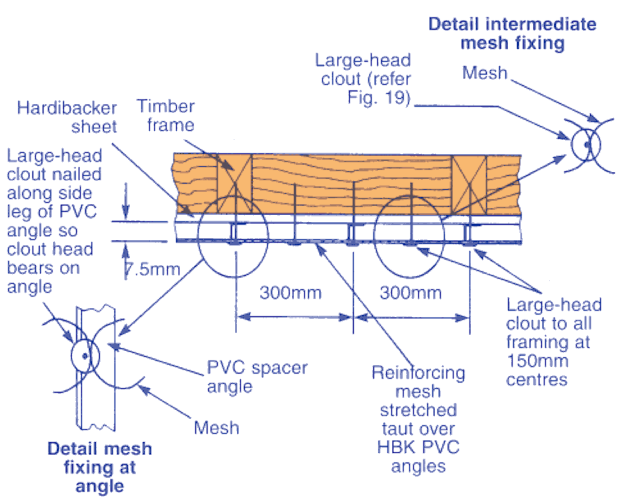
Laps in reinforcing must be 75mm minimum, with vertical laps staggered. Securely nail over timber or wire together every 150mm if not on a timber line. (Ribs in lath, if any, must be nested.)

*Fig. 17 Fixing HBK PVC spacing angle*




*Note:* The HBK PVC angle is to be used with plain expanded metal lath or wire mesh.

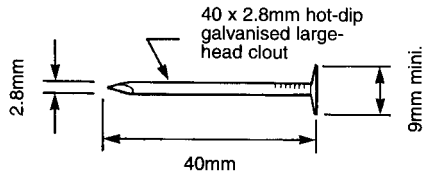
*Fig. 18 Plan A-A fixing and tensioning reinforcing mesh*




*Note:* HBK spacer gives good support to plain reinforcing and makes it easier to fix taut. The long spacers are corrosion resistant and save much time obtaining (or making) and fixing small spacers and *avoid a tendency to use insufficient* individual small spacers.

Do not lap mesh as above at an internal or external vertical corner of a building. Bend mesh around the corner at least 480-600mm to allow location of lap 1 standard stud spacing away from corner.

***Fig. 19*** *Large-head clout fixing*




*Note:* These fixings are available from James Hardie Stockists.

# Plaster mixes and application mixes

Use mixes in correct decreasing order of strength, e.g.:

- Bond coat of 1 cement, 3 sand plus waterproofer and reinforcing strand in accordance with manufacturer's instructions
- Flanking coat 1 cement: $^1/_2$ lime: $4^1/_2$ sand
- Finish 1 cement: 1 lime: 5-6 sand.

All mixes to be batched by volume using a bucket or gauge box and batten to flush off top of material. Use chopped fibreglass strand in bond and flanking to reduce the risk of cracking.

### Application

All coats to be applied in good weather conditions, working out of the sun or behind shade-cloth to prevent too rapid drying. Do work when the metal lath/background is in a cold, contracted state. Best trade practice shall *control suction and reduce need to wet down walls etc.*

For example, provide bond coat in 2 applications; the first being a *waterproofed* bond coat mix. Then 'double back' with second application (non-waterproofed flanking strength) over the whole while the work is still green and has some suction (same day).* Ensure the above leaves no mesh exposed and allow to cure slowly, normally for 7 days. Test suction before applying other coats.

Often no water, *or only a little applied by brush,* will be needed. Especially note that the waterproofed bond coat method avoids commonly and wrongly done hosing down It also avoids plaster and substrate having to adjust during work from very wet to dry and greatly reduces movement and risk of cracking.*

*See BRANZ Bulletin 147 October 1971, Plastering - 2, External Walls.

Complete other coats and finish to good trade practice after fixing of internal lining.

# Paint systems

Use only quality 100% acrylic paints. Economy paints are not recommended because generally they are less well bound, less moisture resistant and more prone to mould growth.

In all cases the manufacturer's specification for the selected paint and number of coats must be followed. Note that some paints require an undercoat before applying finish coats.

Damp, shady situations, proximity to bush, agricultural paddocks or sea spray environments may induce an extra tendency for mould growth. Use mould-inhibiting undercoats and consult the paint manufacturer for maximum mould-resistant paints.

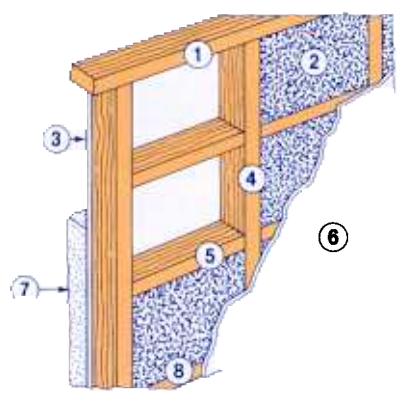
Before painting, remove any surface dirt, grime or other contaminants and ensure the plaster surface is dry and well cured. Paint must not be applied when the air temperature is below 10°C.

The painted plaster surface requires regular maintenance and recoating to ensure the system remains waterproof as is required to meet the durability provisions.

# Energy efficiency

A timber framed wall clad with 4.5mm Hardibacker and 21mm of solid plaster (refer Fig. 20) will exceed the 1.5°Cm²/W requirement of clause H1 Energy Efficiency cited by Acceptable Solution E3/AS1.

***Fig. 20*** *Timber framed wall with fibreglass batts*




**CONSTRUCTION**

1. Top plate
2. Fibreglass Wall Pink Batts R1.8
3. Hardibacker sheet 4.5mm thickness
4. Studs ex (100 x 50) at 600mm centres
5. 2 rows nogs (800mm centres)
6. Internal lining (9.5mm Gib board)
7. Building paper, reinforcing mesh and solid plaster over 4.5mm Hardibacker sheet
8. Bottom plate

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

# Working instructions

On site, sheets must be kept dry and protected from soiling, damage and bowing.

Hardibacker is readily cut using a scoring knife available from James Hardie stockists.
Procedure:

- Position the straight-edge along the line of cut.
- Score against straight-edge and repeat action to obtain adequate depth for clean break (normally 1/3 of sheet thickness).
- With straight-edge firmly in place along the score line snap the sheet upwards.
- If necessary clean edges with rasp.

Alternatively, cut with a hand guillotine. These are available from James Hardie stockists or hire centres. Pack the sheet clear of the ground to allow for the hand guillotine operation. Make the guillotine cut on the off-cut side of the line to allow for the thickness of the blade.

Penetrations for services pipes etc. are simply made by drilling a series of holes around the opening - tap out the waste and clean up with a rasp.

Alternatively, straight-sided penetrations can be made in the sheet before it is applied to the wall. Mark out the penetration on the reverse side of the sheet. Drill holes at each corner and join using a key hole or jig saw.

Alternatively, score joining the holes, turn the sheet over and repeat the process on the face side, then tap out the waste. *Care should be taken to score to an adequate depth* (at least 2/3 of the sheet).

# Sheet weights (at EMC)

| Size (mm) | Sheet Weight (kg) | Weight (kg/m²) |
|---|---|---|
| 1197 x 2397 | 20.1 | 7 |
| 1197 x 2697 | 22.6 | 7 |

The narrower sheet width and length is to allow for accurate fixing when narrow-width kiln-dried timber frame or steel frame is used.

Sheet and frame fixing tolerances are a minimum when ex 35mm kiln-dried timber or steel frame is used, therefore setting out must be accurate when using this framing.

# Fire properties

Hardibacker 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 |

# New Zealand Standard

Hardibacker sheets are manufactured to comply with NZS 2908:1993 'Cellulose Cement Products'.

# Window and flashing details

The following are suggested details for timber and aluminium windows.

***Fig. 21*** *Timber window head detail*

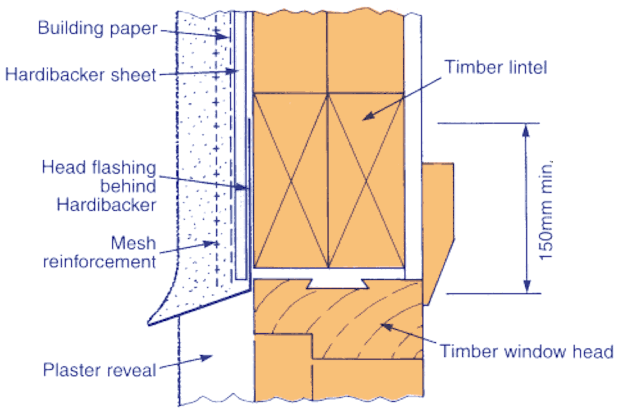



***Fig. 22*** *Timber window head detail*

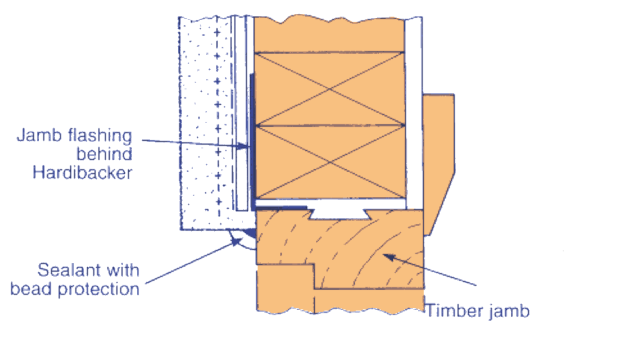



***Fig. 23*** *Timber window sill detail*

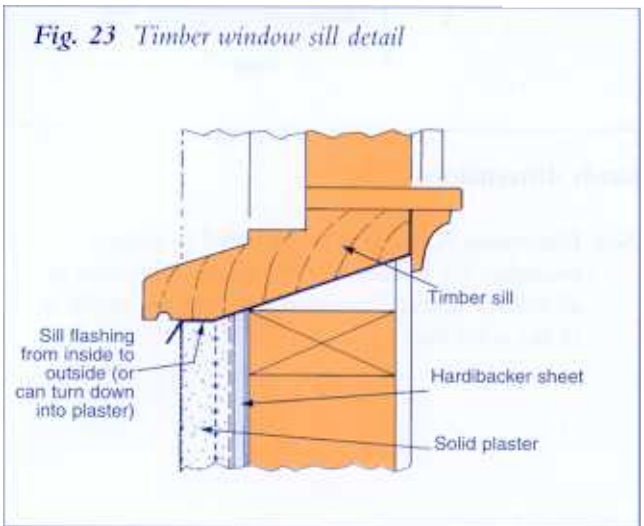


*Fig. 24 Aluminium window jamb detail*

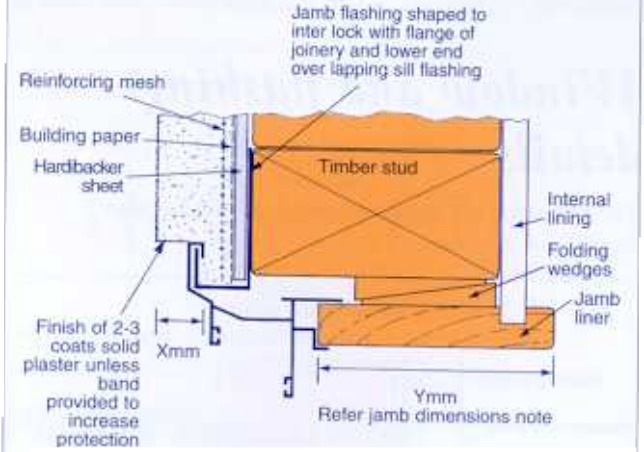



*Fig. 25 Alternative band detail at jamb*

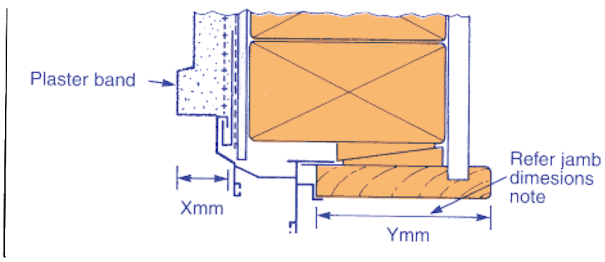
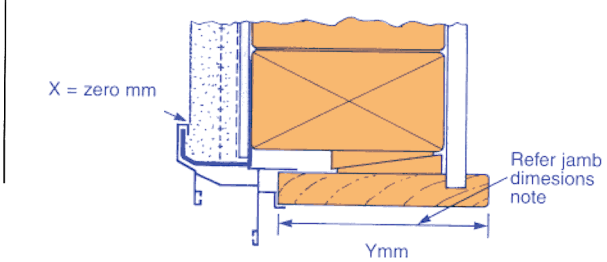



*Fig. 26 Alternative flush jamb detail*




## Jamb dimensions

Dimension X needs to be provided to joinery manufacturer to allow for the accurate location of all joinery as this dimension will vary the width Y of the jamb liner.

*Fig. 27 Aluminium window head detail*

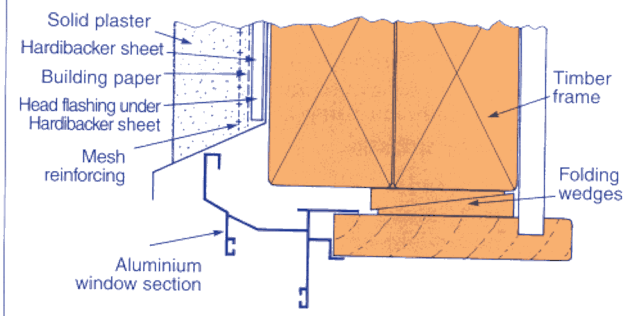
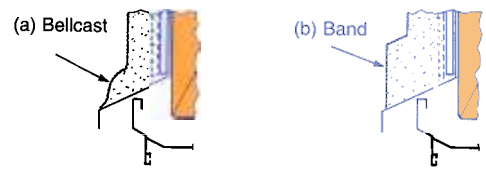



*Fig. 28 Alternative head details*




*Alternatives:* head flashing extended out to better protect window head by addition of (a) Bellcast or (b) Band.

*Fig. 29 Aluminium sill detail*

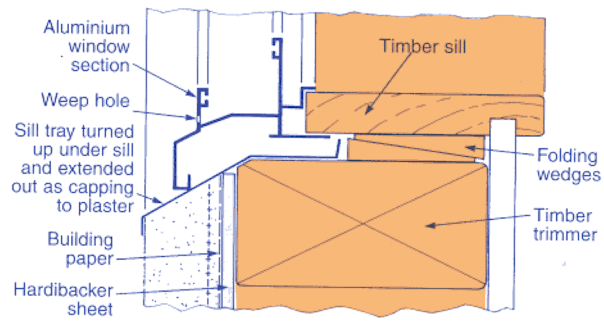
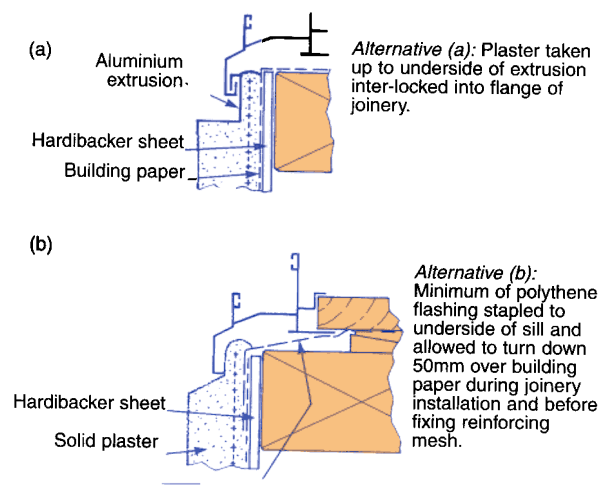



*Fig. 30 Alternative sill details*




*Alternative (a):* Plaster taken up to underside of extrusion inter-locked into flange of joinery.

*Alternative (b):* Minimum of polythene flashing stapled to underside of sill and allowed to turn down 50mm over building paper during joinery installation and before fixing reinforcing mesh.

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