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

Ask James Hardie™
literaturefeedback@jameshardie.co.nz

1 Application and scope

1.1 APPLICATION

Monotek™ Sheets are manufactured in New Zealand by James Hardie from fibre cement which is a composition of Portland cement, ground sand, cellulose fibre and water. Monotek Sheet is a suitable cladding material to achieve monolithic looks on external walls. Monotek Sheets are readily identified by the name printed on the face and the reverse of the sheet. Monotek Sheets are manufactured in 9mm thickness and are face and edge sealed.

SPECIFIER

If you are a specifier or other responsible party for a project ensure that the information in this document is appropriate for the application you are planning and that you undertake specific design and detailing for areas which fall outside the scope of these specifications.

INSTALLER

If you are an installer ensure that you follow the design, moisture management and associated details and material selection provided by the designer. All the details provided in this document must be read in conjunction with the specifier's specification.

Make sure your information is up to date

When specifying or installing James Hardie products, ensure you have the current manual. If you're not sure you do, or you need more information, visit www.jameshardie.co.nz or Ask James Hardie on 0800 808 868.

1.2 SCOPE

The scope of this specification is for the use of Monotek Sheets for buildings which fall within the scope of the New Zealand Building Code (NZBC) Acceptable Solution 'E2/AS1'. Refer to 'E2/AS1' for further information.

This specification also covers the use of Monotek Sheets in cavity construction when buildings subject to specific design wind pressure of 2.5kPa (ULS) regardless of building height. This document is intended for use by architects, designers and specifiers who are involved in specifying Monotek Sheet cladding.

1.3 DETAILS

Various Monotek Sheet details are provided in the Details section of this document. This specification and details in CAD file are also available to download from our website at www.jameshardie.co.nz.

1.4 SPECIFIC DESIGN

For use of Monotek Sheets outside the scope of this document, the architect, designer or engineer must undertake specific design. For advice on designs outside the scope of this specification, Ask James Hardie on 0800 808 868.

2 Design

2.1 COMPLIANCE

Monotek Sheet complies with section 9.7.2 of 'E2/AS1'. Information contained in this document is aligned with the requirements of NZBC Acceptable Solution 'E2/AS1'.

Monotek Sheet cavity construction has also been BRANZ appraised. The BRANZ Appraisal No is 466 (2005) and can be viewed at www.branz.co.nz or www.jameshardie.co.nz. All design and construction must comply with the requirements of the NZBC regulations and standards.

2.2 RESPONSIBILITY

The specifier or other party responsible for the project must run through a risk matrix analysis to determine which construction method is to be used. The designer must also ensure that the information and details published in this specification are appropriate for the intended application and that additional detailing is performed for specific design or any areas that fall outside the scope of this specification. The designers should ensure that the intent of their design meets the requirements of the NZBC. All dimensions shown are in millimeters unless noted otherwise. All New Zealand Standards referenced in this document are current edition and must be complied with.

James Hardie conducts stringent quality checks to ensure that any product manufactured falls within our quality spectrum. It is the responsibility of the builder to ensure that the product meets aesthetic requirements before installation. James Hardie will not be responsible for rectifying obvious aesthetic surface variations following installation.

2.3 SITE AND FOUNDATION

The site on which the building is situated must comply with the NZBC Acceptable Solution E1/AS1 'Surface Water'. Foundation design must comply with the requirements of NZS 3604 'Timber Framed Buildings' or be as per specific engineering design. The grade of adjacent finished ground must slope away from the building to avoid any possibility of water accumulation in accordance with the NZBC requirements.

2.4 CLEARANCES

The clearance between the bottom edge of cladding and paved/unpaved ground must comply with NZBC Acceptable Solution 'E2 /AS1', paragraph 9.1.3.

The finished floor level must also comply with these requirements. These clearances must be maintained throughout the life of the building.

Monotek Sheets must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZS 3604.

Monotek Sheets must have a minimum clearance of 100mm from paved ground and 175mm from unpaved ground.

On the roofs and decks the minimum clearance must be 50mm.

Do not install external cladding such that it may remain in contact with water or ground.

2.5 MOISTURE MANAGEMENT

It is the responsibility of the specifier to identify moisture related risks associated with any particular building design.

Wall construction design must effectively manage moisture, considering both the interior and exterior environments of the building, particularly in buildings that have a higher risk of wind driven rain penetration or that are artificially heated or cooled.

Walls shall include those provisions as required by the NZBC Acceptable Solution 'E2/AS1' 'External Moisture'. In addition all wall openings, penetrations, junctions, connections, window sills, heads and jambs must incorporate appropriate flashings for waterproofing. The other materials, components and installation methods used to manage moisture in external walls, must comply with the requirements of relevant standards and the NZBC.

For further information in relation to designing for weathertightness, refer to BRANZ Ltd and the Ministry of Business, Innovation and Employment updates on the following websites, respectively www.branz.co.nz and www.building.govt.nz.

2.6 STRUCTURE

Timber framing must comply with the NZS 3604 for buildings or parts of buildings within the scope limitations of the NZS 3604. Buildings or parts of buildings outside the scope of the NZS 3604 must be as per specific design in accordance with the NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of the NZS 3604. In all cases studs must be at maximum 600mm centres for buildings designed to the NZS 3604 and at maximum 400mm centres for specifically designed buildings.

For timber frame walls longer than 12m, it is best practice to allow for construction joints to accommodate movements generated due to timber shrinkage or deflections etc.

2.7 WIND LOADING

Monotek Sheet is suitable for use in all New Zealand wind zones up to and including EH as defined in the NZS 3604.

Monotek Sheet is suitable for use in specific engineering design (SED) projects subject to maximum wind pressure of up to 2.5kPa (uls).

2.8 STRUCTURAL BRACING

Monotek Sheets installed as per this specification cannot be used to achieve structural bracing. However, bracing can be achieved by using HomeRAB Pre-Cladding or RAB™ Board fixed direct to the framing or by using internal linings such as Villaboard™ Lining or plasterboard bracing systems have been independently tested and assessed by Scion. Refer to the James Hardie Bracing Design Manual for details.

2.9 FIRE RATED WALLS

Monotek Sheet clad walls using a cavity construction method can achieve fire ratings up to 60/60/60 when the walls are constructed in accordance with this literature and include the fire rated system requirements as specified in James Hardie Fire and Acoustic Design Manual. Refer to Fire and Acoustic design manual for further information on fire rated systems

2.10 ENERGY EFFICIENCY

External walls constructed using Monotek Sheet, bulk insulation, where the area of glazing is 30% or less of the total wall area and constructed as per this technical specification complies with the requirements for walls in the NZBC Acceptable Solution H1/AS1 (NZBC Clause H1 Energy Efficiency). To meet thermal insulation requirements for the construction, the bulk insulation as specified in Table 1 must be used. This insulation may be substituted with insulations having higher R-values. The thermal insulation of a wall gets affected when the depth of the timber framing is increased or decreased. The calculation used in Table 1 is based on a timber framing size 90 x 45mm and using an internal lining material such as James Hardie Villaboard Lining or a 10mm plasterboard.

Table 1

Insulation capability		
Climate Zone	Construction R-Value Requirement	Minimum R-Value of Insulation Required
1 and 2	1.9 m ² °C/W	R2.0*
3	2.0 m ² °C/W	R2.2*

Total construction R-Value depends on the insulation material used and the framing ratio. The insulation material R-Values specified in this table are for studs spaced at 600mm centres and nogs spaced at 800mm centres.

* To achieve higher R-Values of construction the wall insulation must be replaced with an insulation material having higher R-Values to suit the requirements.

For further guidance on insulation requirement refer to the current edition of 'House Insulation Guide' published by BRANZ.

3 Framing

3.1 GENERAL

This Monotek Sheet technical specification is only suitable for timber-framed buildings. Other framing materials are outside the scope of this specification.

3.2 DIMENSIONS

A 45mm (nominal) minimum stud width is required.

3.3 TIMBER GRADE

Minimum timber grade requirements are No. 1 framing grade as per the NZS 3631 'New Zealand Timber Grading Rules' or equivalent.

3.4 DURABILITY

To comply with the NZBC requirements the external framing must be treated to a minimum H1.2 treatment. Refer to the NZBC Acceptable Solution B2/AS1 'Durability' for further information about the durability requirements.

For timber treatment and allowable moisture content information refer to the NZS 3602 (Timber and Wood-Based Products for use in Buildings) and NZS 3640 (Chemical Preservation of Round and Sawn Timber) for minimum timber treatment selection and treatment requirements.

Also refer to framing manufacturer's literature for further guidance on timber selection.

Framing must be protected from moisture at sites in accordance with the recommendations of framing manufacturers.

Note: Refer to the NZS 3602 for information about the allowable moisture content in timber.

3.5 FRAME CONSTRUCTION

The framing must fully support all sheet edges. The framing must be rigid and not rely on the cladding sheet for stability.

All timber framing sizes and set-out must comply with NZS 3604 and as specified in this specification. Use of timber framing must be in accordance with framing manufacturer's specifications.

- When studs are spaced at 600mm centres maximum then the noggs/dwangs must be provided at 800mm centres maximum
- When studs are spaced at 400mm centres then the noggs/dwangs may be provided at 1200mm centres
- An extra stud is required in internal corners
- For EH wind zone, specific engineering design projects or wind pressures above 1.5kPa, studs must be spaced at 400mm centres maximum
- For SED projects framing is to be designed/verified by project structural engineer

3.6 TOLERANCES

In order to achieve an acceptable wall finish, it is imperative that framing is straight and true. Framing tolerances must comply with the requirements of the NZS 3604. All framing shall be made flush.

3.7 CURVED WALLS

Monotek Sheet can be used in a curved application. For further information Ask James Hardie on 0800 808 868.

4 Preparation

4.1 FLEXIBLE UNDERLAY OR HOMERAB PRE-CLADDING

Flexible underlay or a rigid air barrier such as HomeRAB Pre-Cladding must be provided as per the requirements of External Moisture Clause E2 of the NZBC. The flexible underlay selected for use must comply with Table 23 of E2/AS1.

The flexible underlay must be fixed in accordance with section 9.1.7 E2/AS1 and underlay manufacturer's recommendations.

Walls which are not lined on the inside face e.g. garage walls or gable ends must include a rigid sheathing or an air barrier behind the cladding which complies with the requirements of the NZBC Acceptable Solution 'E2/AS1'. James Hardie Rigid Air Barriers are suitable for use in these applications. It must be installed in accordance with James Hardie Rigid Air Barrier installation manual.

4.2 EH/SED WIND ZONE

With EH wind zone or for specific design wind zone, a rigid air barrier must be used instead of flexible underlay as per E2/AS1 clause 9.1.7.2 e.g. RAB Board.

To achieve the temporary weathertightness using James Hardie rigid air barriers, windows/doors need to be temporarily installed. Refer to James Hardie Rigid Air Barriers installation manual for information regarding its installation and to achieve temporary weathertightness.

4.3 VENT STRIP

The James Hardie uPVC cavity vent strip must be installed at the bottom of all walls constructed using the drained and ventilated cavity construction method. It is important that the openings in the vent strip are kept clear and unobstructed to allow free drainage and ventilation of cavities. James Hardie uPVC vent strip has an opening area of 1000mm²/m length.

4.4 CAVITY BATTENS

In accordance with the NZBC Acceptable Solution 'E2/AS1' Table 2, Monotek Sheets to be installed on a cavity.

The cavity battens provide airspace between the frame and the sheet and are considered a 'packer' only in this specification.

The timber battens must be minimum H3.1 treated in accordance with the NZS 3640 (Chemical preservation of rough and sawn timber) to comply with the durability requirements of B2/AS1.

Cavity battens must comply with following requirements

- be minimum 18mm thick
- be minimum as wide as the width of studs
- when studs are at 600mm centres battens to be provided at 300mm centres
- be fixed by the cladding fixings to the main framing through the flexible underlay
- until claddings are fixed the battens only need to be tacked to the framing

Note: Batten fixing is required temporarily to keep them straight on the wall during construction.

Battens should be fixed with 40 x 2.8mm nails at 800mm centres maximum.

4.5 INTERMEDIATE SUPPORT

Where studs are at 600mm centres an intermediate means of restraining the flexible underlay and insulation from bulging into the cavity shall be installed. An acceptable method to achieve this is using one of the following:

- Intermediate cavity batten between the studs; or
- 75mm galvanised mesh; or
- Polypropylene tape at 300mm centres fixed horizontally and drawn taut.

No intermediate supports are required:

- Where studs are at maximum 400mm centres; or,
- When rigid sheathings instead of flexible underlays are used.

Note: 100mm long cavity packers must be used where required to support fixings in this circumstance.

4.6 FLASHINGS

All wall openings, penetrations, intersections, connections, window sills, heads and jambs must be flashed prior to sheet installation. Please refer to moisture management requirements in clause 2.5.

The flexible underlay must be appropriately incorporated with penetration and junction flashings. Materials must be lapped in such a way that water tracks down to the exterior on the face of flexible underlay. James Hardie will assume no responsibility for water infiltration within the wall due to poor installation of flashing or flexible underlay. The selected flashing materials must comply with the durability requirements of Table 20 of the NZBC Acceptable Solution 'E2/AS1'.

4.7 JUNCTIONS AND PENETRATIONS

Refer to Clause 2.5 of this specification for moisture management requirements. All windows and doors must be detailed as per the requirements of this specification. James Hardie has developed the window details for Monotek Sheet which meet the requirements of E2 'External Moisture', an approved document of the NZBC, refer to Figures 11 to 13.

5 Fixing Monotek Sheet

5.1 GENERAL

Monotek Sheets must be kept dry and under cover whilst in storage or during the installation. Framing moisture contents must not exceed the maximum limit specified in NZS 3602 prior to sheet installation. Every endeavour must be made to keep framing dry once sheet fixing commences. Site cut sheet edges must be sealed prior to installation. The site cut sheets edges

around window/door openings and other penetrations, e.g. meter boxes etc. are also required to be sealed.

Use acrylic sealers such as Dulux acraprime 501/1 or Dulux 1 Step or similar. Check compatibility with texture coat systems.

5.2 FASTENER DURABILITY

Fasteners must meet the minimum durability requirements of the NZBC. NZS 3604 specifies the requirements for fixing material to be used in relation to the exposure conditions and are summarised in Table 2.

Table 2

Exposure conditions and nail selection prescribed by NZS 3604		
Zone	Application	Nail material
D (Sea Spray) * and Geothermal hot spots	General	Stainless steel 304/316
	Fire	
	Bracing	
C and B	General	Hot dip galvanised**
	Fire	
	Bracing	

*Where local knowledge dictates that increased durability is required use stainless steel nails

** Hot dip galvanised must comply with AS/NZS 4680

Also refer to the NZBC Acceptable Solution 'E2/AS1' Table 20 and 21 for information regarding the selection of suitable fixing materials and their compatibility with other materials.

5.3 FASTENER – SIZE AND LAYOUT

Monotek Sheets must be fixed to framing using the fixings as specified in Table 3 and in accordance with the following requirements:

- Nails must have a minimum clearance of 12mm from sheet edges and a minimum of 75mm vertically and 150mm horizontally from sheet corners
- The sheets must have a gap of 1-2mm at all flush finished joints
- Nails must finish flush with the sheet surface

Table 3

Sheet fixing	
Up to and including VH wind zones over flexible underlay	
60 x 3.15mm HardieFlex™ nails	Fix sheet at 200mm centres at all studs. Fix sheet at 150mm centres at top plate and bottom plate.
On buildings with EH wind zone or with ULS design wind pressure of up to 2.5kPa over rigid air barrier	
75 x 3.15mm HardieFlex nails	Fix sheet at 150mm centres at all sheet edges as well as all intermediate framing.

Note: Special fixing arrangements are required for bracing and fire-resistance rated wall systems. For more information Ask James Hardie on 0800 808 868.

5.4 GUN NAILING

Monotek Sheets can be fixed using nail guns. The gun nails used must have a full round head to provide the required holding power. The length and gauge of nails must be a minimum as specified in this document. Check with nail gun manufacturer for more information.

Note: Do not use D Head nails.

5.5 SHEET LAYOUT

The framing layout must be checked to facilitate the construction of control joints prior to sheet installation.

- All sheet edges must be supported by the framing
- All sheets must be fixed vertically

6 Jointing

6.1 GENERAL

The Monotek Sheets are supplied with 2 recessed edges. When the sheets are cut on site to suit the site requirements then the sheet edge cut on site must be recessed for flush jointing. The control joints are formed with square sheet edges. Minimum sheet width for installation must be 200mm.

6.2 FLUSH JOINTS

Monotek Sheets must have a gap of 1 – 2mm when joining them together for the flush joints, refer to Figure 6.

- Monotek Sheets must be flush jointed using a proprietary flush jointing and plaster system tested to EM4 requirements as per E2/AS1 of the NZBC.
- Where a flush horizontal joint and a vertical control joint coincide on the wall, the vertical control joint must extend to full height of the wall.
- Flush joints must never be located on the corners of openings or at other high stress locations. Flush joint must be off set from the corners of opening by 200mm minimum.
- Flush joints must not be located along floor joists.

6.3 CONTROL JOINTS

Control joints are required as described in Table 4. Flush–finish joints are not control joints. Control joints are necessary to accommodate the minimal differential movements between framing and sheets due to normal cyclic changes in the environment and structural behaviour.

Table 4

Control joints	
Vertical	Horizontal
5400mm centres max and at all internal corners (standard detail is a control joint)	At all floor joist locations (standard details are control joints) and 5400mm centres max. (Full height, continuous studs nogged at flush joint)
Refer Figure 4 for further information on control joint locations.	

6.3.1 Vertical Control Joint

Vertical control joints must be provided at a maximum spacing of 5400mm from other control joints, the edge of the cladding, expansion joints or internal and external corners.

Vertical control joints may occur at the edge of window or door openings. Vertical control joints may be staggered across horizontal control joints.

6.3.2 Horizontal Control Joint

At floor joist level, in addition to the movements outlined above, horizontal control joints are required to accommodate the movement resulting from timber joist shrinkage and deflection. Horizontal control joints must be provided at all floor joists and wall frame to truss connections. Elsewhere horizontal control joints are required at a maximum spacing of 5400mm where the studs are running continuous to full height.

6.3.3 Gable Ends

Where the truss is sitting over the wall frame a horizontal control joint must be provided above the top plate. Additional framing may need to be provided in the gable frame to support Monotek Sheet installation as required under Section 3 Framing.

Where a single stud continues from bottom plate to the underside of roof framing, no horizontal control joint is required where the stud height is equal to or less than 5400mm. In this case flush horizontal joints can be formed similar to the vertical flush joints, refer to Figure 18.

6.4 EXPANSION JOINT

Expansion joints are provided to accommodate structural movement. They are generally only required for larger commercial buildings, and such buildings are outside the scope of this literature. Appropriate joint design shall be undertaken for the application.

6.5 OPENINGS

All openings in the cladding must be adequately flashed to prevent moisture ingress in to the wall. Horizontal and vertical flush joints must not be located along the sides of windows and doors. These must be located a minimum of 200mm from the corner of an opening or change in the height of the wall when required.

7 Finishing

7.1 PREPARATION

Protective texture coating of Monotek Sheet is required in order to meet the durability requirements of the NZBC. All sealants must meet the relevant requirements of the NZBC. The Monotek Sheets must be dry and free from dirt before jointing and texture coating. Monotek Sheets must be texture coated within 90 days of installation.

7.2 SEALANTS

All sealants must meet the relevant requirements of the NZBC. Their application and usage of sealants must be in accordance with manufacturer's instructions and be compatible with texture coating. Check with sealant manufacturer prior to coating over sealants. Some sealant manufacturers do not recommend coating over their product.

7.3 JOINTING AND TEXTURE COATING

Jointing and coating systems must comply with EM4 and meet the requirements of the NZBC Acceptable Solutions 'E2/AS1'. The Light Reflectance Value (LRV) for coatings to be used with Monotek Sheet cladding must be minimum 40% or higher.

8 Care and Maintenance

The extent and nature of maintenance will depend on the geographical location and exposure of the building. It is the responsibility of the specifier to determine normal maintenance requirements to comply with the NZBC Acceptable Solution B2/AS1. As a guide, it is recommended that basic normal maintenance tasks shall include but not be limited to:

- Washing down exterior surfaces every 6-12 months* using low pressure water and a brush, and every 3 - 4 months in extreme coastal conditions or sea spray zones
- Re-application of exterior protective finishes if necessary. Always refer to your paint manufacturer for re-coating requirements
- Maintaining the exterior envelope and connections including joints, penetrations, flashings and sealants that may provide a means of moisture entry beyond the exterior cladding
- Cleaning out gutters, blocked pipes and overflows as required
- Pruning back vegetation that is close to or touching the building
- The clearances between the bottom edge of Monotek Sheets and the finished/unfinished ground must always be maintained

* Do not use a water blaster to wash down the cladding.

9 Product information

9.1 MANUFACTURING AND CLASSIFICATION

Monotek Sheets are a cellulose fibre reinforced cement building product. The basic composition is Portland cement, ground sand, cellulose fibre and water. The sheets are easily identified by the name Monotek printed at regular intervals on the back face of sheet.

Monotek Sheets are manufactured to AS/NZS 2908.2 'Cellulose-Cement Products Part 2: Flat Sheets' (ISO 8336 'Fibre Cement Flat Sheets'). James Hardie is an ISO 9001 certified manufacturer.

Monotek Sheets are classified Type A, Category 3 in accordance with AS/NZS 2908.2 'Cellulose-Cement Products'.

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

9.2 PRODUCT MASS

Monotek Sheets are 9mm thick and have a mass of 12.84kg/m² at EMC.

Monotek Sheets are classified as a Light Weight Wall Cladding (not exceeding 30kg/m²) in accordance with the NZS 3604.

9.3 SHEET SIZES

Nominal sizes of Monotek Sheets are specified in Table 5.

Table 5

Monotek Sheet sizes — 9mm	
Two edges step recessed (2 long edges)	
Length (mm)	Width (mm)
2450	1200
2700	1200
3000	1200

Note: All dimensions and masses provided are approximate only and are subject to manufacturing tolerances.

9.4 DURABILITY

Monotek Sheets, when installed and maintained as per the technical specification, will meet the durability requirements for claddings as required in the NZBC Approved Document B2 'Durability'.

10 Safe working practices

9.4.1 Resistance to moisture/rotting

Monotek Sheet demonstrates resistance to permanent moisture induced deterioration (rotting) and has passed the following tests in accordance with AS/NZS 2908.2:

- Heat Rain (Clause 6.5)
- Water Permeability (Clause 8.2.2)
- Warm Water (Clause 8.2.4)
- Soak Dry (Clause 8.2.5)

9.4.2 Control of External Fire Spread

External spread of fire (clause C3.5 and C3.7) apply where:

- Building height is greater than 10m and upper floors have sleeping uses or are different property (C3.5), and
- Where the building is located within 1m of a relevant boundary (C3.7)

Refer to Table 5.1 of Section 5.4 of C/AS1 for group SH or table 5.5 of Section 5.8.1 of C/AS2 for the other risk groups to identify the external fire spread requirement applicable to the external cladding material and surface finish.

For the other situations where 'no requirement' is listed, Monotek Sheet installed as per the details published in this specification complies.

For buildings that are >10m high and contain tenancies above as per Table 5.5. of C/AS2, Monotek Sheet installed over timber cavity battens in conjunction with RAB Board with R2.2 fibreglass/James Hardie mineral insulation complies. A continuous timber cavity batten must be installed at the top of cavity at each floor level to stop fire and smoke spread.

9.4.3 Alpine regions

In regions subject to freeze/thaw conditions, Monotek Sheet must not be in direct contact with snow or ice build up for extended periods, e.g. external walls in alpine regions must be protected where snow drifts over winter is expected.

The Monotek Sheet has been tested in accordance with AS/NZS 2908.2 Clause 8.2.3.

WARNING - DO NOT BREATHE DUST AND CUT ONLY IN WELL VENTILATED AREA

James Hardie products contain sand, a source of respirable crystalline silica. May cause cancer if dust from product is inhaled. Causes damage to lungs and respiratory system through prolonged or repeated inhalation of dust from product

Intact fibre cement products are not expected to result in any adverse toxic effects. The hazard associated with fibre cement arises from the respirable crystalline silica present in dust generated by activities such as cutting, rebating, drilling, routing, sawing, crushing, or otherwise abrading fibre cement, and when cleaning up, disposing of or moving dust.

When doing any of these activities in a manner that generates dust, follow James Hardie instructions and best practices to reduce or limit the release of dust.

If using a dust mask or respirator, use an AS/NZS 1716 P1 filter and refer to Australian/New Zealand Standard 1715:2009 Selection, Use and Maintenance of Respiratory Protective Equipment for more extensive guidance and more options for selecting respirators for workplaces. For further information, refer to our installation instructions and Safety Data Sheets available at www.jameshardie.co.nz.

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

Crystalline Silica is

- Commonly known as sand or quartz
- Found in many building products e.g. concrete, bricks, grout, wallboard, ceramic tiles, and all fibre cement materials

Why is Crystalline Silica a health hazard?

- Silica can be breathed deep into the lungs when present in the air as a very fine (respirable) dust
- Exposure to silica dust without taking the appropriate safety measures to minimise the amount being breathed in, can lead to a potentially fatal lung disease – silicosis – and has also been linked with other diseases including cancer. Some studies suggest that smoking may increase these risks
- The most hazardous dust is the dust you cannot see!

When is Crystalline Silica a health hazard?

- It's dangerous to health if safety protocols to control dust are not followed when cutting, drilling or rebating a product containing crystalline silica
- Products containing silica are harmless if intact (e.g. an un-cut sheet of wall board)

Avoid breathing in crystalline silica dust

Safe working practices

- ✗ NEVER use a power saw indoors or in a poorly ventilated area
- ✗ NEVER dry sweep
- ✓ ALWAYS use M Class or higher vacuum or damp down dust before sweeping up
- ✗ NEVER use grinders
- ✓ ALWAYS use a dust reducing circular saw equipped with a sawblade specifically designed to minimise dust creation when cutting fibre cement – preferably a sawblade that carries the HardieBlade™ logo or one with at least equivalent performance – connected to an M Class or higher vacuum
- ✓ Before cutting warn others in the area to avoid dust
- ✓ ALWAYS follow tool manufacturers' safety recommendations
- ✓ ALWAYS expose only the minimum required depth of blade for the thickness of fibre cement to be cut
- ✓ ALWAYS wear a properly-fitted, approved dust mask or respirator P1 or higher in accordance with applicable government regulations and manufacturer instructions
- ✓ Consider rotating personnel across cutting tasks to further limit respirable silica exposures.

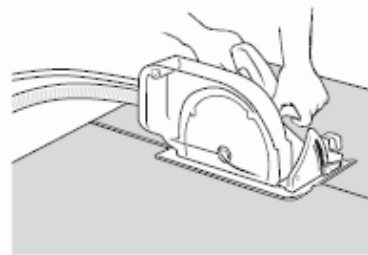
When cutting Monotek Sheet

- ✓ Work outdoors only
- ✓ Make sure you work in a well ventilated area
- ✓ Position cutting station so wind will blow dust away from yourself and others in the working area
- ✓ Rotate employees across cutting task over duration of shift
- ✓ Cut products with a HardieBlade Saw Blade (or equivalent) and a dust reducing circular saw connected to a M Class or higher vacuum
- ✓ When sawing, sanding, rebating, drilling or machining fibre cement products, always:
 - Wear your P1 or higher (correctly fitted in accordance with manufacturers' instructions), ask others to do the same.
 - Keep persons on site at least 2 metres and as far as practicable away from the cutting station while the saw is in operation.
 - If you are not clean shaven, then use a powered air respirator with a loose fitting head top
 - Wear safety glasses
 - Wear hearing protection
 - When others are close by, ask them to do the same
- ✓ Make sure you clean up BUT never dry sweep. Always hose down with water/wet wipe or use an M Class or higher vacuum

Working instructions

HardieBlade™ Saw Blade

The HardieBlade Saw Blade used with a dust-reducing saw is ideal for fast, clean cutting of James Hardie fibre cement products. A dust-reducing saw uses a dust collector connected to a M Class or higher vacuum. When sawing, clamp a straight edge to the sheet as a guide and run the saw base plate along the straight edge when making the cut.



Hole forming

For smooth clean cut circular holes:

- Mark the centre of the hole on the sheet
- Pre-drill a 'pilot' hole
- Using the pilot hole as a guide, cut the hole to the appropriate diameter with a hole saw fitted to a heavy duty electric drill



For irregular holes:

- Small rectangular or circular holes can be cut by drilling a series of small holes around the perimeter of the hole then tapping out the waste piece from the sheet face
- Tap carefully to avoid damage to sheets, ensuring that the sheet edges are properly supported

10.1 STORAGE AND DELIVERY

Keeping products and people safe

Off loading

- ✓ James Hardie products should be off-loaded carefully by hand or by forklift
- ✓ James Hardie products should not be rolled or dumped off a truck during the delivery to the jobsite

Storage

James Hardie products should be stored:

- ✓ In their original packaging
- ✓ Under cover where possible or otherwise protected with a waterproof covering to keep products dry
- ✓ Off the ground – either on a pallet or adequately supported on timber or other spacers
- ✓ Flat so as to minimise bending

James Hardie products must not be stored:

- ✗ Directly on the ground
- ✗ In the open air exposed to the elements

James Hardie is not responsible for damage due to improper storage and handling.

10.2 TIPS FOR SAFE AND EASY HANDLING OF MONOTEK SHEET

- ✓ Carry with two people
- ✓ Hold near each end and on edge
- ✓ Exercise care when handling sheet products to avoid damaging the edges/corners








11 Accessories

Accessories supplied by James Hardie

	Accessory	Size (mm)	Material	Code
	Inseal 3259 1.5mm thick 48mm 80mm	50m roll 50m roll	Black compressible foam	300767 300769
	HardieFlex nail — 5kg	60 x 3.15mm	316 Stainless Steel	302782
	HardieFlex nail — 5kg	60 x 3.15mm	Hot Dip Galvanised	302784
	HardieFlex nail	75 x 3.15mm	316 Stainless Steel	304253
	HardieFlex nail	75 x 3.15mm	Hot Dip Galvanised	304251
	9mm Horizontal Flashing	3000 long	uPVC	302257
	Horizontal 180° Flashing Jointer	100 long	uPVC	301921
	Corner 90° Flashing Jointer	50 x 50	uPVC	301920
	Vent Strip	3000 long	uPVC	302490
	Corner Underflashing 50 x 50mm	3000 long	uPVC	303745
	HardieBlade Saw Blade	4 tooth - 184mm	Diamond Tipped	300660

Accessories not supplied by James Hardie

James Hardie recommends the following products for use in conjunction with its Monotek™ Sheet. James Hardie does not supply these products. Please contact component manufacturer for information on their warranties and further information on their products.

	Accessory	Size (mm)	Material/appearance
	HardieFlex nail	40 x 2.8mm	316 Stainless Steel
	HardieFlex nail	40 x 2.8mm	Hot Dip Galvanised
	Flexible sealant e.g. Sikaflex AT Facade or similar	Tube	Cured Ruberised compound
	PEF rod or expandable foam	Polyethylene foam	Plastic/foam
	Flashing tape Tyvek, Protecto wrap or similar	Proprietary tape to adhere to flexible underlay	Synthetic paper
	Flashing to Table 20 'E2/AS1'	Refer Figure 14	
	Inseal 3109 Sealing Strip	19 x 10	Black compressible foam

12 Details

Various details outlined in the following table are available on pages 13 to 34.

Table 6

Details	
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Figure 2: Cavity batten fixing	14
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Figure 1: Cavity framing and batten setout

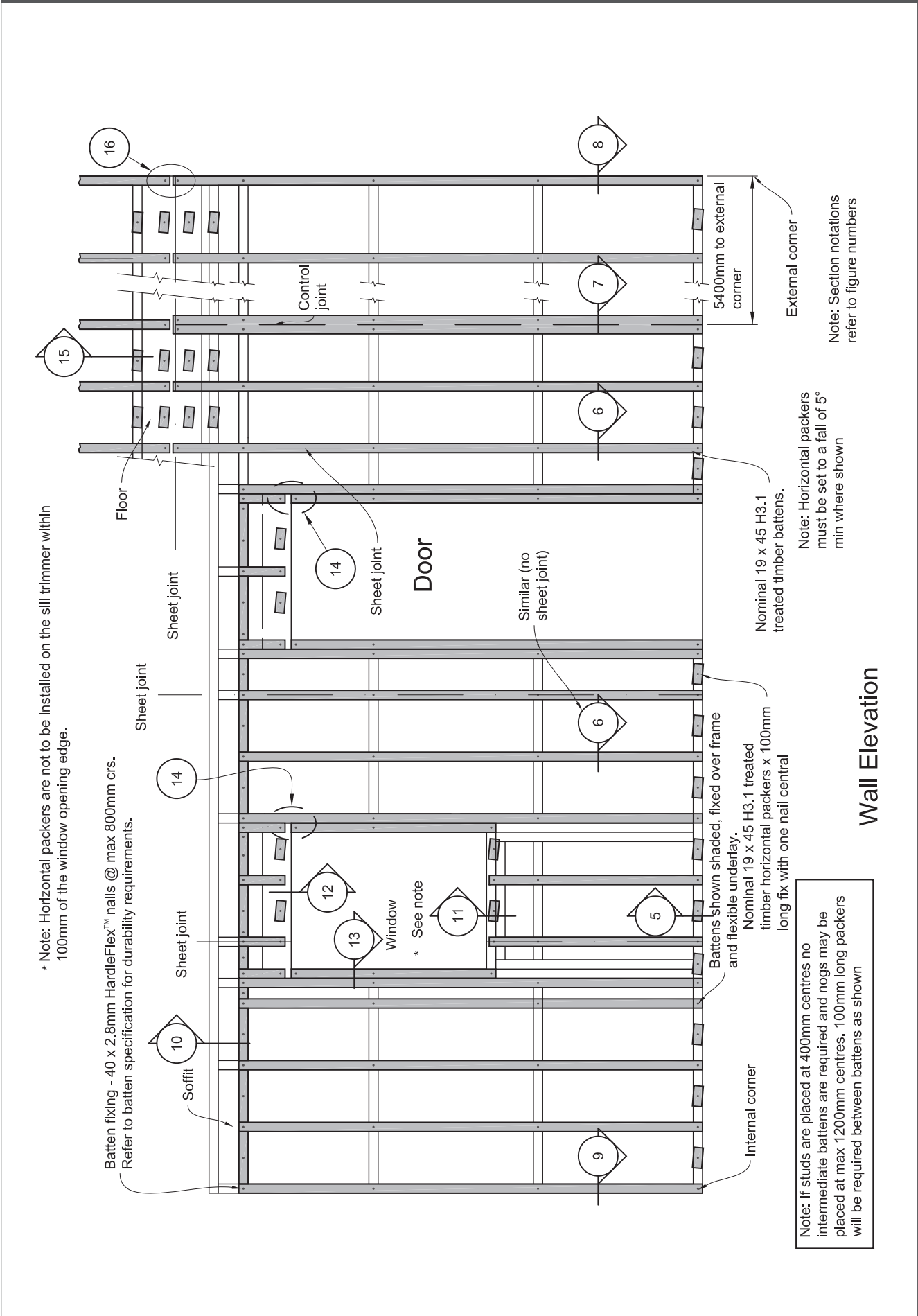
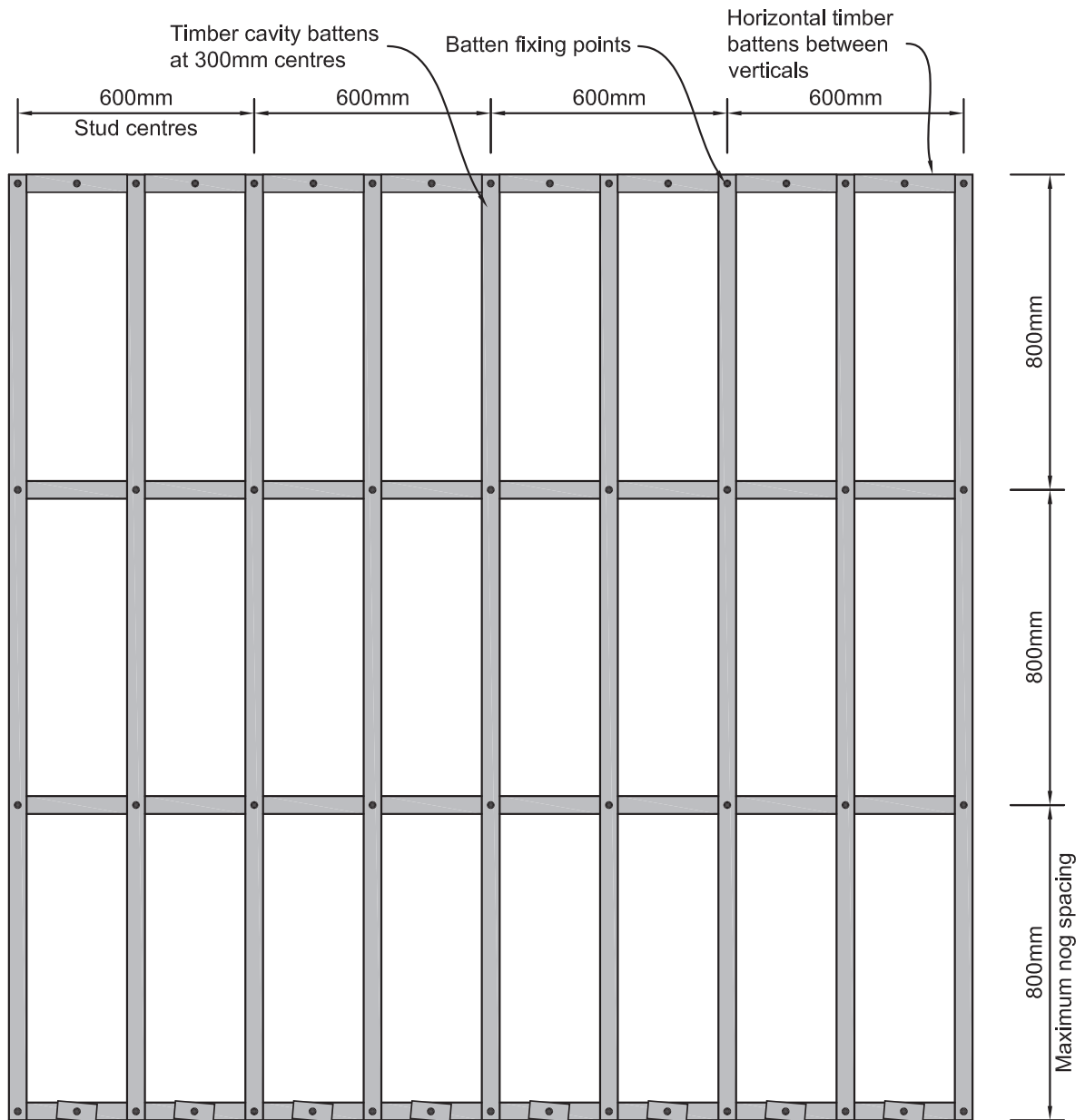


Figure 2: Cavity batten fixing



100mm long horizontal packers bottom of sheet

Note:

- No horizontal cavity packers required at nogs
- Horizontal packers must be set to a fall of 5° min where shown

Figure 3: Cavity sheet fixing setout

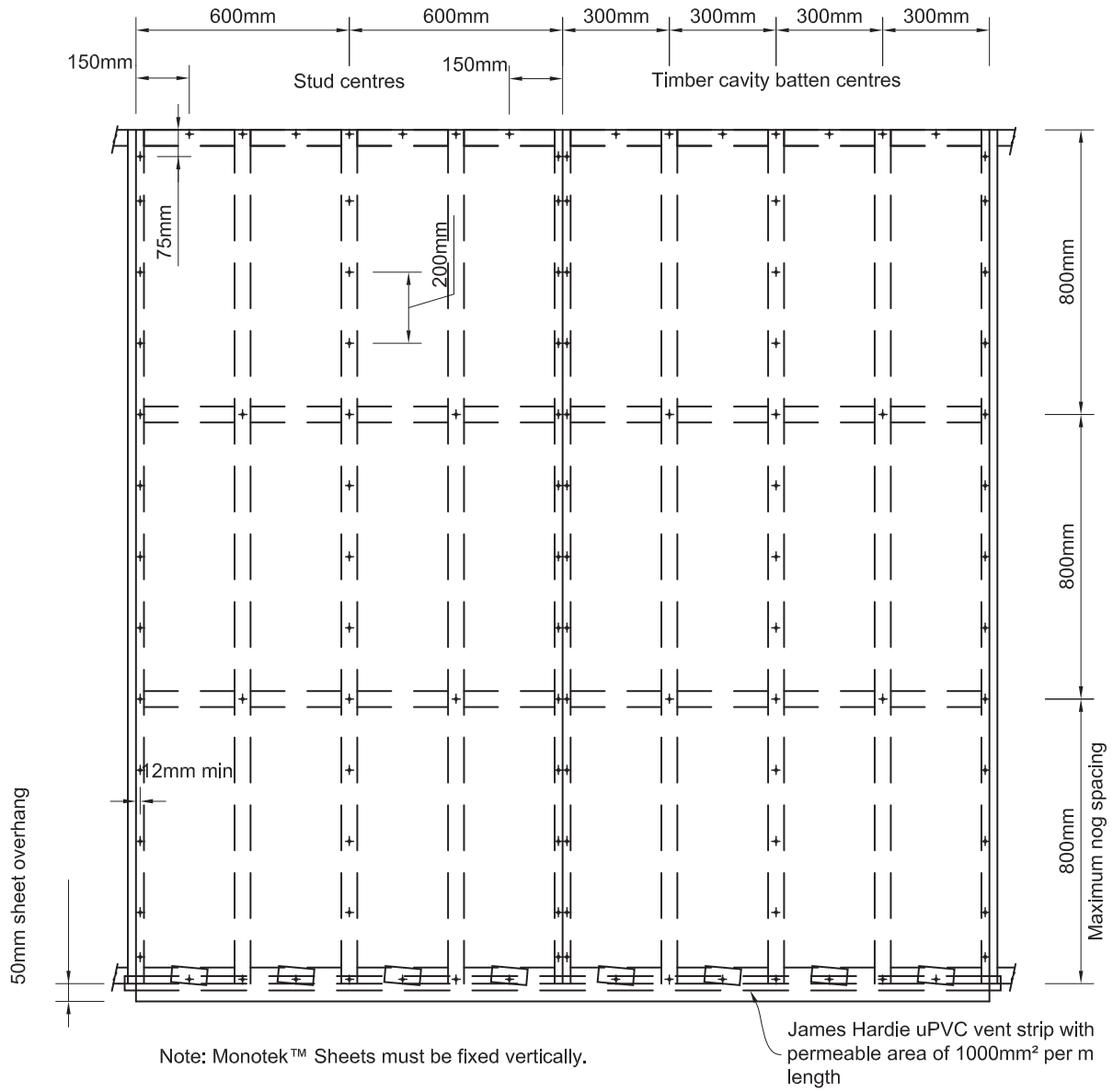
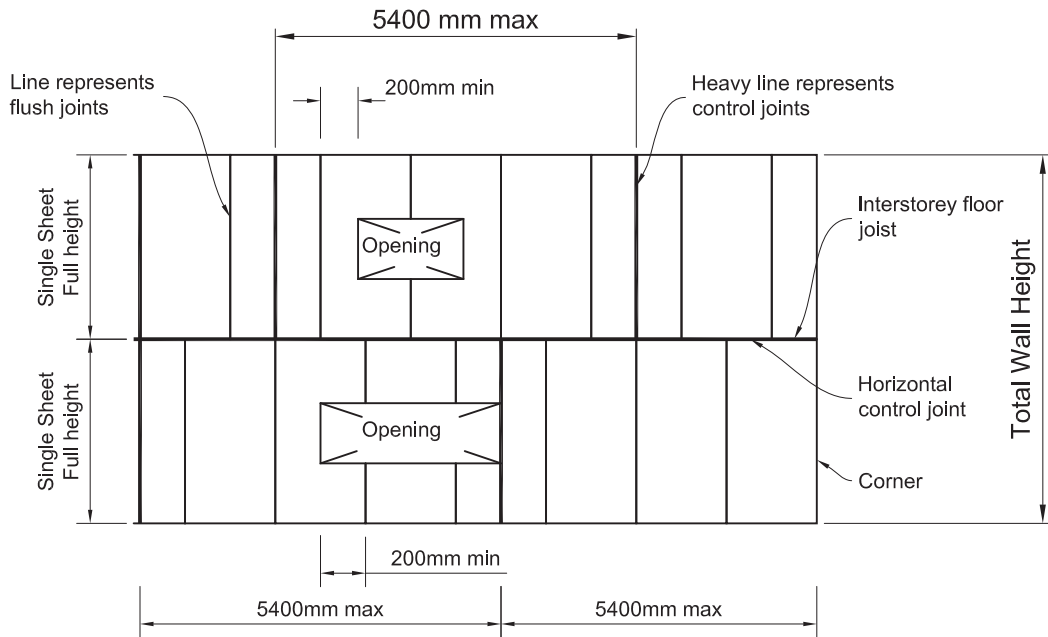
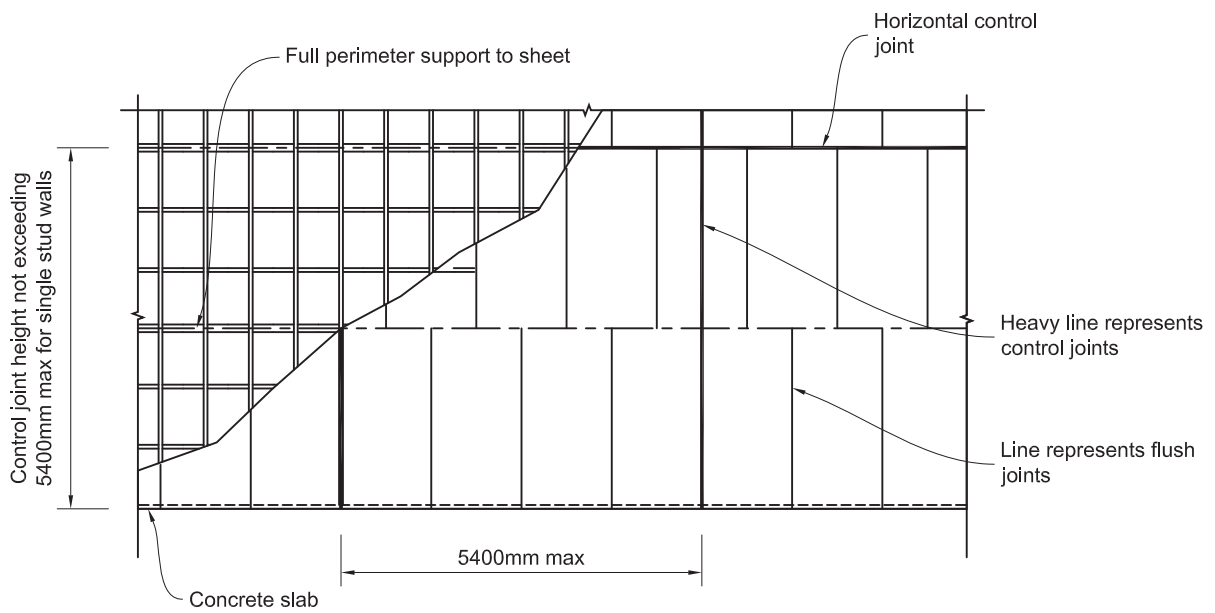


Figure 4: Control joint setout



Note:
 • Control joint required at horizontal interstorey floor joists because of joist shrinkage

Typical Two Story Control Joint Layout



Typical High Wall Control Joint Layout

Figure 5: Cavity concrete footing

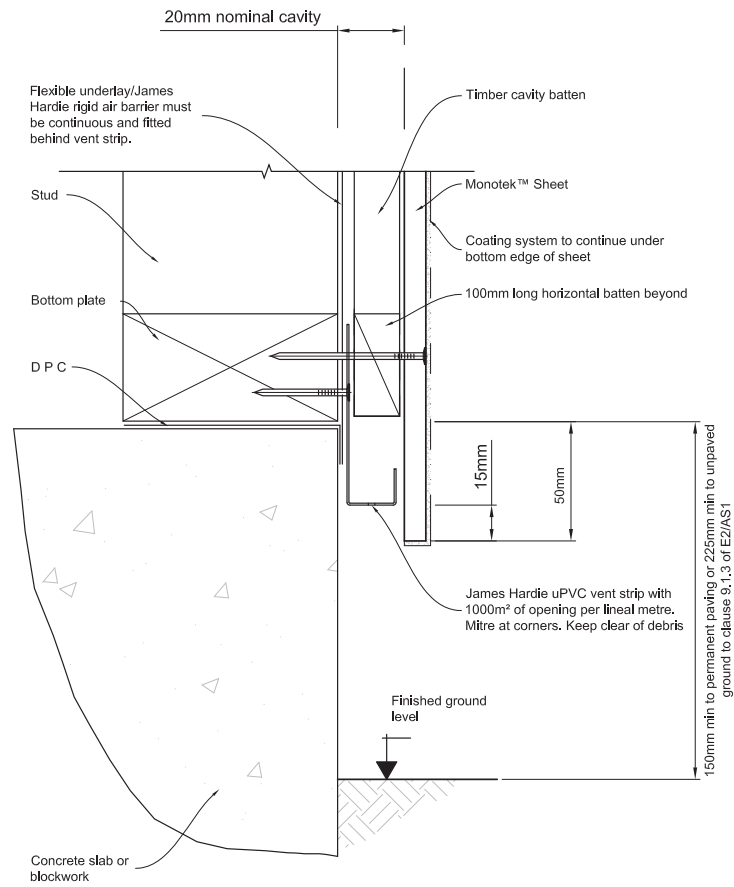


Figure 6: Cavity vertical flush joint setout

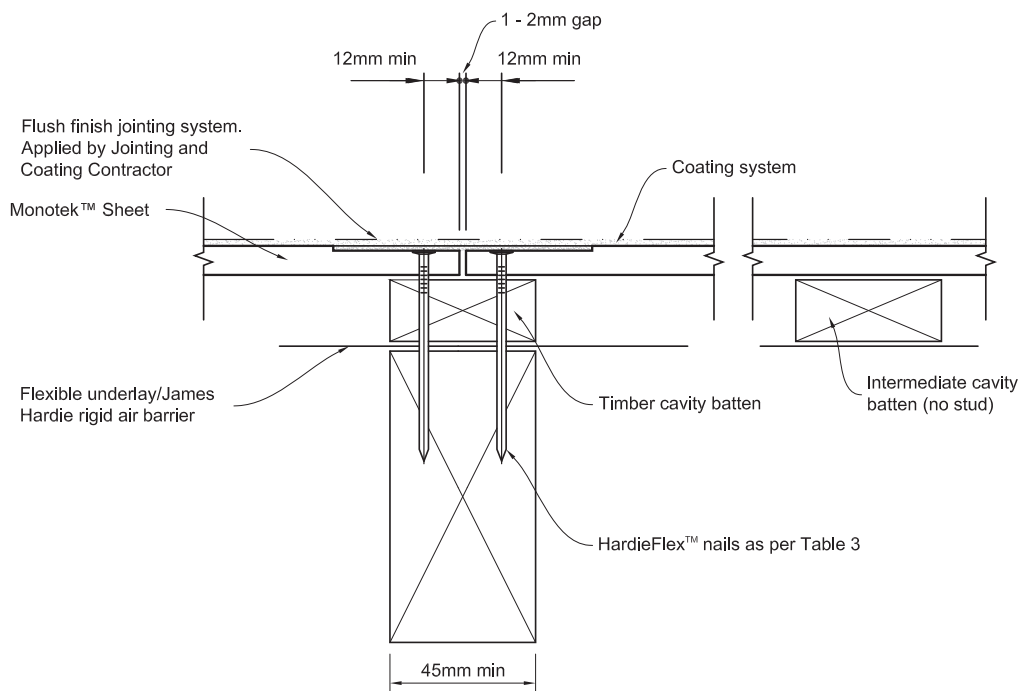


Figure 7: Cavity vertical control joint setout

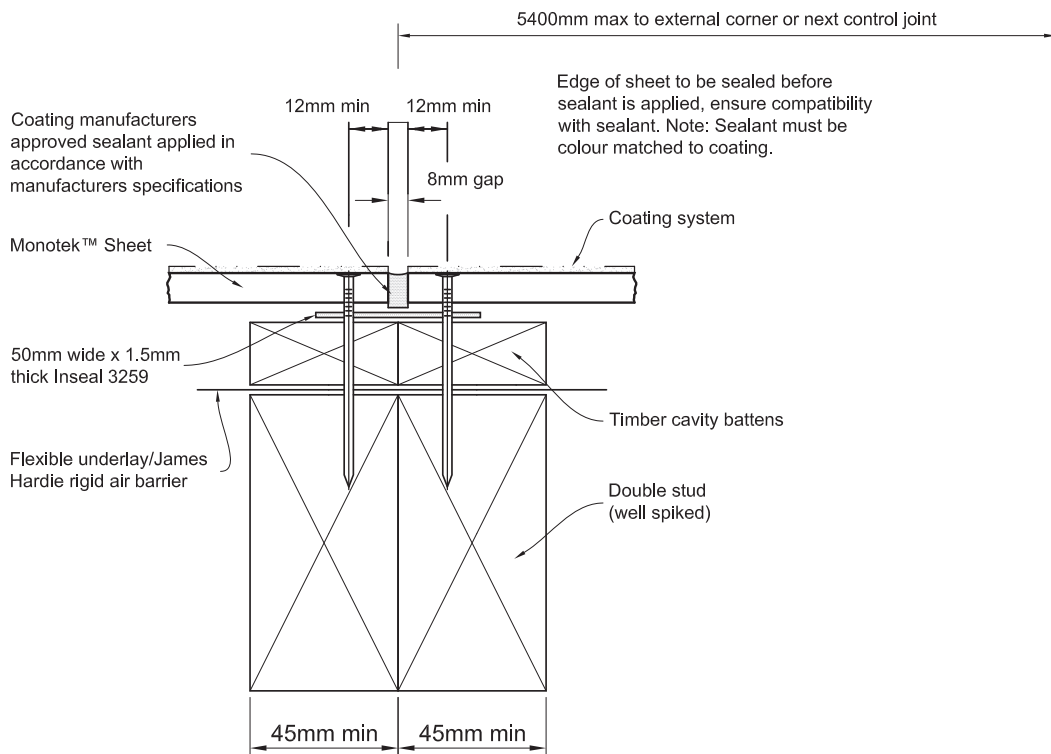
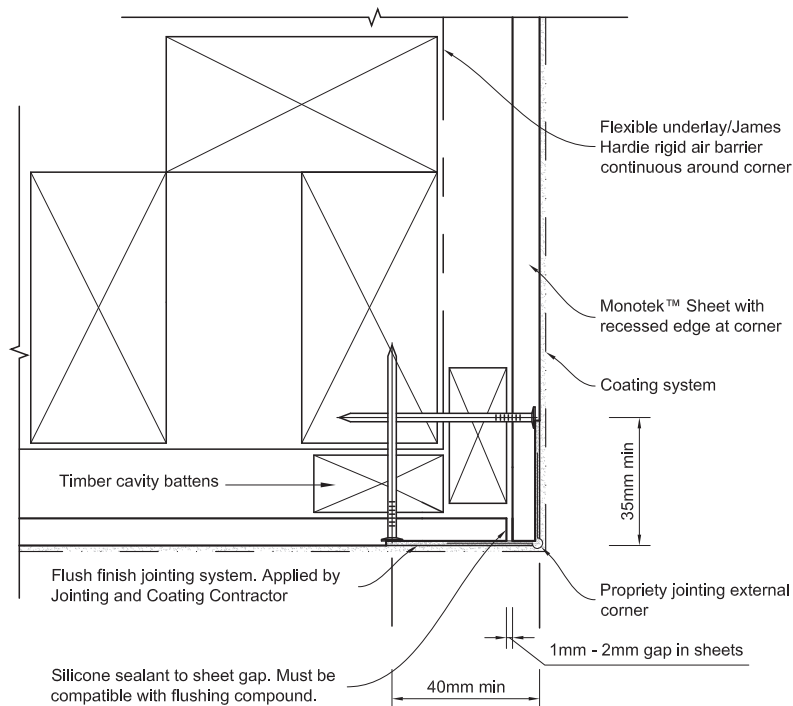


Figure 8: Cavity external corner



Note: Proprietary systems corner - refer installation as per manufacturers' recommendations

Figure 9: Cavity internal corner

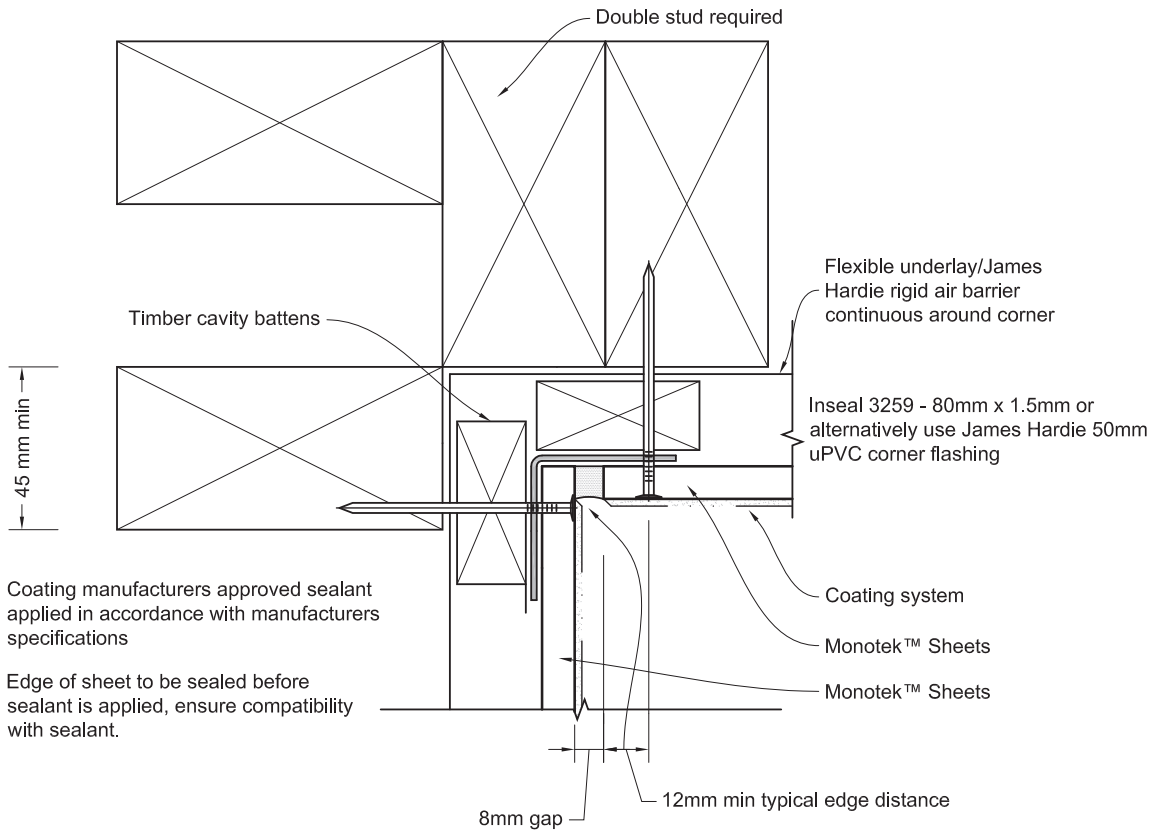


Figure 10: Cavity soffit detail

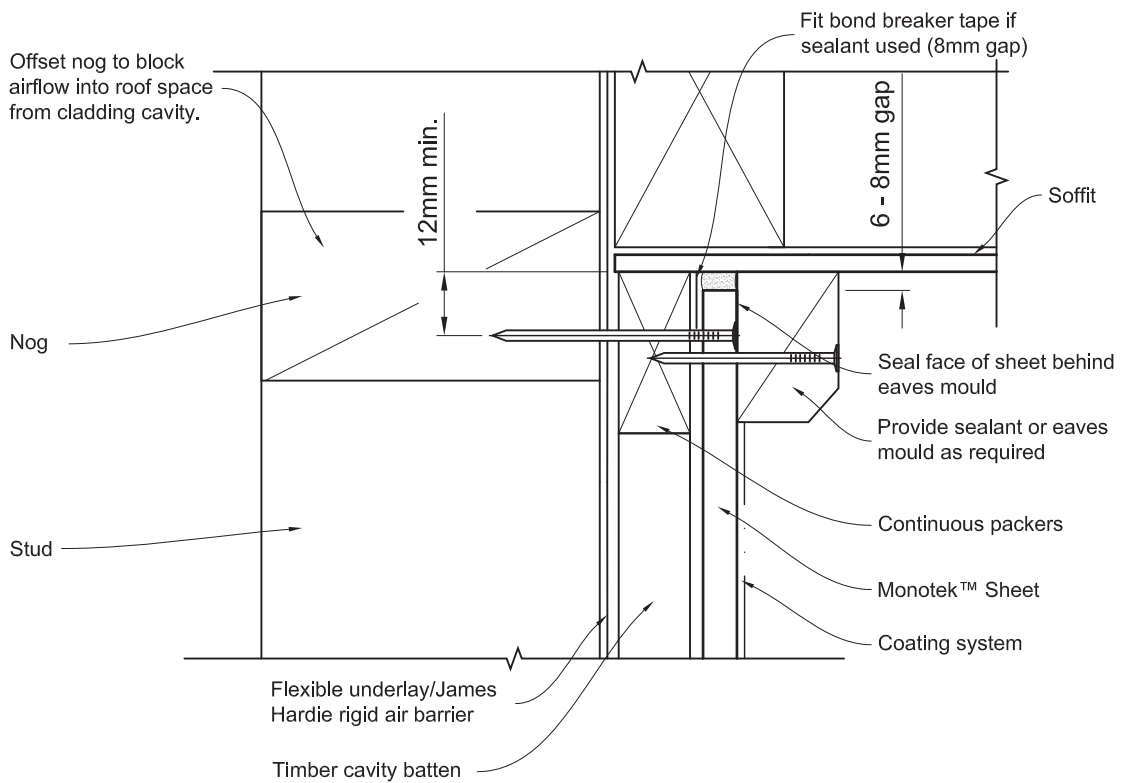
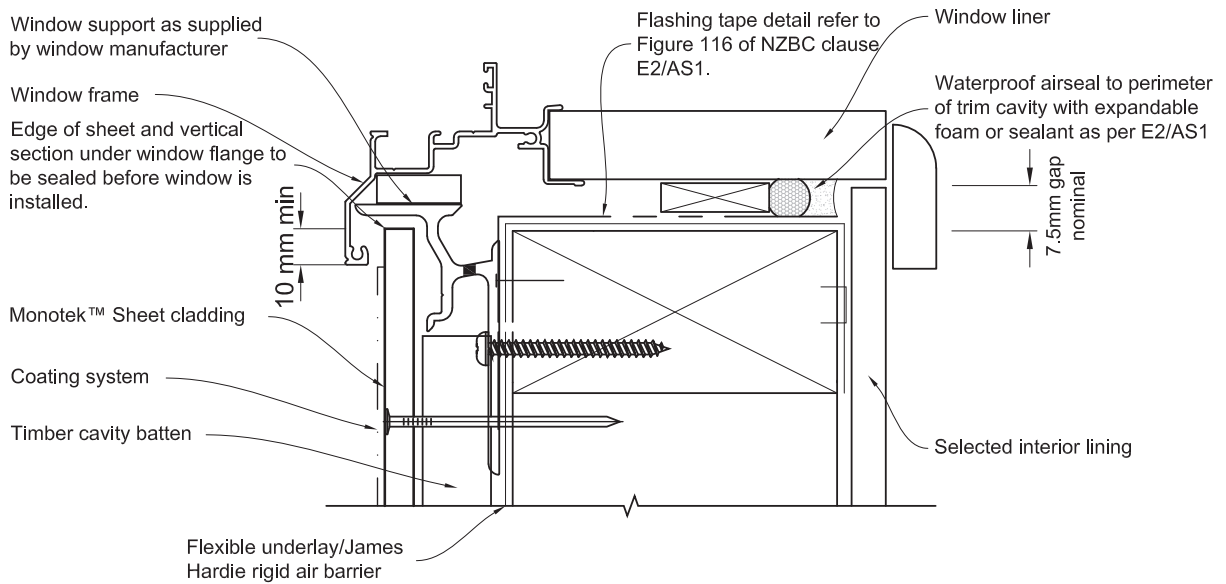


Figure 11: Cavity window sill

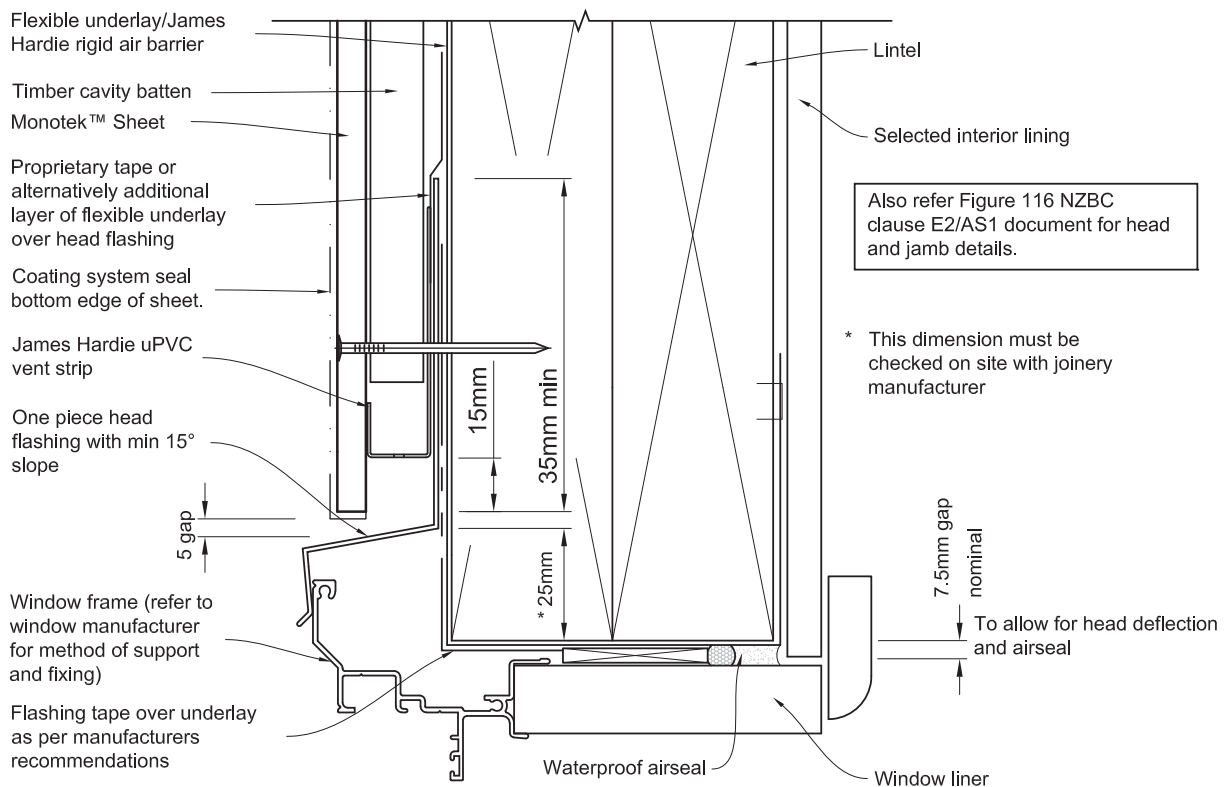


General notes for materials selection

1. Flashing materials must be selected based on environmental exposure, refer to NZS 3604 and NZBC clause 'E2/AS1'.
2. Flexible underlay must comply with acceptable solution NZBC clause 'E2/AS1' and NZS 3604.
3. Flashing tape must have proven compatibility with the selected flexible underlay and other materials with which it comes into contact as per NZBC clause 'E2/AS1'.

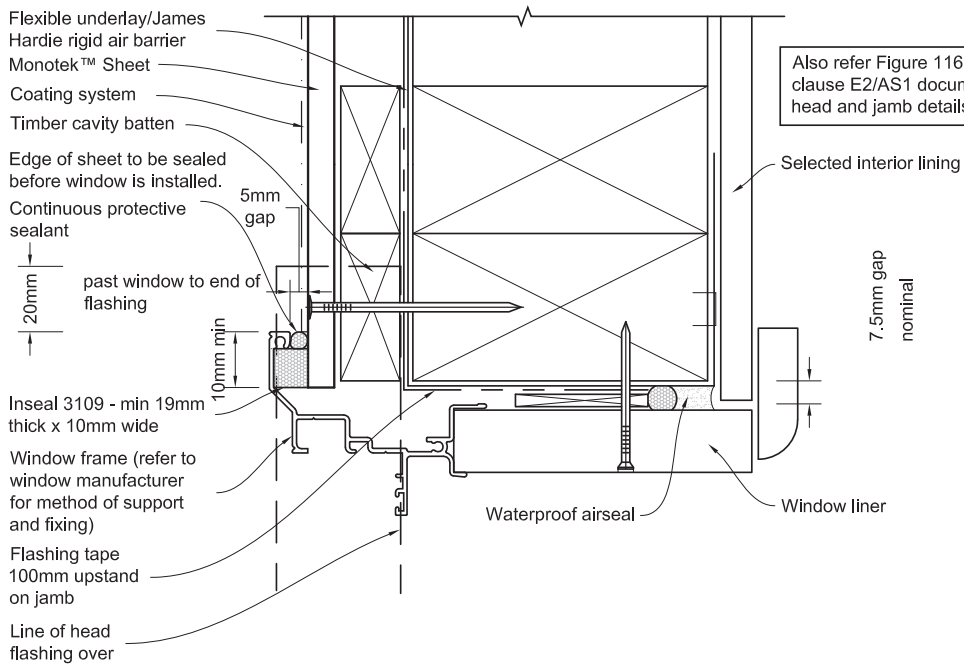
Refer to the manufacturer or supplier for technical information for these materials.

Figure 12: Cavity window head



Note: When James Hardie rigid air barrier is used, flashing tape or flexible underlay to be applied to the entire window head. Refer to the James Hardie Rigid Air Barrier installation manual for further information.

Figure 13: Cavity window jamb



Note: When James Hardie rigid air barrier is used, flashing tape or flexible underlay to be applied to the entire window head. Refer to the James Hardie Rigid Air Barrier installation manual for further information.

Figure 14: Cavity head flashing termination

Note: Accurate slot to be cut in Monotek™ Sheet to enable fit around head flashing. Prevent moisture ingress at end of slot by sealing gap.

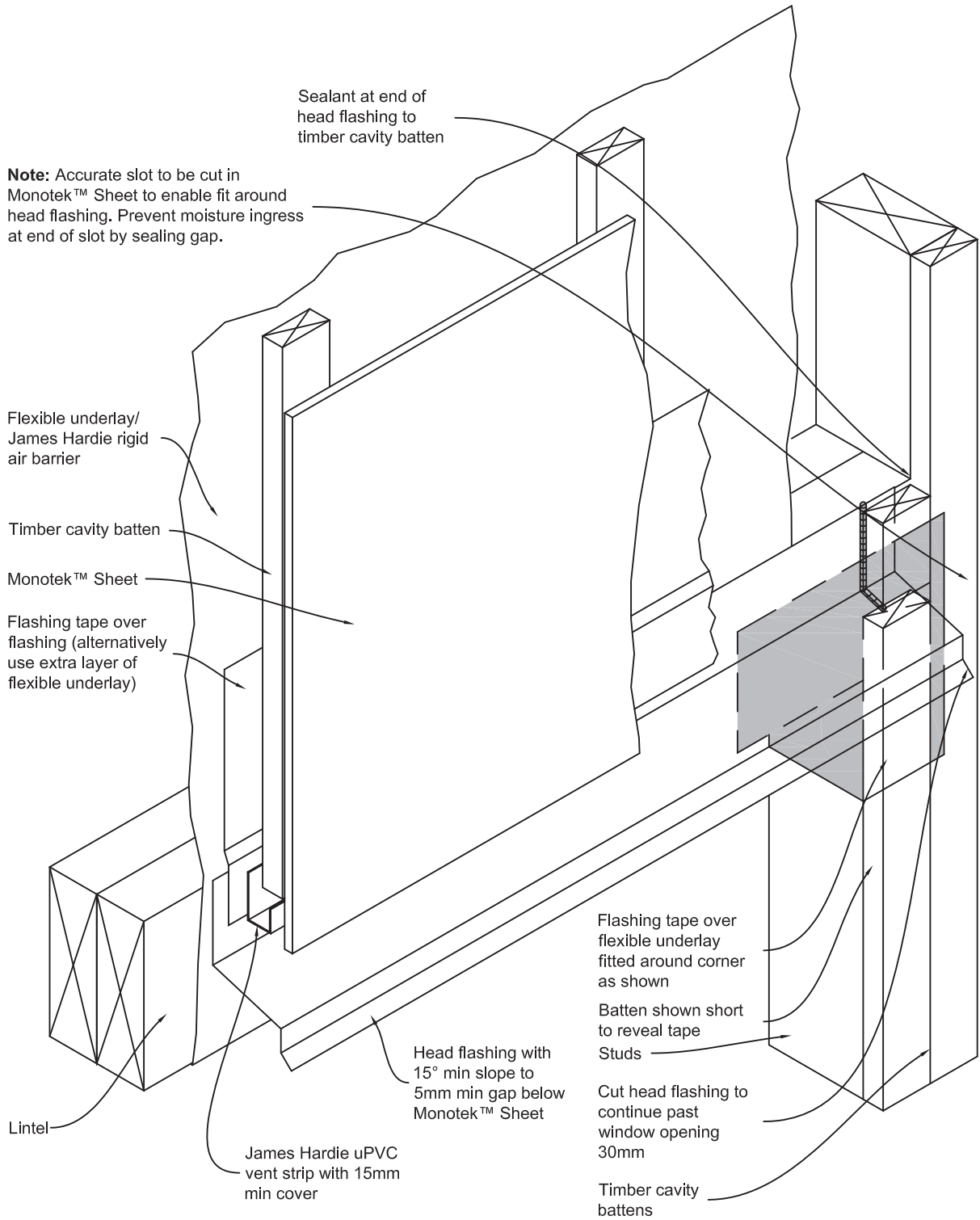
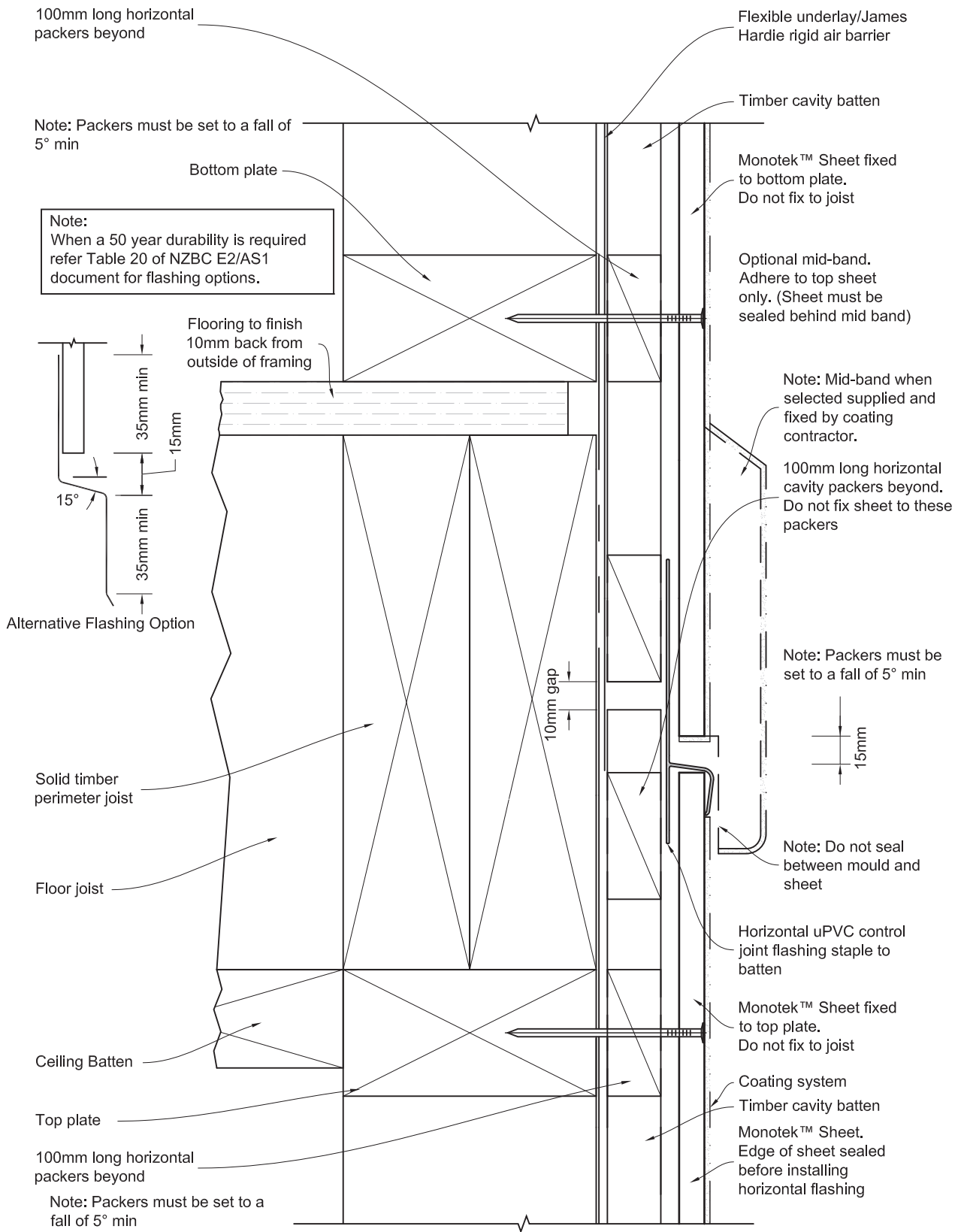
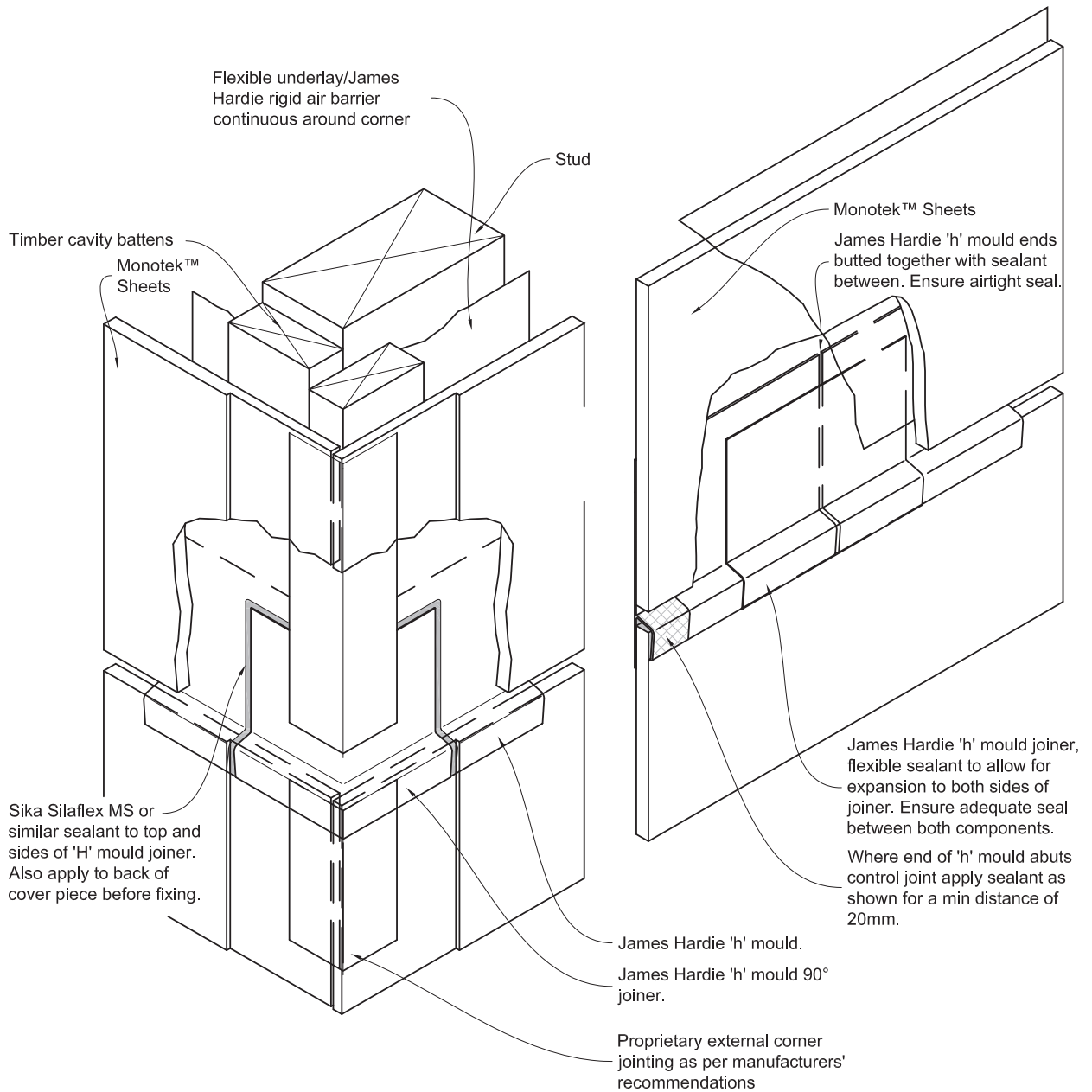


Figure 15: Cavity horizontal control joint



Vertical Section

Figure 16: Cavity 'h' mould joiner and corner



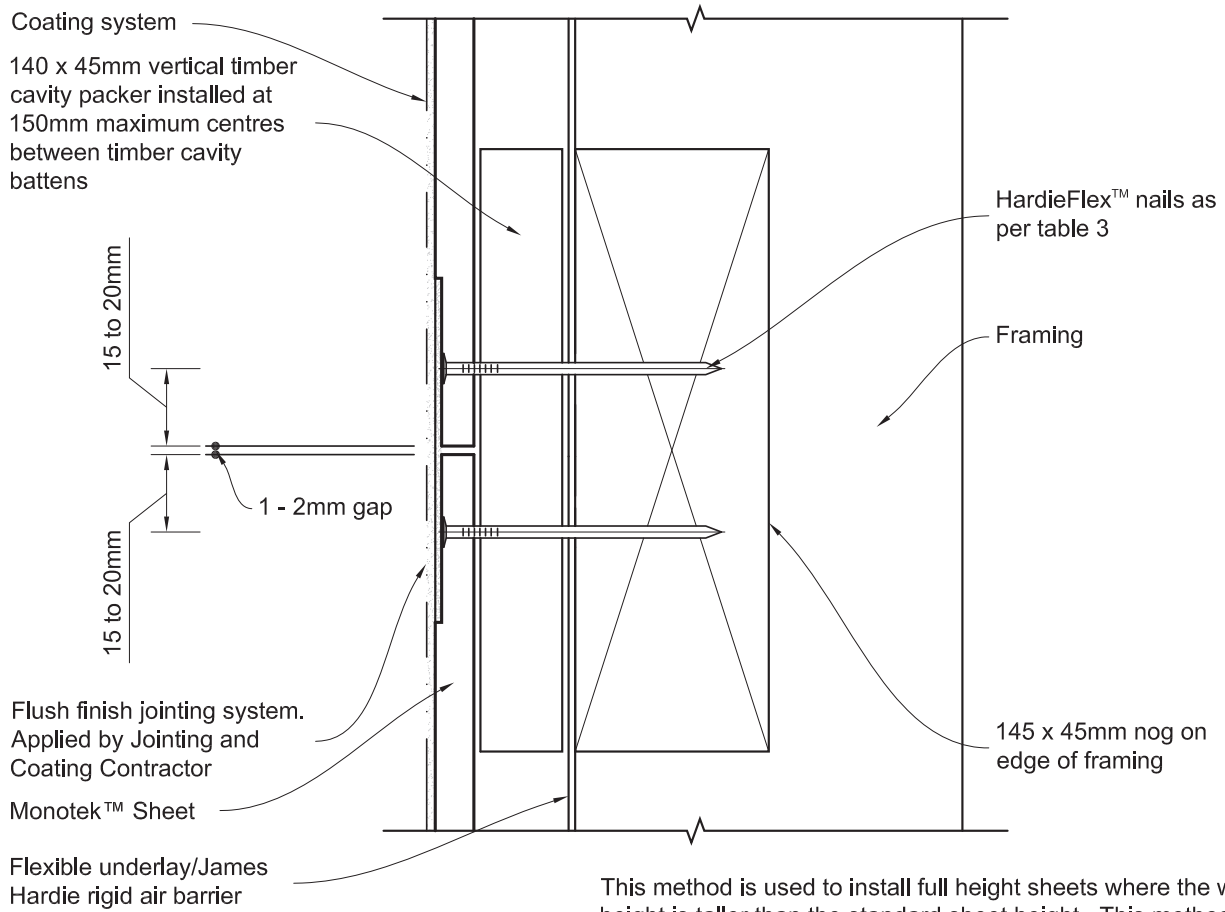
External Corner at Horizontal Joint.

Note: Proprietary systems corner - refer to installation as per manufacturers' recommendations

Note: Do not continue 'h' mould across control joints.

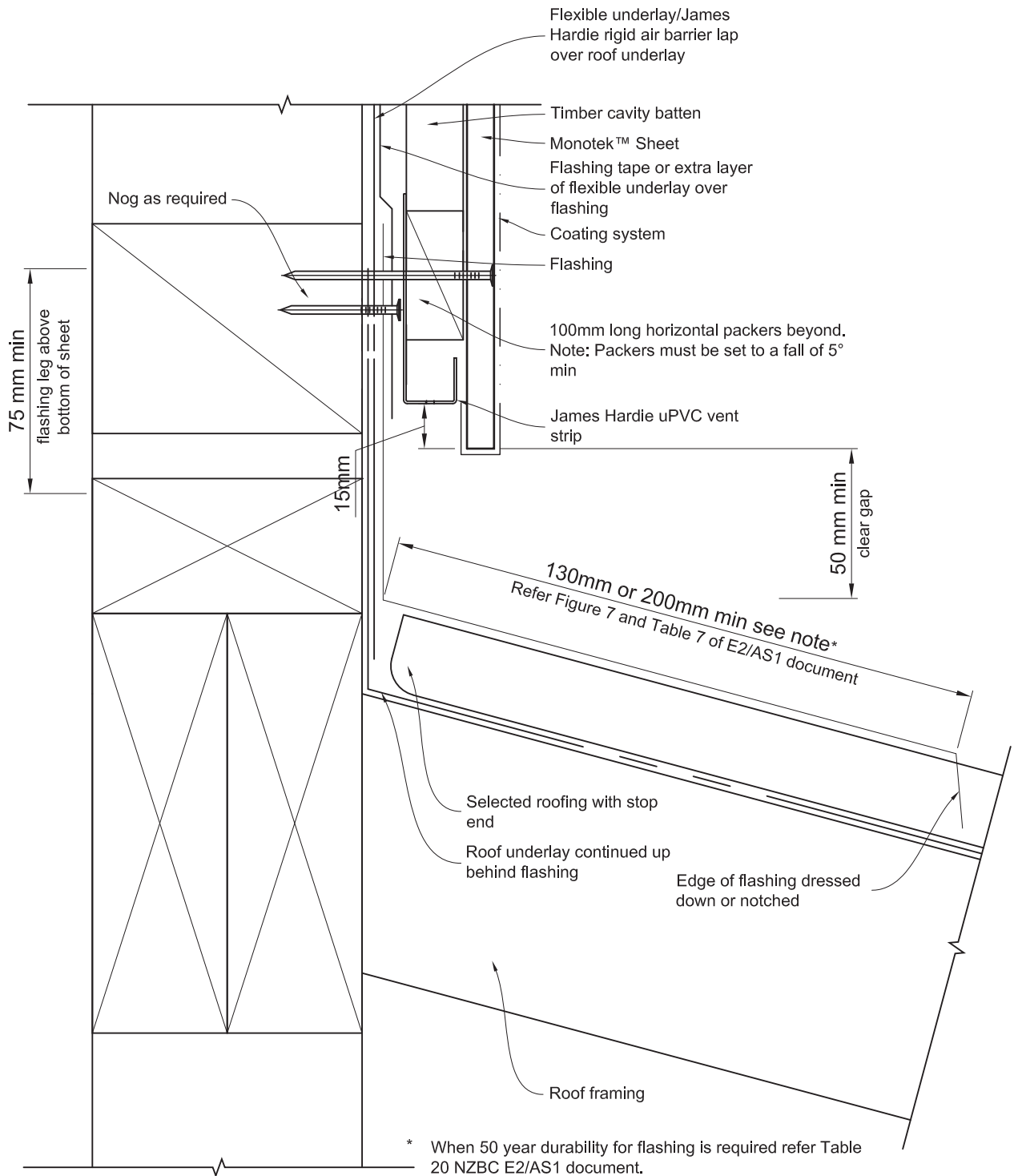
'h' Mould Joiner Connection

Figure 17: Cavity flush stopped horizontal joint



This method is used to install full height sheets where the wall height is taller than the standard sheet height. This method **must not** be used at floor joists or gable ends as a control joint

Figure 18: Cavity one piece apron flashing joint



Vertical Section

Figure 19: Cavity enclosed balustrade to wall

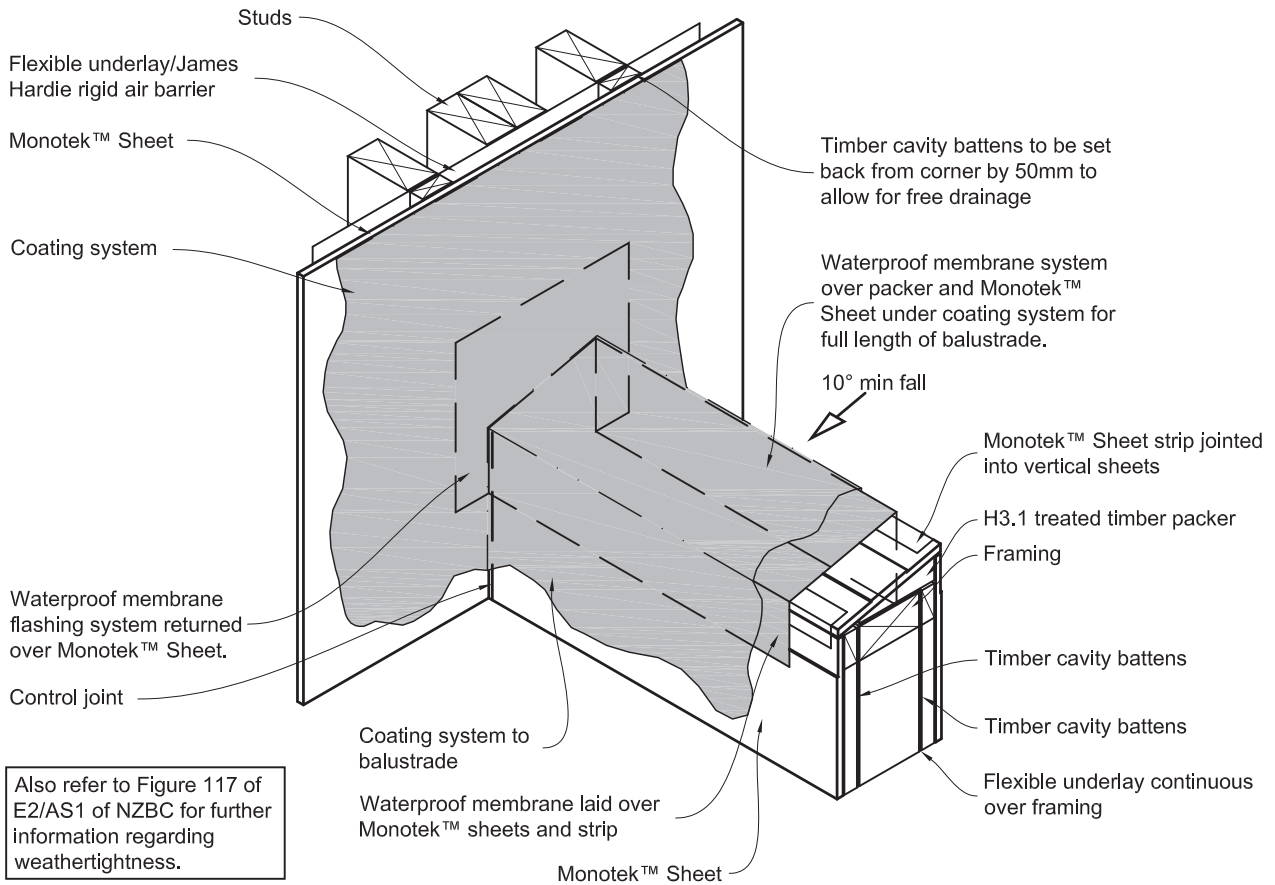
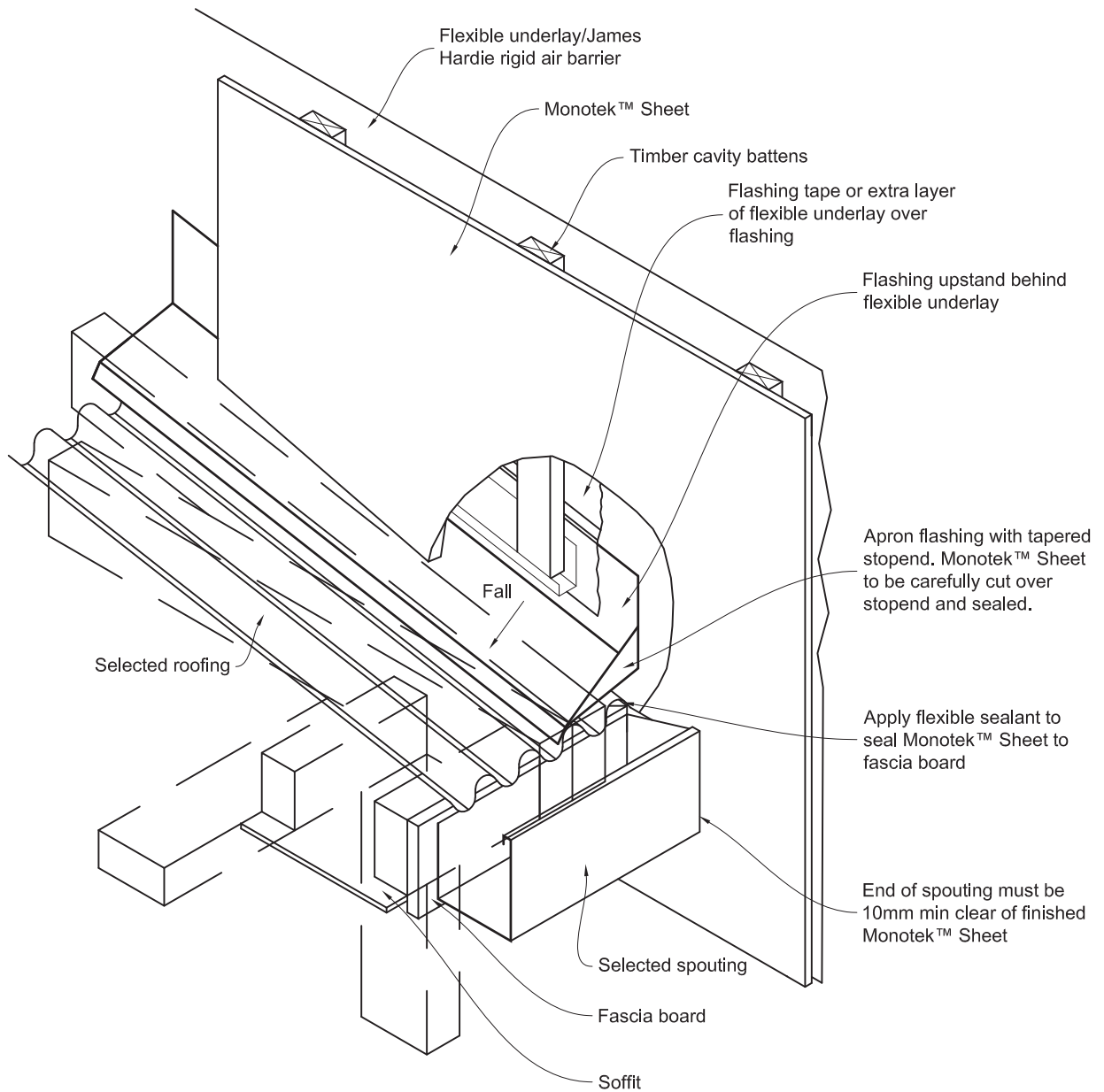


Figure 20: Cavity one piece gutter/wall junction



* When 50 year durability for flashing is required refer Table 20 NZBC E2/AS1 document.

Figure 21: Cavity parapet flashing

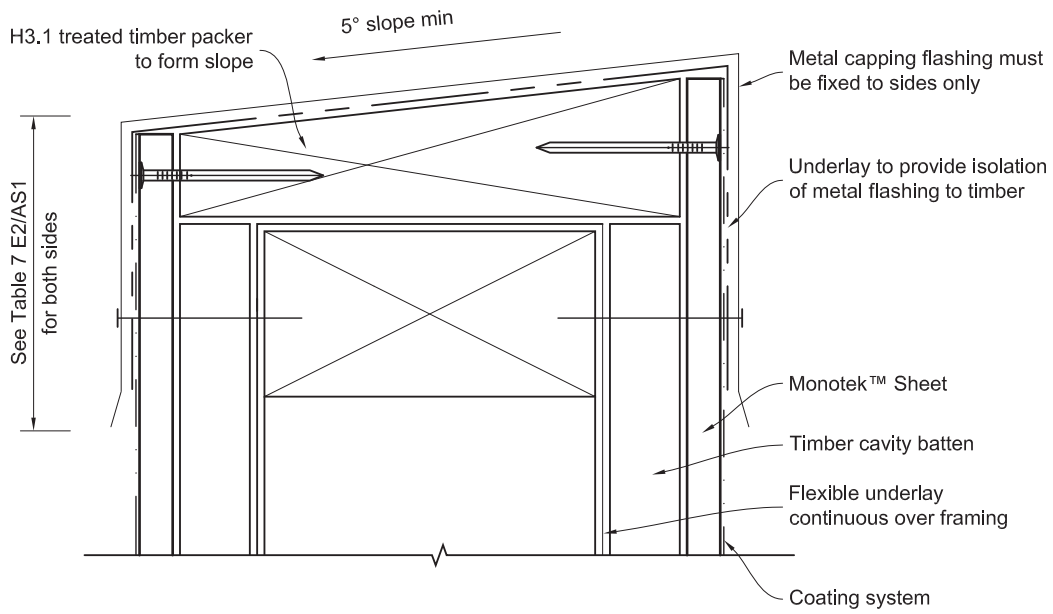


Figure 22: Cavity deck junction

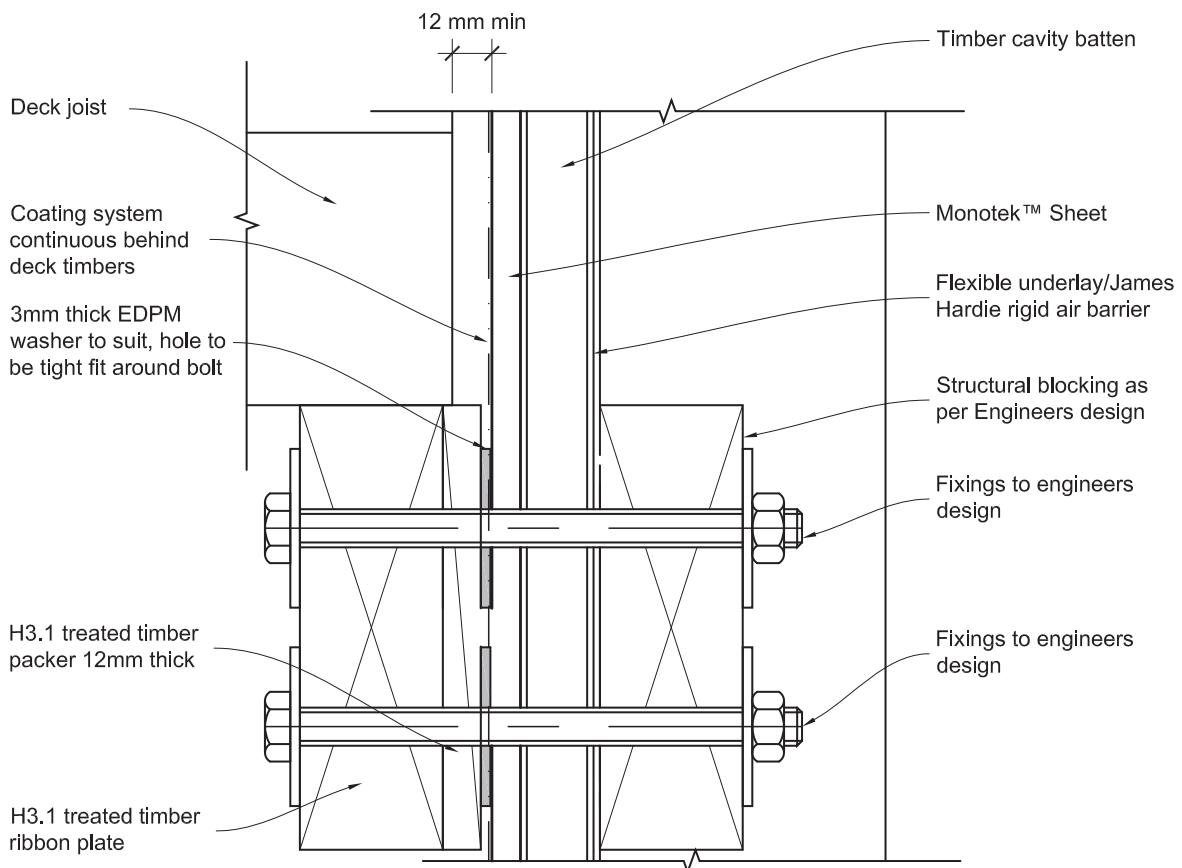


Figure 23: Cavity pipe penetration

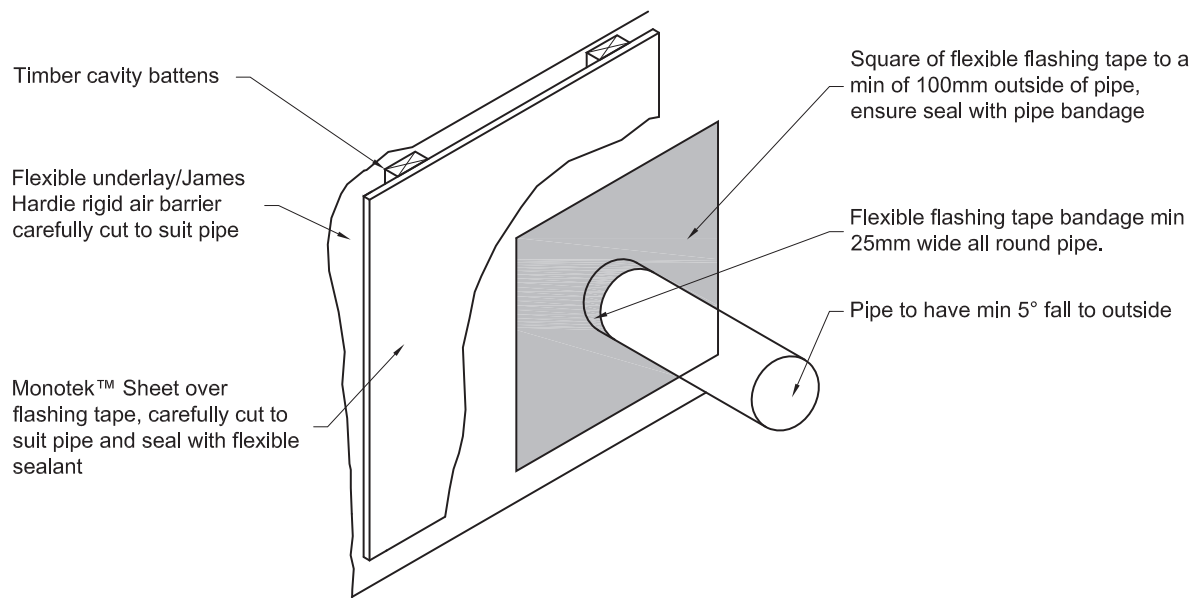
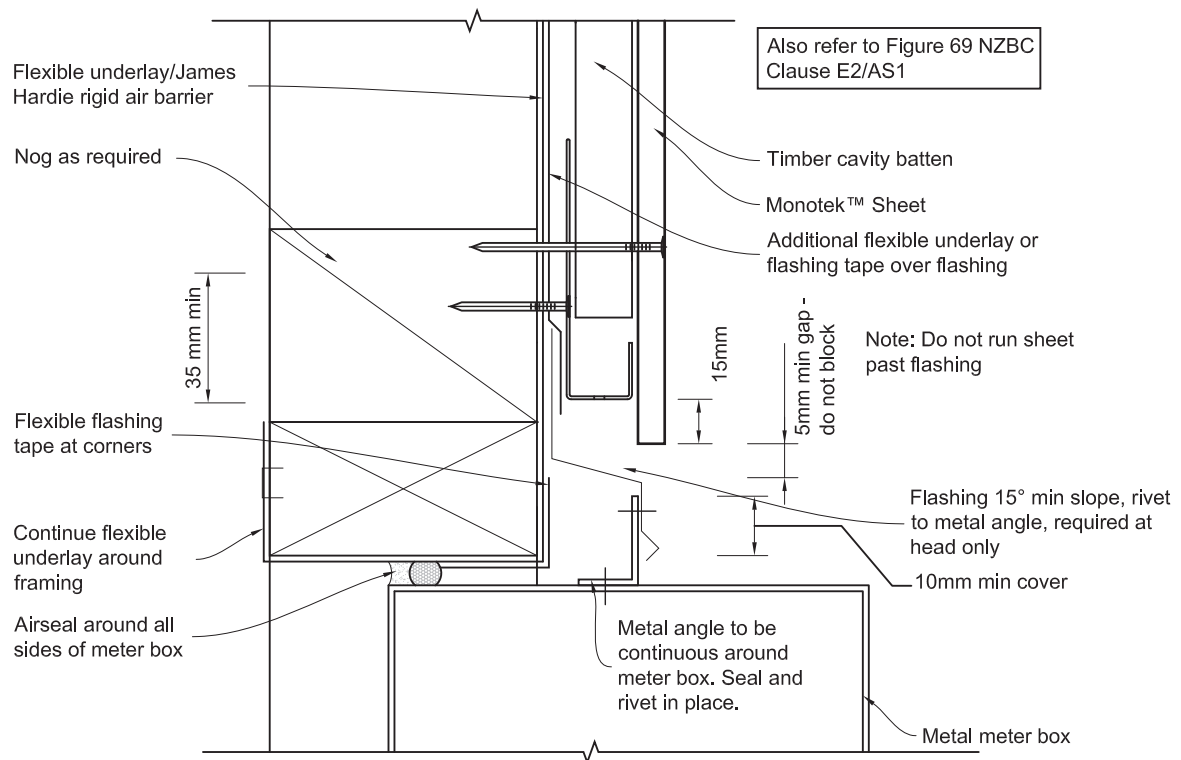


Figure 24: Cavity meter box at head



Note: When James Hardie rigid air barrier is used, flashing tape or flexible underlay to be applied to the entire window head. Refer to the James Hardie Rigid Air Barrier installation manual for further information.

Figure 25: Cavity meter box at sill

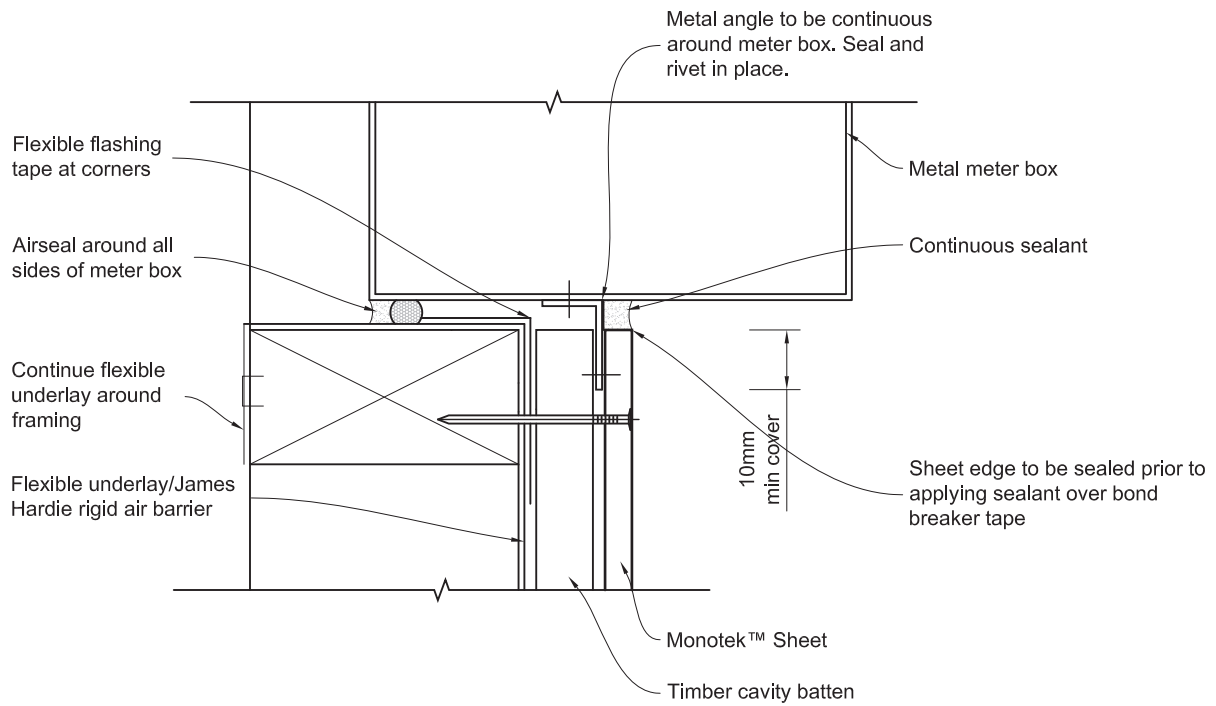
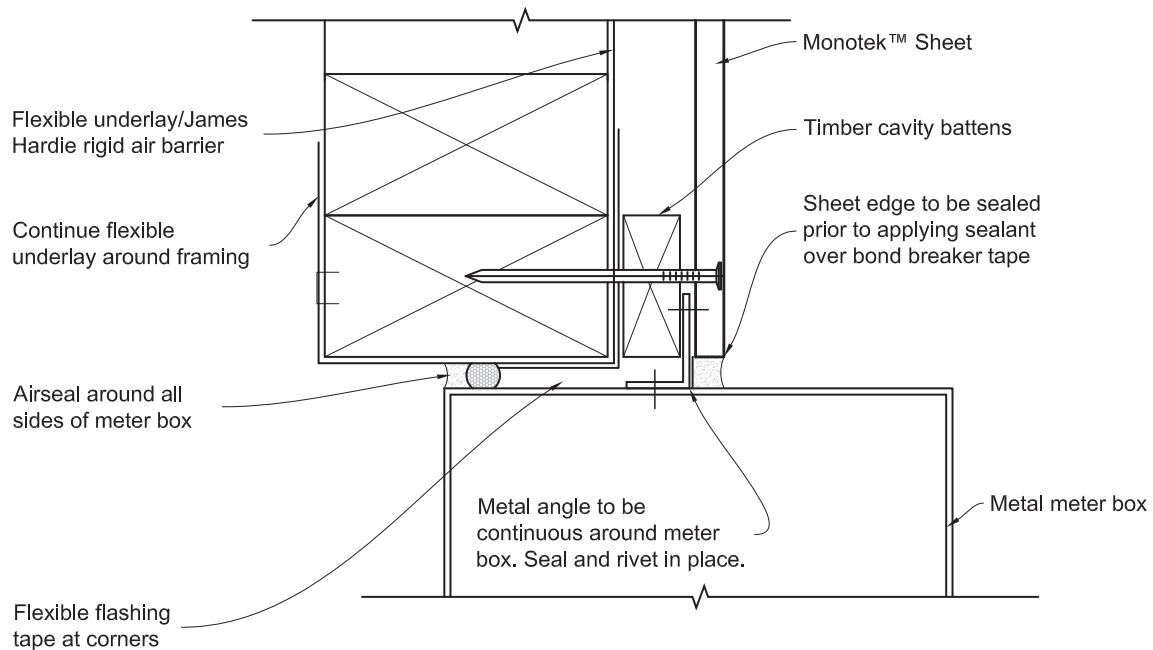


Figure 26: Cavity meter box at jamb



Note: When James Hardie rigid air barrier is used, flashing tape or flexible underlay to be applied to the entire window head. Refer to the James Hardie Rigid Air Barrier installation manual for further information.

Figure 27: Cavity at enclosed deck

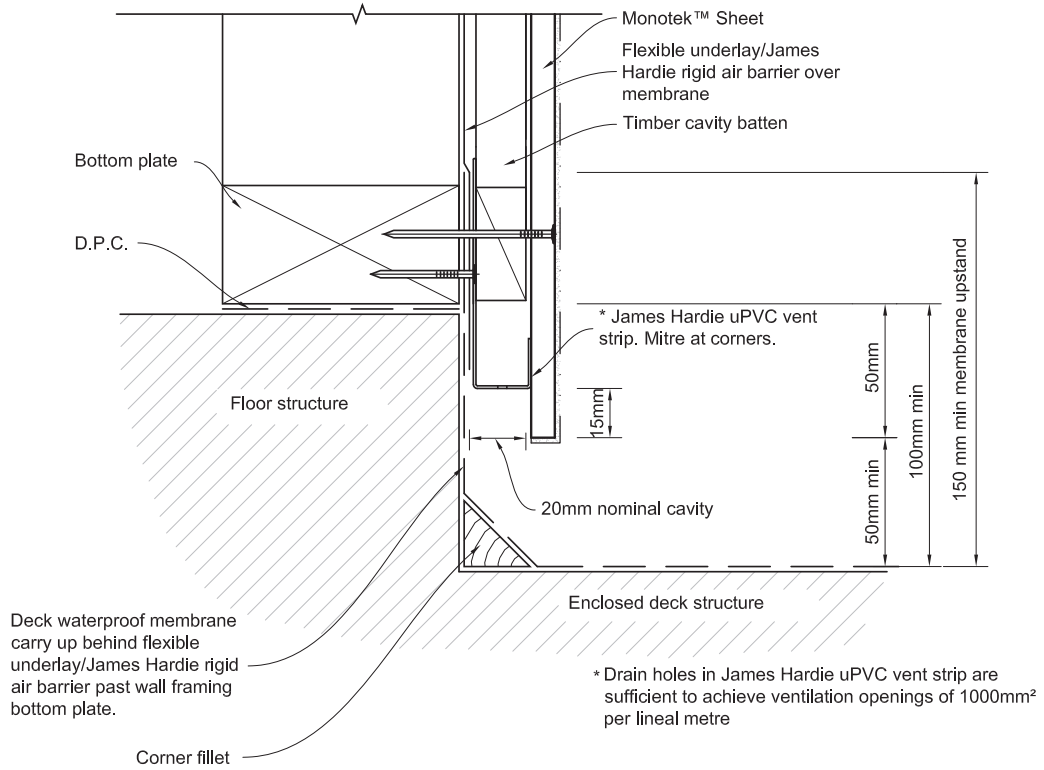


Figure 28: Cavity balustrade to wall junction

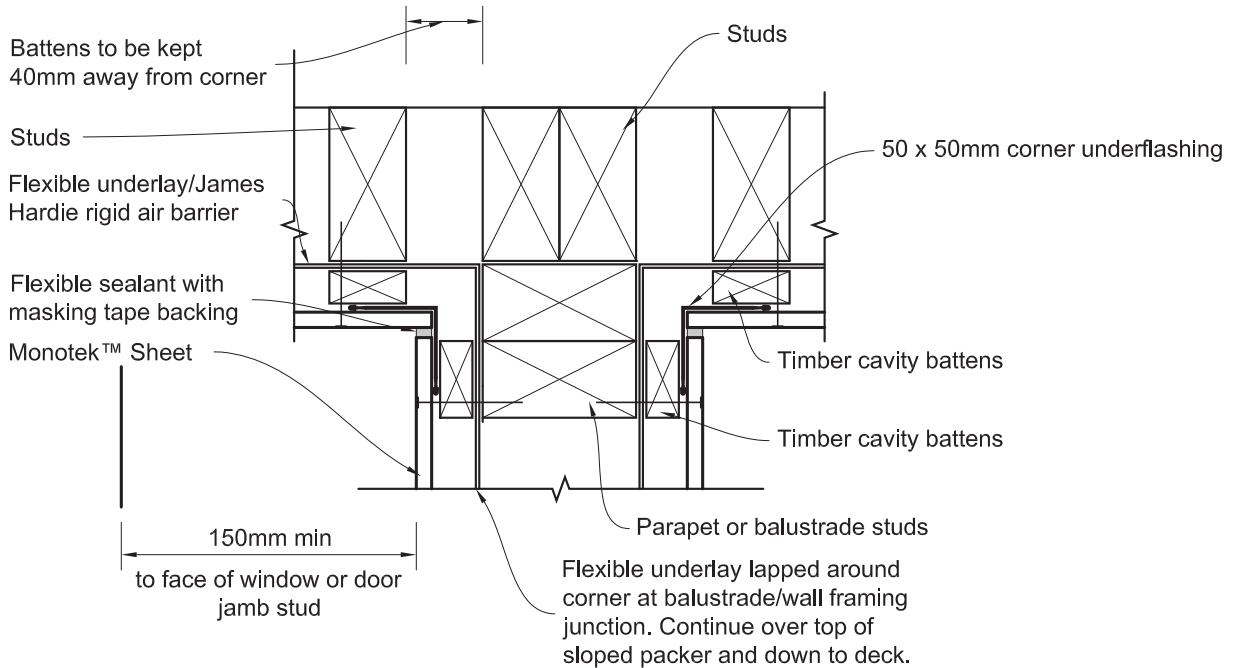
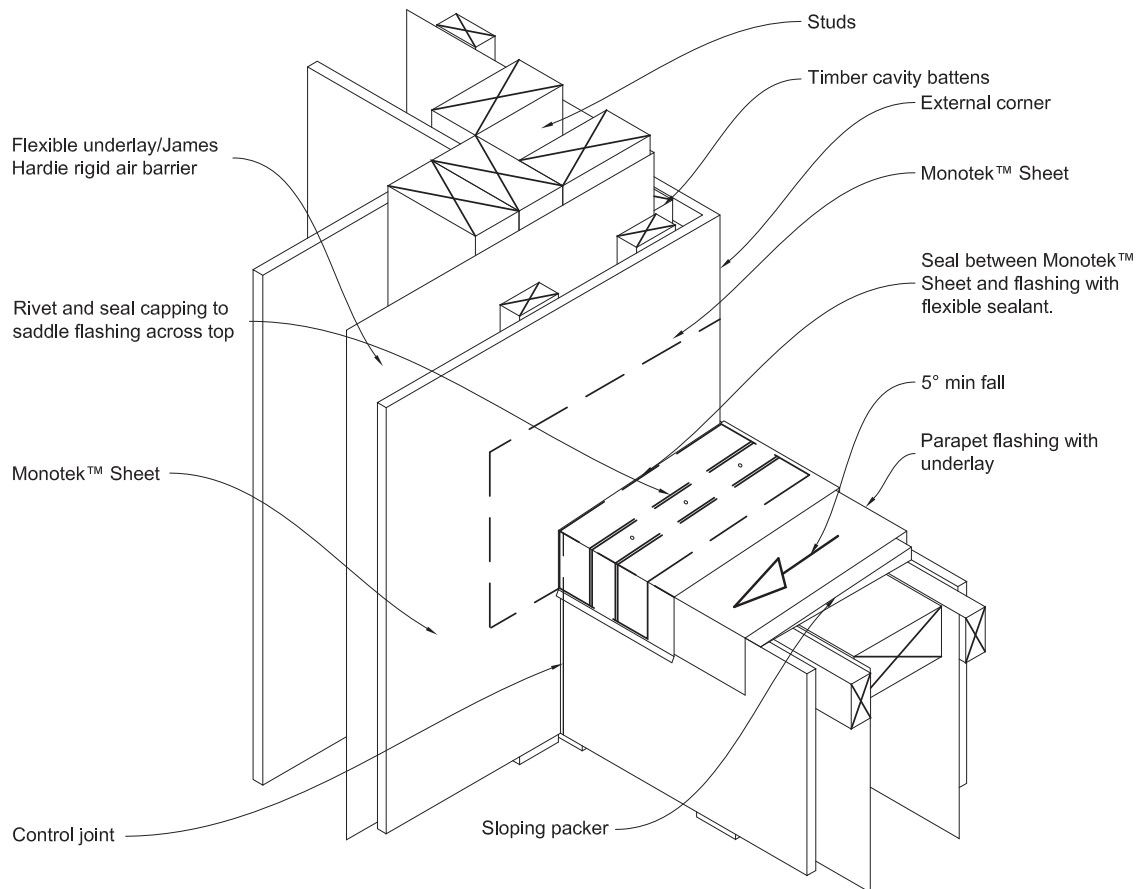


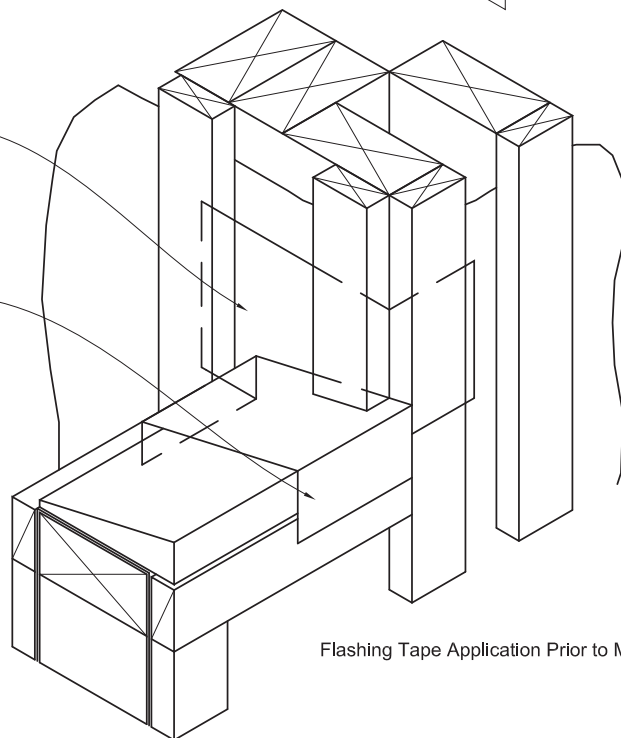
Figure 29: Cavity enclosed balustrade to wall



Flexible flashing tape dressed up and adhered to flexible underlay behind battens

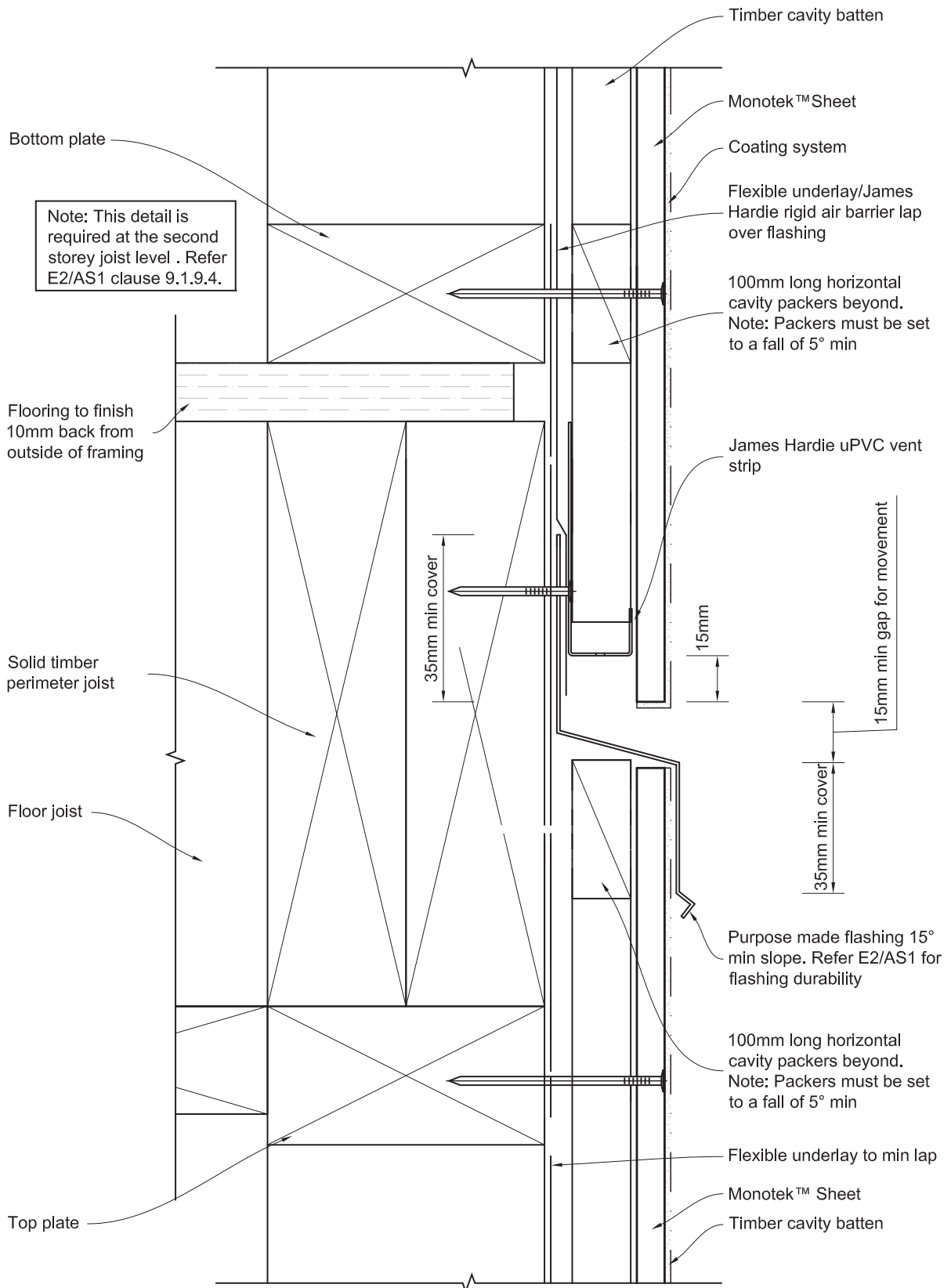
Flexible flashing tape to extend min 50mm down face of battens

Also refer to Figure 12 of E2/AS1 of NZBC for further information regarding weathertightness.



Flashing Tape Application Prior to Metal Flashing Fixing

Figure 30: Cavity drained flashing joint



Notes

Lined writing area for notes, consisting of 25 horizontal lines.

Product Warranty

James Hardie New Zealand Limited (“James Hardie”) warrants for a period of 15 years from the date of purchase that the Monotek™ Sheet (the “Product”), will be free from defects due to defective factory workmanship or materials and, subject to compliance with the conditions below, will be resistant to cracking, rotting, fire and damage from termite attacks to the extent set out in James Hardie’s relevant published literature current at the time of installation. James Hardie warrants for a period of 15 years from the date of purchase that the accessories supplied by James Hardie will be free from defects due to defective factory workmanship or materials.

Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

CONDITIONS OF WARRANTY:

The warranty is strictly subject to the following conditions:

- a) James Hardie will not be liable for breach of warranty unless the claimant provides proof of purchase and makes a written claim either within 30 days after the defect would have become reasonably apparent or, if the defect was reasonably apparent prior to installation, then the claim must be made prior to installation.
- b) This warranty is not transferable.
- c) The Product must be installed and maintained strictly in accordance with the relevant James Hardie literature current at the time of installation and must be installed in conjunction with the components or products specified in the literature. Further, all other products, including coating and jointing systems, applied to or used in conjunction with the Product must be applied or installed and maintained strictly in accordance with the relevant manufacturer’s instructions and good trade practice.
- d) The project must be designed and constructed in strict compliance with all relevant provisions of the current New Zealand Building Code (“NZBC”), regulations and standards.
- e) The claimant’s sole remedy for breach of warranty is (at James Hardie’s option) that James Hardie will either supply replacement product, rectify the affected product or pay for the cost of the replacement or rectification of the affected product.
- f) James Hardie will not be liable for any losses or damages (whether direct or indirect) including property damage or personal injury, consequential loss, economic loss or loss of profits, arising in contract or negligence or howsoever arising. Without limiting the foregoing James Hardie will not be liable for any claims, damages or defects arising from or in any way attributable to poor workmanship, poor design or detailing, settlement or structural movement and/or movement of materials to which the Product is attached, incorrect design of the structure, acts of God including but not limited to earthquakes, cyclones, floods or other severe weather conditions or unusual climatic conditions, efflorescence or performance of paint/coatings applied to the Product, normal wear and tear, growth of mould, mildew, fungi, bacteria, or any organism on any Product surface or Product (whether on the exposed or unexposed surfaces).
- g) All warranties, conditions, liabilities and obligations other than those specified in this warranty are excluded to the fullest extent allowed by law.
- h) If meeting a claim under this warranty involves re-coating of Products, there may be slight colour differences between the original and replacement Products due to the effects of weathering and variations in materials over time.

Disclaimer: The recommendations in James Hardie’s literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to conditions (c), (d), (f) and (g) above. James Hardie has tested the performance of the Monotek™ Sheet when installed in accordance with the Monotek™ Sheet technical specification, in accordance with the standards and verification methods required by the NZBC and those test results demonstrate the product complies with the performance criteria established by the NZBC. However, as the successful performance of the relevant system depends on numerous factors outside the control of James Hardie (e.g. quality of workmanship and design) James Hardie shall not be liable for the recommendations made in its literature and the performance of the relevant system, including its suitability for any purpose or ability to satisfy the relevant provisions of the NZBC, regulations and standards as it is the responsibility of the building designer to ensure that the details and recommendations provided in the relevant James Hardie installation manual are suitable for the intended project and that specific design is conducted where appropriate.

