

# SHADOWCLAD® SPECIFICATION & INSTALLATION GUIDE

**FOR CAVITY CONSTRUCTION**

FEBRUARY 2024

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## 1.0 SHADOWCLAD® PRODUCT RANGE

Manufactured in New Zealand by Carter Holt Harvey Plywood (CHH Plywood), Shadowclad® panels are suitable for use as an exterior wall cladding when using H3 treated panels.

Shadowclad is manufactured under a third party audited quality control programme to monitor compliance with AS/NZS 2269 Plywood Structural. All Shadowclad products carry Engineered Wood Products Association of Australasia (EWPAA) Joint Accreditation System – Australia and New Zealand (EWPAA/JAS-ANZ) certification.

Shadowclad has been BRANZ appraised as a cladding material for cavity wall construction. To view the BRANZ Appraisal No. 764 (2017) visit [www.chhply.co.nz](http://www.chhply.co.nz).

For specific information regarding the use of Shadowclad with weatherboard, solid plaster or brick vertical junctions refer to the Shadowclad Specification and Installation Guide for mixed cladding systems on cavity construction.

Our other plywood products:

- For specific information on plywood as a rigid air barrier, and/or bracing, refer to the current Ecoply® Barrier Specification and Installation Guide.
- For information relating to Ecoply structural plywood and applications other than exterior cladding, refer to the current Ecoply Specification and Installation Guide.

These are all available for download from [www.chhply.co.nz](http://www.chhply.co.nz).

The Shadowclad for cavity construction BRANZ Appraisal No. 764 (2017) does not cover:

- Shadowclad used as an interior lining.
- Handiply® Utilityclad™ plywood products.
- Shadowclad in direct fix cladding applications.

Shadowclad products must be competently installed in accordance with good building practices and sound design principles to satisfy the requirements of the Building Act 2004, the New Zealand Building Code (NZBC), and applicable New Zealand Standards. This is the responsibility of building owners and the design professionals and builders that they engage. This Shadowclad Specification and installation guide for cavity construction contains information, limitations, and cautions regarding the properties, handling, installation, usage, and the maintenance of Shadowclad products. However, to the maximum extent permitted by law, CHH Plywood assumes no legal liability to you in relation to this information.

*The information contained in this document is current as at February 2024. It is your responsibility to ensure you have the most up to date information available.*

*The information contained in this publication relates specifically to Shadowclad structural plywood products manufactured by CHH Plywood and must not be used with any other plywood manufacturer's products no matter how similar they may appear.*

*Alternative plywood products can differ in a number of ways which may not be immediately obvious and substituting them for Shadowclad structural plywood products is not appropriate, and could in extreme cases lead to premature failure and/or buildings which do not meet the requirements of the NZBC.*



## 1.1 TECHNICAL INFORMATION & CAD DETAILS

When specifying or installing any Shadowclad product visit [www.chhply.co.nz](http://www.chhply.co.nz) or call 0800 326 759 to ensure you have current specification material and any relevant technical notes.

For buildings containing mixed cladding solutions with Shadowclad refer Shadowclad Specification and Installation Guide for mixed cladding systems on cavity construction.

**Having trouble installing Shadowclad? Visit [www.chhply.co.nz](http://www.chhply.co.nz) or download the Shadowclad APP to view the installation animations of common Shadowclad junctions.**

## 1.2 PRODUCT DESCRIPTION & RANGE

Shadowclad structural plywood panels are manufactured from radiata pine wood veneers. The veneers are placed at right angles to each other for maximum strength and stability then bonded together with synthetic phenolic (PF) resin to form a strong and permanent Type A bond.

Shadowclad is available in panel sizes 2440/2745 x 1216mm (to provide 1200mm cover) and features a unique textured (bandsawn) appearance which also helps to diffuse UV rays for increased aesthetic performance when exposed to weather.

Shadowclad is available as a Textured or Grooved profile and in either Natural or Ultra finishes. The Selection, application and maintenance of coatings is the responsibility of the building owners and the professionals that they engage. For advice on specific coating systems and their suitability for use with Shadowclad Natural or Shadowclad Ultra, always refer to the coating manufacturer.

### Shadowclad Natural

Shadowclad Natural is an uncoated panel suitable for use with penetrating stains, film forming stains and paint systems. If Shadowclad is left uncoated or is clear coated in exterior applications the long term aesthetics of the board will be significantly reduced. While the product will meet NZBC Clauses B2 and E2 durability and weathertightness requirements for cladding, a high visual appearance will not be achieved in the long term.

### Shadowclad Ultra

Shadowclad Ultra features a factory applied exterior grade performance coating suitable for use with most paint and film forming stain systems. Using a unique powder coating process on the panel face and edges means Ultra panels can be immediately top coated on site, eliminating (in most cases) the need for expensive and time consuming wet primers.

CHH Plywood recommends the use of Shadowclad Ultra where suitable paint or film forming stains are being used.





Shadowclad Ultra features:

- High 60-80 microns film build, can be up to 2-3 times thicker than traditional wet primers.
- Continuous powder coated surface forms an effective moisture barrier for a drier more consistent painting surface.
- Saves time and money as traditional wet primers are not normally required.
- Panel surface, edges and bottom 150mm of sheet factory coated for increased panel durability.
- Once installed Shadowclad Ultra can be exposed to weather for up to 3 months prior to application of finishing coats.
- Low volatile organic compound (VOC) primer coating.

Shadowclad Ultra H3 is treated for use as an exterior cladding and is available both H3.1 LOSP and H3.2 CCA treated.

Shadowclad Ultra is not suitable for use with penetrating stains.

**Table 1: Surface Finishes**

Natural					Ultra				
Texture		Groove			Texture		Groove		
									
Shadowclad Natural is an uncoated panel suitable for staining and painting.					Shadowclad Ultra features a performance coated surface ready for top coating saving time and money when using paints and film forming stains. It is suitable for use in exterior applications only.				

**Table 2: Shadowclad Product Range**

	Texture	Groove
<b>Finish</b>	Natural or Ultra	Natural or Ultra
<b>Sheet Length</b>	2440 and 2745mm	2440 and 2745mm
<b>Width (Overall)</b>	1216mm	1216mm
<b>Width (Effective)</b>	1200mm	1200mm
<b>Cover/Width Tolerance</b>	+/- 1mm	+/- 1mm
<b>Nominal Thickness</b>	12mm	12mm
<b>Weight (kg/m<sup>2</sup>)</b>	6.6	6.6
<b>R-value (m<sup>2</sup>.C/W)</b>	0.104	0.104
<b>Groove Profile</b>	N/A	9mm wide, 5mm deep at 150mm centres
<b>Edge Profile</b>	Ship lap with weather groove	Ship lap with weather groove
<b>Treatment Available</b>	<ul style="list-style-type: none"> <li>• H3.1 LOSP (Azole)</li> <li>• H3.2 CCA (Ultra finish only)</li> </ul>	<ul style="list-style-type: none"> <li>• H3.1 LOSP (Azole)</li> <li>• H3.2 CCA (Ultra finish only)</li> </ul>

### Shadowclad Exterior Flashing Range

Manufactured from extruded aluminium or folded from 0.5mm thick G304 stainless steel, the Shadowclad flashings range is purpose designed to complement Shadowclad panels used in exterior applications.

Independently tested for weathertightness and compliant with Table 20 of E2/AS1, Shadowclad flashings achieve 50 year durability in all NZS 3604 exposure zones including zone D (sea spray).

**Note: Stainless steel fasteners should not have contact with or pierce aluminium flashings. Where stainless steel fasteners are to pierce flashings stainless steel flashings should be used.**

The range includes internal and external angles, Horizontal and inter-storey 'Z' flashings and a cavity base closure.

Aluminium horizontally installed flashings come in 3600mm lengths and vertically installed angles are available in 3000mm and 6000mm lengths - refer Table 4. Stainless Steel flashings are available in 3000mm lengths - refer Table 5.

The information, details and performance statements provided in this guide are based on Shadowclad plywood panels and Shadowclad flashings being used together as a system. CHH Plywood does not recommend that Shadowclad plywood panels be installed with non-CHH Plywood flashings. Flashings not supplied by CHH Plywood must, as a minimum, comply with E2/AS1 specifications and be compatible for use with H3.1 LOSP or H3.2 CCA treated plywood. It is the Designer's responsibility

to ensure that any non-CHH Plywood flashings are fit for purpose and compatible with Shadowclad products and any other building materials or components of the exterior wall.

### Aluminium Flashing Finishes

Shadowclad aluminium flashings are available in either natural anodised finish (silver colour) or in mill finish for powder coating.

### Exterior Flashings & H3.2 CCA Treated Shadowclad

#### Exposure Zone B & C

H3.2 CCA treated Shadowclad in exposure zones B and C (where flashings are exposed to weather) must use mill finished flashings which must be powder coated to the desired colour or use stainless steel flashings.

H3.2 CCA treatment contains copper. As such, some form of isolation between aluminium flashings and H3.2 CCA treated panels such as powder coating of the flashings is required. Refer to Table 21 "Compatibility of Materials in Contact" in E2/AS1 for more information.

#### Exposure Zone D (Sea Spray)

In exposure zone D (sea spray) flashings exposed to weather must be stainless steel for H3.2 CCA treated Shadowclad.

#### H3.2 CCA Treated Shadowclad

Uncoated aluminium flashings are not permitted to be in direct contact in any zone with H3.2 CCA treated Shadowclad under any circumstances.

**Table 3: Flashing Durability for Shadowclad**

Sheet Finish	Treatment	Exposure Zone (refer to section 4 of NZS 3604)	Flashing Material/Finish required
<b>Shadowclad Natural/Ultra</b>	H3.1 LOSP	Zones B and C	Aluminium Anodised, or Stainless Steel
		Zone D (Sea spray)	Stainless Steel*
<b>Shadowclad Ultra</b>	H3.2 CCA	Zones B and C	Stainless Steel#
		Zone D (Sea spray)	Stainless Steel

\* Aluminium Powder Coated flashings may be used in Exposure Zone D where Shadowclad is H3.1 LOSP treated and they are not pierced by Stainless Steel fasteners. Where stainless steel fasteners are to pierce flashings stainless steel flashings should be used.

# Aluminium Powder Coated flashings may be used in Exposure Zones B and C where Shadowclad is H3.2 CCA treated and they are not pierced by Stainless Steel fasteners. Where stainless steel fasteners are to pierce flashings stainless steel flashings should be used.

Table 4

## Aluminium

## Shadowclad Flashings Range

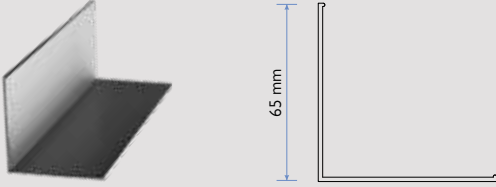
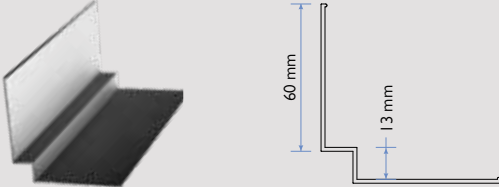
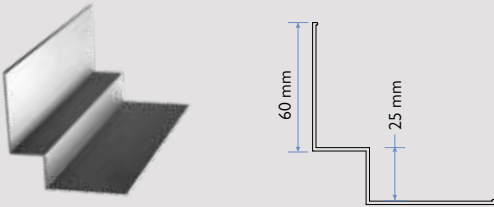
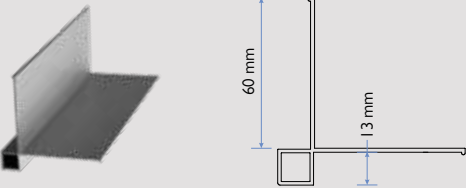
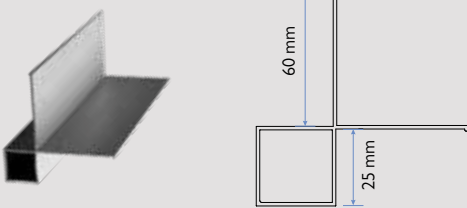
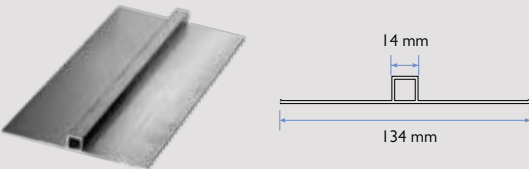
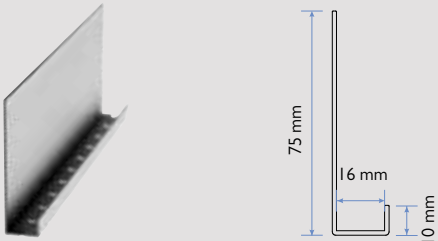
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Internal 90° Angle		Back flashing for internal corners	Natural Anodised	3000 or 6000
Internal 'W' Angle		'W' back flashing for internal corners providing a flush finish with panels (13mm x 13mm)	Natural Anodised or Mill	3000 or 6000
Large Internal 'W' Angle		'W' back flashing for internal corners (25mm x 25mm) <b>Design Tip:</b> Use a Large 'W' where a flush junction between the Horizontal 'Z' flashing and corner flashing is desired	Natural Anodised or Mill	3000 or 6000
External Box Angle		Box corner for external corners providing a flush finish with panels	Natural Anodised or Mill	3000 or 6000
Large External Box Angle		Box corner for external corners (25mm x 25mm) <b>Design Tip:</b> Use Large External Box where a flush junction between the Horizontal 'Z' flashing and corner flashing is desired	Natural Anodised or Mill	3000 or 6000
Vertical Top Hat		Vertical sheet joint flashing	Natural Anodised or Mill	3000 or 6000
Cavity Base Closure		Restricts vermin from accessing the cavity space	Natural Anodised	3600

Table 4

## Aluminium

## Shadowclad Flashings Range

Flashing	Line Drawing	Description	Finish Available	Length (mm)
Horizontal 'Z' Flashing		Horizontal 'Z' flashing for horizontal joints between panels	Natural Anodised or Mill	3600
Inter-Storey 'Z' Flashing		Horizontal 'Z' flashing for horizontal joints between panels when limiting continuous cavities to a height of two storeys or 7 metres	Natural Anodised or Mill	3600
Horizontal 'Z' Back Flashing		Back flashing for junction of butt jointed Horizontal 'Z' flashing	Mill	300
Inter-storey 'Z' Back Flashing		Back flashing for junction of butt joint 'Z' Flashing inter-storey	Mill	300

Table 5

Stainless Steel

Shadowclad Flashings Range

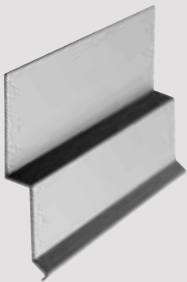
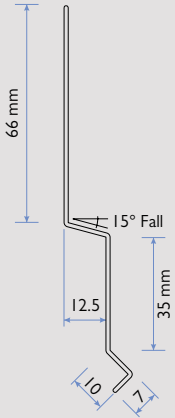
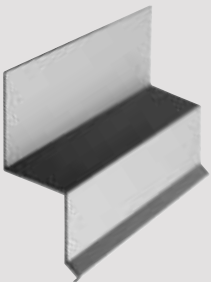
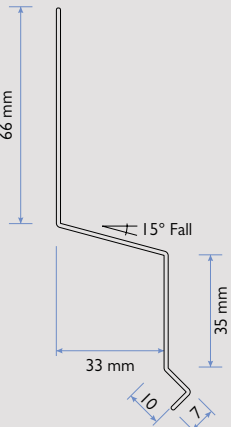
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Internal 90° Angle		Back flashing for internal corners	Stainless Steel	3000
Large Internal 'W' Angle		'W' back flashing for internal corners (25mm x 25mm)	Stainless Steel	3000
Large External Box Angle		Box corner for external corners (25mm x 25mm)	Stainless Steel	3000
Cavity Base Closure		Restricts vermin from accessing the cavity space	Stainless Steel	3000



Table 5

Stainless Steel

Shadowclad Flashings Range

Flashing	Line Drawing	Description	Finish Available	Length (mm)
Horizontal 'Z' Flashing	 	Horizontal 'Z' flashing for horizontal joints between panels	Stainless Steel	3000
Inter-Storey 'Z' Flashing	 	Horizontal 'Z' flashing for horizontal joints between panels when limiting continuous cavities to a height of two storeys or 7 metres	Stainless Steel	3000

## 1.3 BUILDING MATERIALS FOR USE WITH SHADOWCLAD (EXTERIOR CLADDING)

**Table 6: Materials Available from CHH Plywood**

	Description	Treatment	Size/Length
<b>Frame Flashing Tape<sup>1</sup></b>	For a secure and permanent seal of all Ecoply Barrier openings (Use in conjunction with Sill Tape)	-	150mm/200mm x 30m
<b>Sealing Tape<sup>1</sup></b>	For a secure and permanent seal of all Ecoply Barrier vertical joints	-	60mm x 30m
<b>Sill Tape<sup>1</sup></b>	One piece stretchable sill tape for window and door sills. 2 rolls per box	-	150mm/200mm x 20m
<b>Ecoply® Barrier<sup>1</sup></b>	Rigid Air Barrier System	H3.2 CCA	2440mm/2745mm x 1200mm
<b>Cavity Batten</b>	45 x 20mm (nominal)	H3.1 LOSP	Random
<b>Flashings</b>	Aluminium and stainless steel flashings range	Refer Tables 4 and 5	Refer Tables 4 and 5

1. Please refer to the Ecoply Barrier Specification and Installation Guide for more information.

### Building Materials Supplied by Other Manufacturers

- Fasteners (i.e. nails or screws) in accordance with Table 9: Fastener Lengths for Shadowclad fixing.
- Building underlay compliant with Table 23 of E2/AS1.
- Window/door head flashings supplied by window joinery company.
- Paint in accordance with paint manufacturer's recommendations (refer to 5.3 Coating Selection for more details).

## 1.4 PRESERVATIVE TREATMENT

Shadowclad is H3 treated for use as an exterior cladding. H3 treated Shadowclad is treated in accordance with AS/NZS 1604.3 with the standard treatment for Shadowclad panels being H3.1 LOSP (Azole). H3.2 CCA treatment is also available for Shadowclad Ultra panels if required.

**Shadowclad is envelope preservative treated. Where sheets are cut, cuts must be coated with a brush on timber preservative in accordance with the relevant manufacturer's instructions. Soudal® Metalex® Concentrated Timber Preservative Clear (Soudal® Metalex® Clear) is recommended. Failure to properly apply preservative to cut edges will negatively affect the durability of the cut panels.**

### H3.1 LOSP Treatment

H3.1 LOSP treatment is the standard treatment for Shadowclad panels as it does not discolour the panel surface and does not

use water in the treatment process allowing panels to remain at uniform dimensions.

When coating H3.1 LOSP treated plywood some residual solvent may be present on the sheet surface from the treatment process. Sheets feeling greasy to touch should be placed in a well ventilated area and allowed to flash off to ensure proper adhesion of paints and stains to the sheet surface.

Mechanical fasteners are required to fix H3.1 LOSP treated Shadowclad to framing. Do not glue Shadowclad to frames.

### H3.2 CCA Treatment

H3.2 CCA uses water during the treatment process and may leave panel surfaces with a slight green colour. For this reason H3.2 CCA treatment is available only in the Shadowclad Ultra finish.

**Table 7: Preservative Treatment Options**

	H3.1 LOSP (Azole)	H3.2 CCA
<b>Preservative Carrier</b>	Light organic oil (white spirits)	Water
<b>Colour</b>	Natural	Green
<b>Fungicide</b>	Propiconazole and Tebuconazole	Copper
<b>Insecticide</b>	Permethrin	Arsenate
<b>Other Chemicals</b>	Butyl Oxitol (co-solvent to assist active stability)	Chrome (to fix preservative in water)
<b>Mouldicide</b>	IPBC	Copper (limited efficiency)
<b>Notes</b>	Solvent does not affect dimensions. Solvent smell disappears when exposed to air flow	Dried after treatment to average 18% moisture content
<b>Applications (Refer NZ S3602)</b>	Exterior (service performance subject to detailing and coatings used)	Exterior (service performance subject to detailing and coatings used)

## 1.5 SUSTAINABILITY

Carter Holt Harvey's commitment to the environment is fundamental to its business. From the use of plantation forests to promoting policies minimizing waste and emissions, CHH is proud of the sustainable base for its products.

CHH Plywood uses waste handling procedures to optimise recovery and manage the creation of arisings. This starts with the use of only radiata pine sourced from sustainably managed renewable plantations and includes the application of optimisation algorithms for veneer peeling to enhance finished goods recovery.

CHH Plywood has been actively involved in the development of markets for the use of downgraded arising product for use in industrial applications including packaging whilst peeler cores are often reprocessed for use as bearers. All waste product derived is assessed for downstream applications including bark for landscaping, boiler fuel and/or sold for use in wood fibre products.

### Environmental Product Declaration (EPD)

The CHH Plywood EPD is a demonstration of the continual focus and commitment to sustainability, through a science driven, independently verifiable process with standard methodology across all products.

### Environment, Social and Governance (ESG)

Carter Holt Harvey has developed a new ESG reporting programme. The company has focused on setting out what its stakeholders have identified as material ESG issues, how it manages, or plans to manage those issues, and key environmental indicators. In the future, Carter Holt Harvey will celebrate its ESG achievements and acknowledge those areas where it needs to improve, keeping on a path of steady improvement that will further strengthen Carter Holt Harvey in the years to come.

### FSC® and Sustainability Accreditations

CHH Plywood sources logs from sustainably managed plantation forests, and has the Forest Stewardship Council® (FSC®) Chain of Custody certification (FSC® C012019). This measure provides a formal assurance that gives CHH Plywood's customers confidence about its sustainability credentials. CHH Plywood's products can be supplied with a FSC certificate on request.

### EWPA Formaldehyde Emission Classifications Certificate

Formaldehyde Emissions for CHH Plywood products are measured as being less than 0.5 mg/L, classed as E0

To view and download certificates and documents related to Sustainability please visit [www.chhply.co.nz/sustainability](http://www.chhply.co.nz/sustainability)

## 1.6 PRODUCT IDENTIFICATION

In accordance with AS/NZS 2269, every sheet of Shadowclad plywood has the following information marked on the back:

- Brand name: e.g. SHADOWCLAD®.
- Intended application: e.g. STRUCTURAL.
- Glue bond: e.g., A BOND.
- Formaldehyde emission class: e.g. E0.
- Australasian Standard: e.g. AS/NZS 2269:2012.
- Treatment Standard (if applicable) e.g. AS/NZS 1604.3:2012.
- Date and time of manufacture: e.g. 01/12/15 12:34:56.
- The Engineered Wood Products Association of Australasia (EWPA) brand and mill number: e.g. 911 (Tokoroa mill).

SHADOWCLAD STRUCTURAL A BOND E0 AS/NZS 2269.0:2012  
AS/NZS 1604.1:2021 AS/NZS 1604.3:2012 131 64 H3 E H3.1 LOSP RETREAT CUTS  
PAT 12/12/2023 12:23:45 CHH.COM



## 2.0 DESIGN CONSIDERATIONS

### 2.1 DESIGN RESPONSIBILITY

Design responsibility lies with the building owner and the professionals that they engage. The specifier for the project must ensure that the details in the specification for their individual projects are appropriate for the intended application. The specifier must also ensure that additional detailing is provided for specific design or any areas that fall outside the scope and specifications of this literature. It is the specifier's responsibility to ensure that non-CHH Plywood products are fit for purpose, and compatible with Shadowclad products.

Good detailing which avoids moisture or dust accumulation on the sheet surface can help increase durability and aesthetics. Roof overhangs contribute to performance as they offer shade and will protect walls from rain and dust. Trims should be bevelled to shed moisture and flashings should be detailed with gaps that do not trap water at the panel edges.

## 2.2 LITERATURE SCOPE

Shadowclad can be used for those structures which fall within the scope of Acceptable Solution E2/AS1 - External Moisture. Shadowclad is recommended for a drained and ventilated cavity, where the cladding is fixed onto timber battens fixed over the timber frame and building underlay.

Shadowclad is not recommended where a risk score >20 in accordance with E2/AS1 is established.

## 2.3 CODE COMPLIANCE

Shadowclad on a cavity wall system is tested in accordance with E2/VM1 and AS/NZS 4284 "Testing of Building Facades" for compliance with the NZBC Clause E2 - External Moisture.

## 2.4 SITE & FOUNDATIONS

The site on which the building is situated must comply with the Functional and Performance Requirements of the NZBC Clause E1 - Surface Water.

## 2.5 GROUND CLEARANCES

The bottom edge of each Shadowclad sheet must be a minimum of 50mm above decks and verandahs, 100mm above paved ground and a minimum of 175mm above unprotected ground.

For garage door openings, refer Paragraph 9 "Openings to garages" in Acceptable Solution E2/AS1.

Shadowclad must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZS 3604 and E2 - External Moisture. Maximum distance from the bottom of the sheet to the fixing shall not exceed 75mm.

## 2.6 MOISTURE MANAGEMENT

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

Where a deck is attached to the building and the Shadowclad extends below the deck to cover the framing, keep decking clear of the Shadowclad surface and detail to avoid moisture entrapment.

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

All wall openings, penetrations, junctions, connections, window sills, heads and jambs must incorporate Shadowclad flashings for waterproofing. Materials, components and the installation used to manage moisture in framed wall construction must, at a minimum, comply with the requirements of the NZBC.

## 2.7 WIND LOADING

Shadowclad is suitable for use in all wind zones up to and including extra high (55m/s) as defined by NZS 3604 and specific design wind pressures up to design differential ultimate limit state (ULS) of 2.5kPa.

## 2.8 DURABILITY

The durability level applicable to Shadowclad is dependent upon the application and coating applied. Detailing, treatment and installation methods need careful consideration to satisfy the requirements of the NZBC.

### Exterior Cladding – 15 Year Durability

**CHH Plywood does not recommend Shadowclad is left uncoated when used as an exterior cladding.**

The NZBC Clause B2 requires claddings to achieve a minimum structural durability level of 15 years.

Shadowclad coated with stains or paints (regardless of colour choice) will meet this requirement. However, if using dark colours (colours with an LRV of less than 50%) homeowners

should expect an increased level of coating maintenance over the life of the cladding than would normally be expected where lighter colours are used.

**Using dark colours with an LRV of less than 50% and failure to adequately maintain the surface coating of the cladding increases the risk of aesthetic related issues such as face checking. For this reason, CHH Plywood does not support the use of dark colours on Shadowclad exterior cladding.**

#### Additional Notes:

For further advice on coatings refer to section 5.0: Coating and Application – Exterior Cladding.

## 2.9 TEXTURED VS. SMOOTH FINISHED PLYWOOD AS EXTERIOR CLADDING

Structurally, some smooth faced plywood products may meet the requirements of E2/AS1 however in CHH Plywood opinion smooth faced plywood does not retain a high visual appearance when directly exposed to weathering.

Where a high visual appearance is desired (such as exterior cladding) CHH Plywood recommends the use of Shadowclad rather than smooth faced plywood.

Shadowclad features a textured (bandsawn) face which reduces the visibility of natural face checking which can occur in any wood based product which has been exposed to weather for a prolonged period.

Face checks are not considered a manufacturing fault as they are part of a natural process and are merely an indication that it is time to re-apply the surface coating on the product.

## 2.10 HEALTH & SAFETY

Shadowclad should be installed and used as per the Safety Data Sheet (SDS) which can be downloaded from [www.chhply.co.nz](http://www.chhply.co.nz).

Always wear safety glasses or non-fogging goggles when cutting Shadowclad panels and flashings.

If wood dust exposures are not controlled when machining (sawing, routing, planing, drilling etc.) a class P1 or P2 replaceable filter or disposable face piece respirator should be worn.

Wear comfortable work gloves to avoid skin irritation and the risk of splinters. Wash hands with mild soap and water after handling panels.

## 2.11 STORAGE & HANDLING

### Shadowclad Panels:

- Keep Shadowclad® panels dry.
- Store under cover.
- Handle and stack with care to avoid damage.
- Stack flat; clear of ground, on at least three evenly spaced bearers.
- Store in well-ventilated areas away from sources of heat, flames or sparks.

### Shadowclad Flashings:

- Keep dry. Should a shipment of Shadowclad flashings arrive in a wet condition, they should be immediately dried before storing.
- When storing flashings avoid contact with other metals which may cause scratches or marks. The use of shelving or racks faced with dry wood is recommended.
- Keep away from caustics, nitrates and acids.

## 3.0 PRE INSTALLATION INSPECTION

Prior to installation, inspect panels for visual defects. Responsibility lies with the installer to ensure individual panels meet the aesthetic requirements for the specific project. CHH Plywood will not be responsible for installation or removal costs where aesthetically unacceptable panels have been installed.

Shadowclad panels may include minor imperfections associated with veneer based wood products.

Shadowclad panels are subject to natural characteristics of timber.



## 4.0 INSTALLATION – EXTERIOR CLADDING

### 4.1 FRAMING – DURABILITY

Refer to NZBC Acceptable Solution B2/AS1 “Durability”. External timber framing must be treated to a minimum H1.2 treatment. For timber treatment and allowable moisture content,

refer to NZS 3602 as well as framing manufacturer's literature (e.g. Laserframe®). The current Laserframe Product Guide can be downloaded from [www.chhwoodproducts.co.nz/librarytools](http://www.chhwoodproducts.co.nz/librarytools).

### 4.2 FRAMING – CONSTRUCTION

Use kiln dried framing such as Laserframe in accordance with timber framing manufacturer's specifications and treated in accordance with NZS 3602. The current Laserframe Product Guide can be downloaded from [www.chhwoodproducts.co.nz/librarytools](http://www.chhwoodproducts.co.nz/librarytools).

Timber frame sizes and set out must comply with NZS 3604 (or specifically designed to NZS 3603) and with stud and nog centres and timber width required by this specification.

All Shadowclad sheet edges must be fully supported by framing.

- Studs must not exceed 600mm centres.
- Nogs must be provided at a maximum of 800mm centres.
  - When using vertical cover battens nogs at maximum 600 centres.
- An extra stud is required at internal corners for ventilated cavities.
- Refer to NZS 3602 for moisture content requirements as a guide, frame and cavity batten moisture content should be no greater than 20%.
- Framing must be kept as dry as possible at all times.
- Single spans of Shadowclad should not exceed 600mm (e.g. below windows or balustrades).

### 4.3 PREPARATION – BUILDING UNDERLAY & RIGID AIR BARRIER

The use of building underlay compliant with Table 23 of E2/AS1 or an alternative solution rigid air barrier must be provided over framing prior to the installation of exterior cladding.

- Barriers to air flow are required.
- Rigid air barriers are required in extra high wind zones and above.

- Rigid air barriers are also required in high wind zones and above for Ministry of Education school properties.

For more information on rigid air barriers refer to the current Ecoply Barrier Specification and Installation Guide which can be downloaded from [www.chhply.co.nz/librarytools](http://www.chhply.co.nz/librarytools).

### 4.4 PREPARATION – CAVITY CONSTRUCTION

#### Cavity Construction

A Shadowclad cavity base closure must be installed at the bottom of all walls and above window heads, this provides vermin proofing to ventilation openings. The holes in the cavity base closure must be kept clear to enable ongoing drainage and ventilation of the cavity.

#### Cavity Battens

Cavity battens provide an air space between the frame and the sheet and are considered a “packer” when installed in accordance with Acceptable Solution E2/AS1.

The battens must be fixed over the building underlay or a rigid air barrier.

All timber battens must: be nominal 20mm thick (between limits of 18mm and 25mm in thickness); at least the same width as the stud; and minimum H3.1 LOSP treated in accordance with NZS 3640.

Polystyrene battens **must not** be used with H3.1 LOSP treated Shadowclad panels, as they may melt in contact with solvents.

Battens must be fixed over the building underlay/rigid air barrier to all studs, as follows.

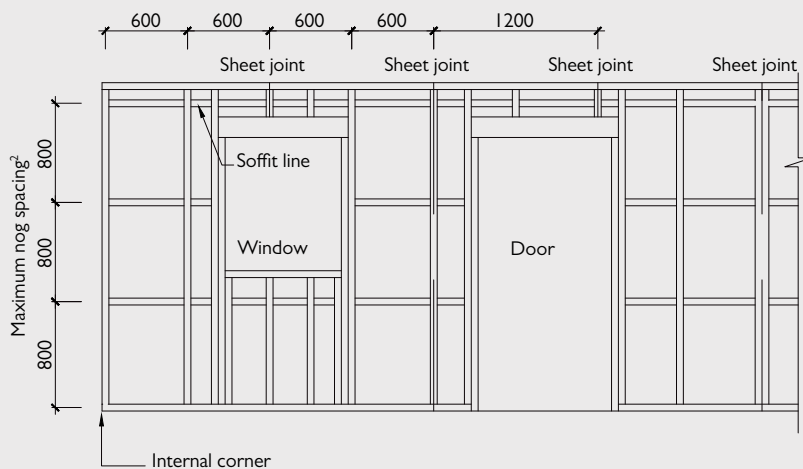
If studs are at 600mm centres:

- Battens must be fixed vertically at 300mm centres (i.e. a batten on studs and one in between the two studs fixed to top and bottom plates and nogs).
- Battens fixed to studs are to support Shadowclad and restrain building underlay and insulation from bulging into the cavity.
- The Shadowclad must not be fixed to these cavity battens where there is no framing behind them.

If studs are at 400mm centres battens may be fixed on studs only.

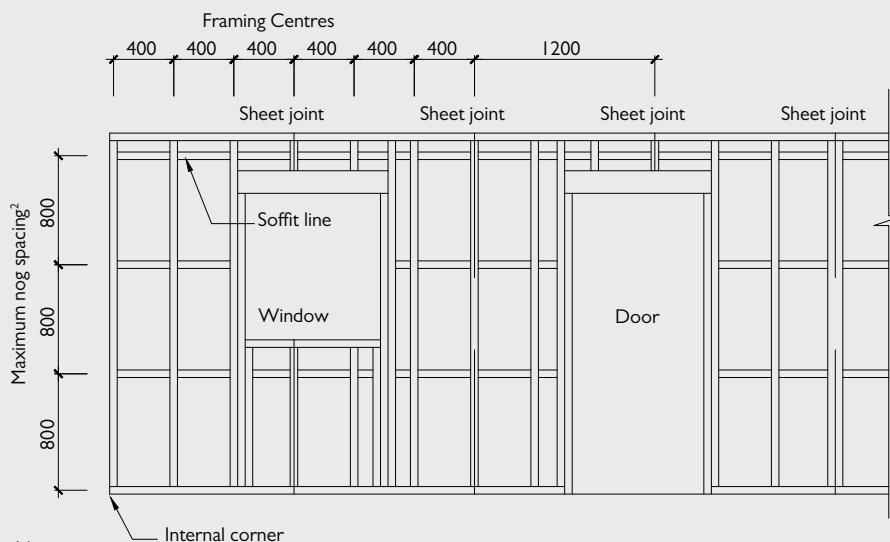
Horizontal battens must be used at the top of the wall to block the top of the cavity from venting into the roof space.

Cavity spacers (i.e. short pieces of cavity batten) may be used to support the bottom sheet edge (or provide intermediate support where required e.g. above window openings) but must allow water drainage to the outside. The cavity spacers must be fixed at a 5° minimum slope with a 50mm minimum air gap at either side.

**SC001: Typical Framing Setout (without Battens) Studs at 600 Centres**

Note:

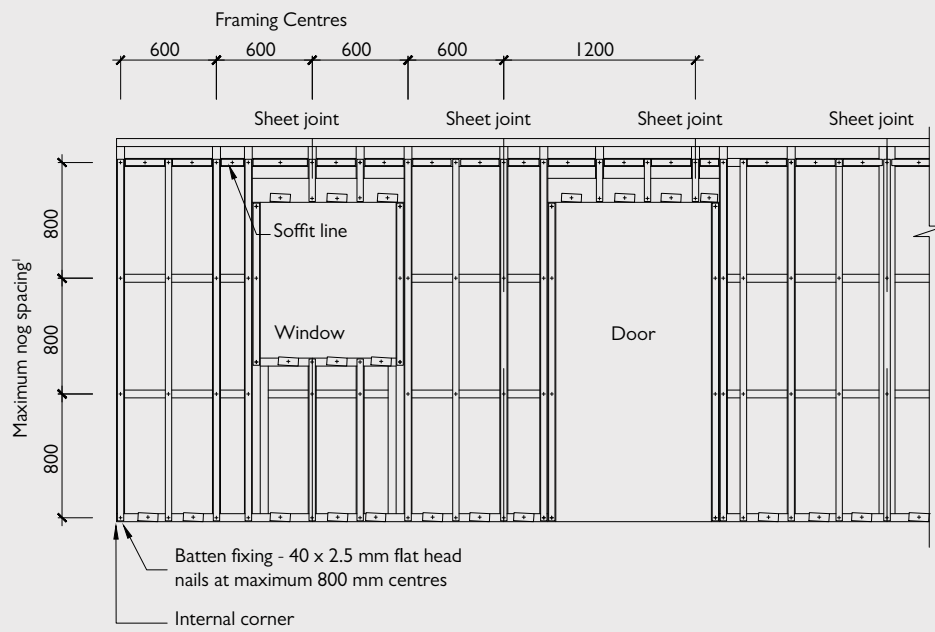
1. Single spans of Shadowclad® must not exceed 600 mm (e.g. below windows or on balustrades)
2. When using vertical cover battens, nogs at maximum 600 centres

**SC001A: Typical Framing Setout (without Battens) Studs at 400 Centres**

Note:

1. Single spans of Shadowclad must not exceed 600 mm (e.g. below windows or on balustrades)
2. When using vertical cover battens, nogs at maximum 600 centres

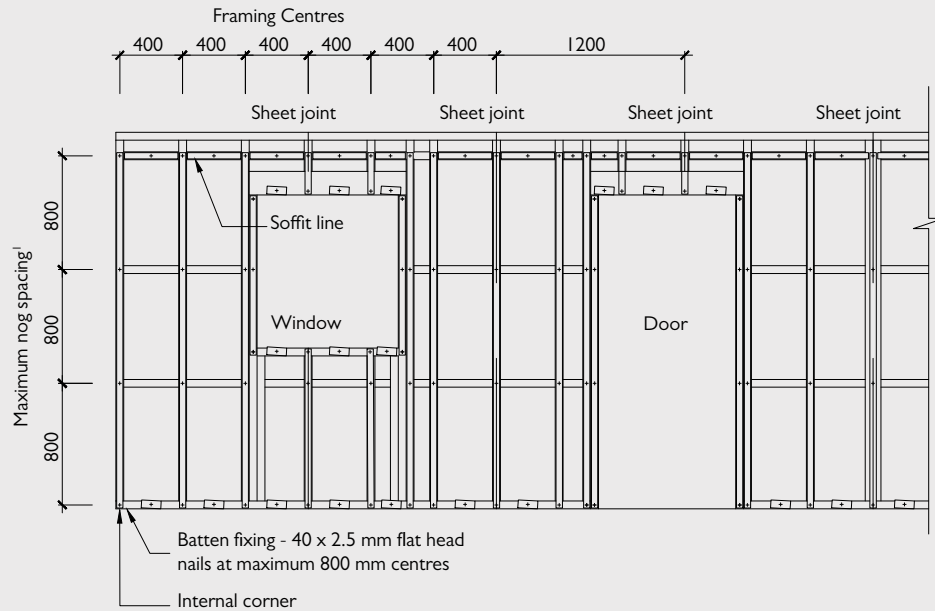
## SC002: Typical Framing Setout (with Battens) Studs at 600 Centres



Note:

1. When using vertical cover battens nogs at maximum 600 centres

## SC002A: Typical Framing Setout (with Battens) Studs at 400 Centres



Note:

1. When using vertical cover battens nogs at maximum 600 centres

## 4.5 SHEET LAYOUT

A sheet layout should form part of architectural drawings and be used from the basis of stud/framing layout.

- Sheet edges must be supported by the framing.
- Sheets are designed to be vertically fixed. **Do not fix sheets horizontally.**
- When laying up on to framing, start at framing corners and work across the wall.

- All treated Shadowclad panels are envelope preservative treated. Where sheets are cut, edges **must** be coated with a brush on timber preservative such as Soudal® Metalex® Clear.
- Cut edges **must** be placed at the top of the sheet to avoid rain drips soaking in to cut end grains.
- Priming the bottom edges and the back (rear) of the sheets to a height of 150mm is required.
  - Shadowclad Ultra sheets are coated on the rear to a height of 150mm (minimum) to meet this requirement.

## 4.6 FIXINGS – FASTENER DURABILITY

**Table 8: Fastener Durability for Shadowclad**

Finish	Treatment	Exposure Zone (Refer to Section 4 of NZS 3604)	Material Required
Shadowclad Natural/Ultra	H3.1 LOSP	Zones B and C	Minimum hot dipped galvanised or better
		Zone D (sea spray)	Stainless Steel
Shadowclad Ultra	H3.2 CCA	All Zones	Stainless Steel

## 4.7 FIXINGS – FASTENER SIZE & LAYOUT

**Table 9: Fastener Lengths for Shadowclad**

Minimum Fastener Length and Size (Cavity Fix)	
Nails in Timber	60 x 2.8mm
Screws in Timber	8g x 65mm

Shadowclad **must** be nailed or screwed to timber as per below:

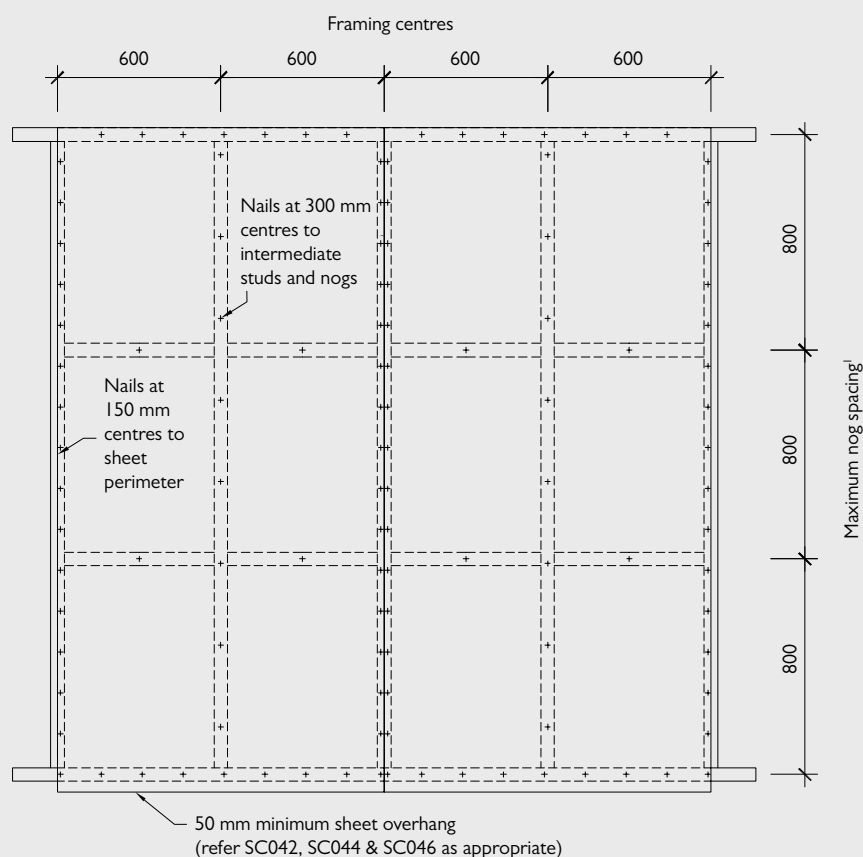
- Use flat head (full round head) nails or rose head nails with timber framing. Rose head nails should be considered where a more decorative fastener is desired.
- Standard fixing pattern: fasten sheet edges at 150mm centres and within the panel on all supports at 300mm centres.
- Do not fix to battens that are not installed over studs as the nails will puncture the building wrap.
- Fasten no closer than 7mm to sheet edges except on edge with top lap (weather groove lap), **do not nail through top lap.**
- Fasten Ship lap joints independently to ensure natural sheet expansion is not restricted.
- When using a rigid air barrier the Shadowclad fastener lengths should be increased by the thickness of the panel to ensure required fastener pull out loadings are achieved.
- Drive nails and screws flush.
- Do not nail through the grooves in Shadowclad Groove panels.

### Power Driven Fastening

- Best practice is to hand drive nails as better control of nail depth is achieved.
- Paslode Impulse Nailers may be used to fire power driven nails. Refer to Paslode for suitable fasteners as per the minimum lengths stated in Table 9.
- Do not overdrive nails into the sheet.

### Fixings at Vertical Sheet Join

Shadowclad Sheets must be fastened off independently to each other. SC006A and SC008A show specific fastener locations to accommodate the Ship lap joint. For Shadowclad Texture and Shadowclad Groove respectively fasten underlap 13mm from sheet edge, with overlap fasten 23mm from sheet edge as detailed.

**SC003: Shadowclad Fastener Layout (Studs at 600 Centres Shown)**

Note:

1. When using vertical cover battens nogs at maximum 600 centres

## 4.8 INSTALLATION TOOLS FOR SHADOWCLAD®

Correct installation and maintenance of Shadowclad® is necessary to ensure that compliance with the New Zealand Building Code, durability, structural integrity and weathertightness are maintained. CHH Plywood have developed two installation tools to compliment the Shadowclad Specification and Installation Guides. These products are an extension of the Specification and Installation Guides and are available by contacting CHH Plywood directly via [www.chhply.co.nz](http://www.chhply.co.nz) or by calling 0800 326 759.

### Shadowclad Stick

The Shadowclad Stick is an installation tool for Shadowclad. This tool removes the need for builders to develop their own 'jigs' to aid in ensuring that critical clearances, nail spacing's, etc. are applied during the installation of Shadowclad sheets. Section 11 of this literature provides information in relation to the use of the Shadowclad stick.

### Shadowclad® sITe APP

The Shadowclad sITe App is a tool for all building practitioners to aid in the installation of Shadowclad in accordance with the CHH Plywood Specification and Installation Guides. The App includes a context sensitive Key Design Points and Installation Checklist, access to all current literature, installation details, maintenance and other key installation requirements.



## 4.9 SHADOWCLAD KEY INSTALLATION & DESIGN POINTS

The following tasks are provided to installers to point out key installation and design factors when used as an exterior cladding. These do not detract from the requirements to read and understand this literature as a whole.

Task	Tick when checked
<b>Prior to Specification and Installation</b>	
Inspect panels for visual defects prior to installation.	<input type="checkbox"/>
Read the Shadowclad Specification and Installation Guide in its entirety	<input type="checkbox"/>
<b>Framing Plan</b>	
Framing setout drawings to suit Shadowclad fixing and installation guidelines	<input type="checkbox"/>
<b>Sheet Cuts</b>	
Coat all sheet cuts with a preservative timber treatment such as Soudal® Metalex® Clear	<input type="checkbox"/>
After applying Soudal® Metalex® Clear, apply the surface coating (e.g. paint or stain) to cut edges	<input type="checkbox"/>
Place uncut edge to bottom	<input type="checkbox"/>
<b>Fastener Material Type</b>	
Galvanised fasteners or better used (Stainless steel annular groove nails required in sea spray zones and with H3.2 CCA treated Shadowclad Ultra)	<input type="checkbox"/>
<b>Sheet Fastener Pattern</b>	
Around sheet edge – maximum 150mm centre spacing	<input type="checkbox"/>
Within sheet body – maximum 300mm centre spacing	<input type="checkbox"/>
<b>Horizontal Sheet Joints</b>	
Minimum 9mm separation gap between sheets above all Horizontal 'Z' flashings	<input type="checkbox"/>
Prime the bottom of the sheet edge and 150mm up the back (rear) of the sheets	<input type="checkbox"/>
50mm strip of neutral cure silicon sealant or stop ends at all 'Z' flashing terminations excluding terminations at Shadowclad metal corner flashings	<input type="checkbox"/>
Back flashings or 150mm overlap to all flashing butt joints	<input type="checkbox"/>
<b>Expansion Gaps Between Sheets (Vertical Sheet Joints)</b>	
Texture Profile Sheets - 2mm gap between vertical edges of sheets	<input type="checkbox"/>
Groove Profile Sheets - 9mm gap (i.e. full groove space) between vertical edges of sheets	<input type="checkbox"/>
Note: Expansion gaps required between vertical edges of sheets to accommodate natural expansion and contraction of sheets	
<b>Ground Clearances</b>	
Paved/Sealed Ground - minimum 100mm distance from the ground to sheet bottom	<input type="checkbox"/>
Broken Ground - minimum 175mm distance from the ground to sheet bottom	<input type="checkbox"/>
Prime the bottom of the sheet 150mm up the back (rear) of the sheet	<input type="checkbox"/>

Refer to the current Shadowclad® Specification and Installation Guide for full installation specifications and suggested details.

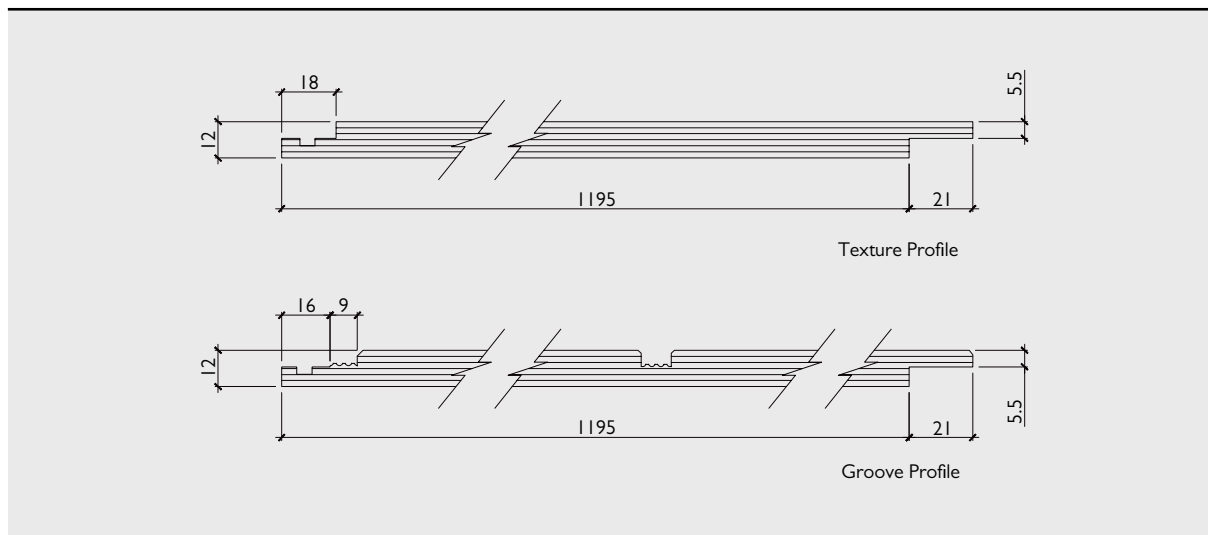
## 4.10 VERTICAL SHEET JOINTS

Shadowclad sheets have a built-in Ship lap joint and weather groove on the long edges of all sheets.

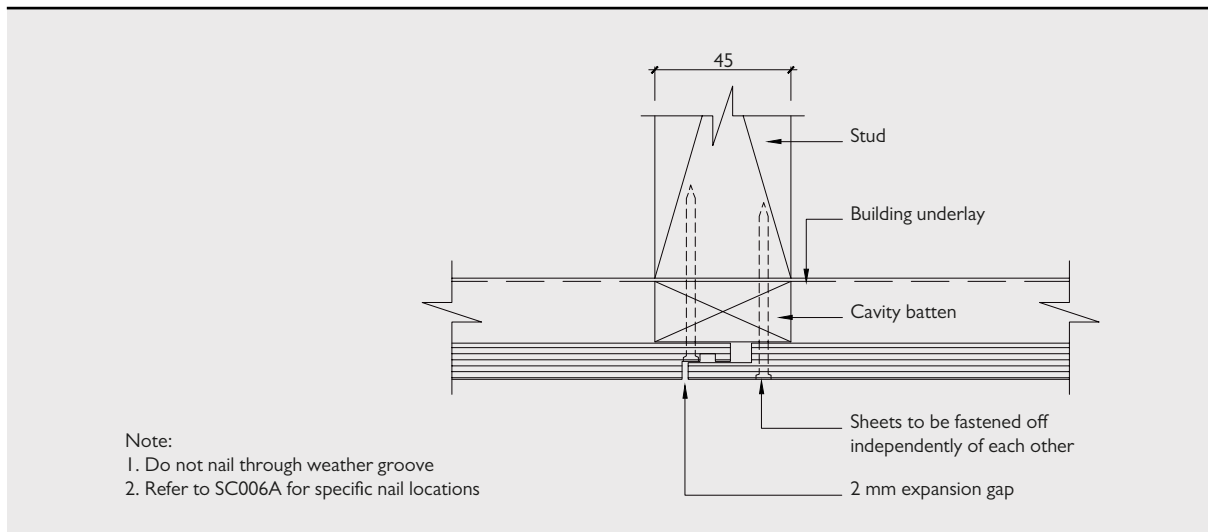
When installing Shadowclad Groove profile sheets, use a 9mm temporary spacer in the groove alongside Ship lap joint to establish correct expansion gap.

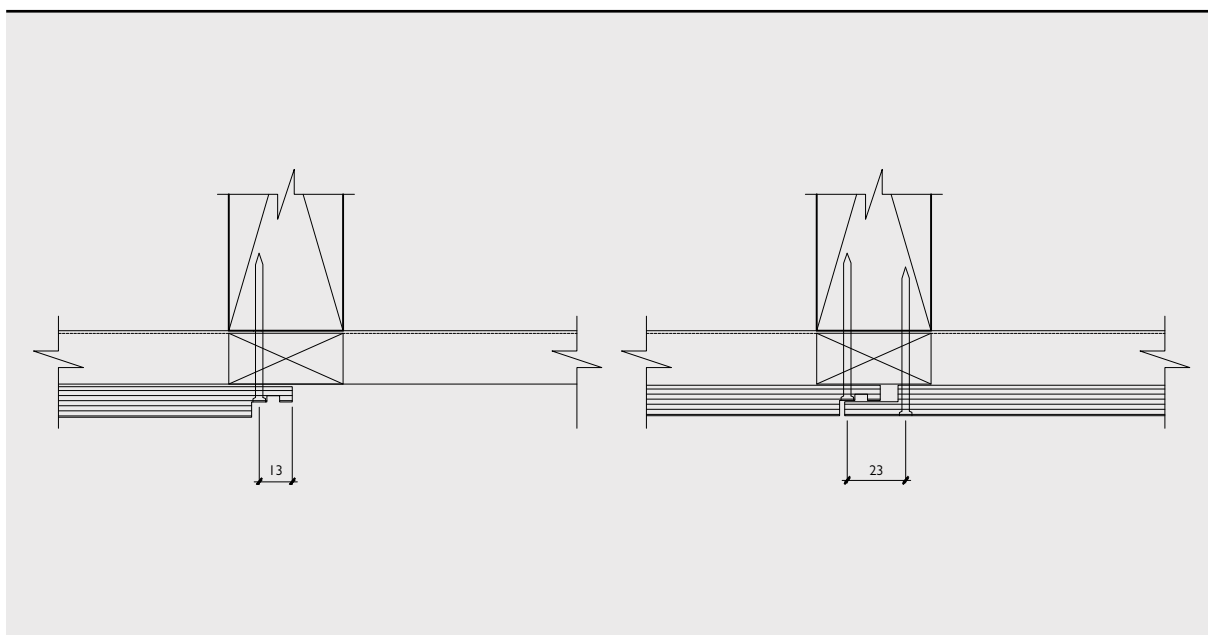
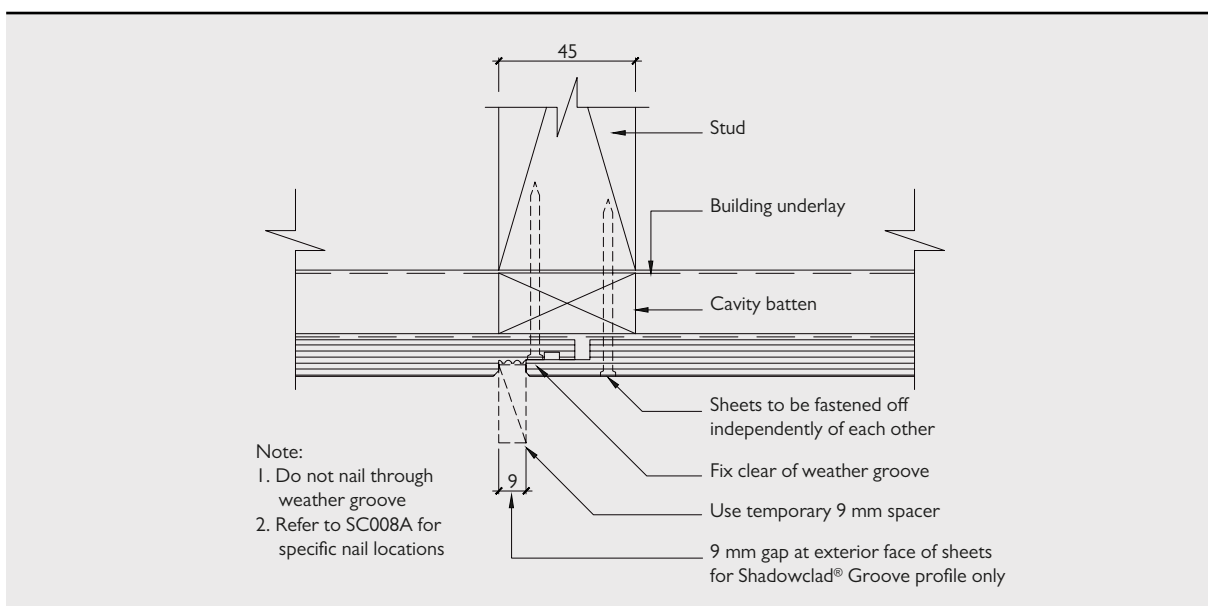
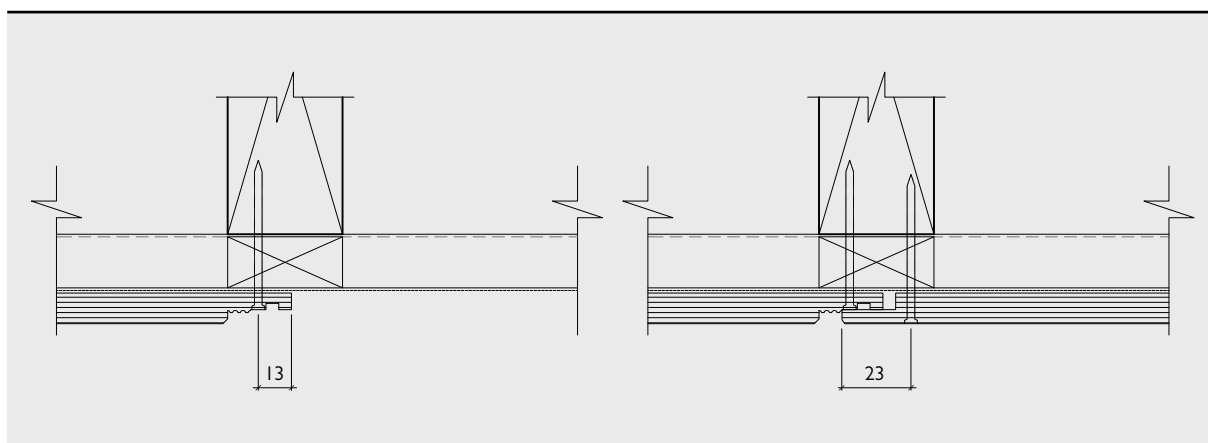
**Shadowclad is envelope preservative treated. Where sheets are cut, ends must be coated with a brush on timber preservative in accordance with the relevant manufacturer's instructions. Soudal® Metalex® Clear is recommended. Failure to properly apply preservative to cut edges will negatively affect the durability of cut panels.**

### SC004: Shadowclad Texture and Groove Sheet Dimensions

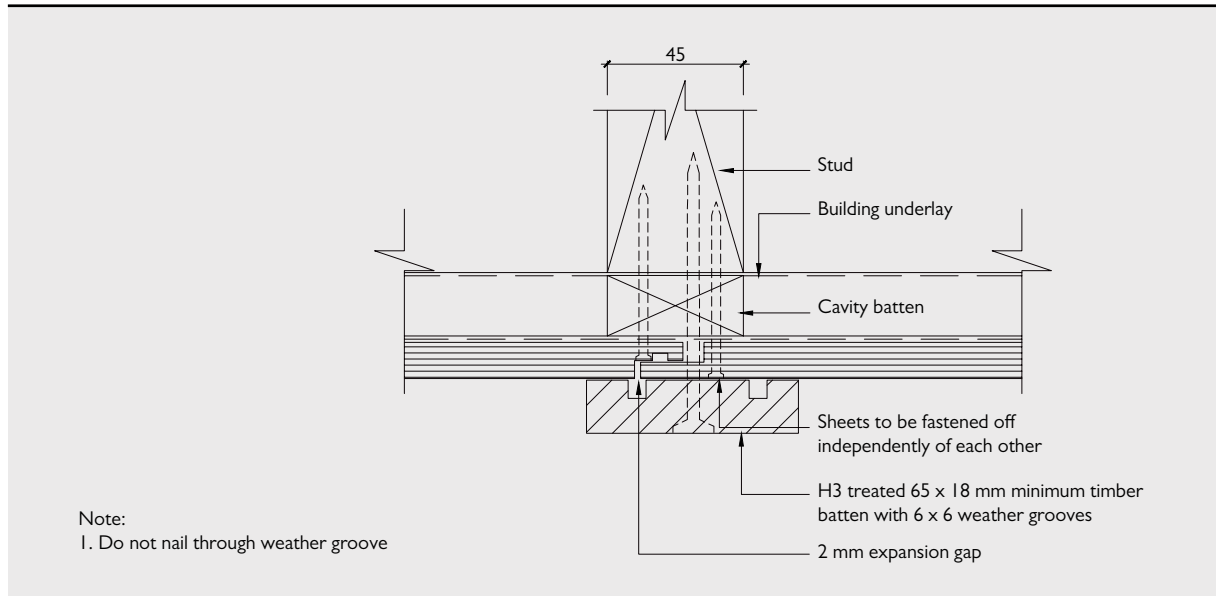


### SC006: Shadowclad Texture Vertical Joint (Cavity)

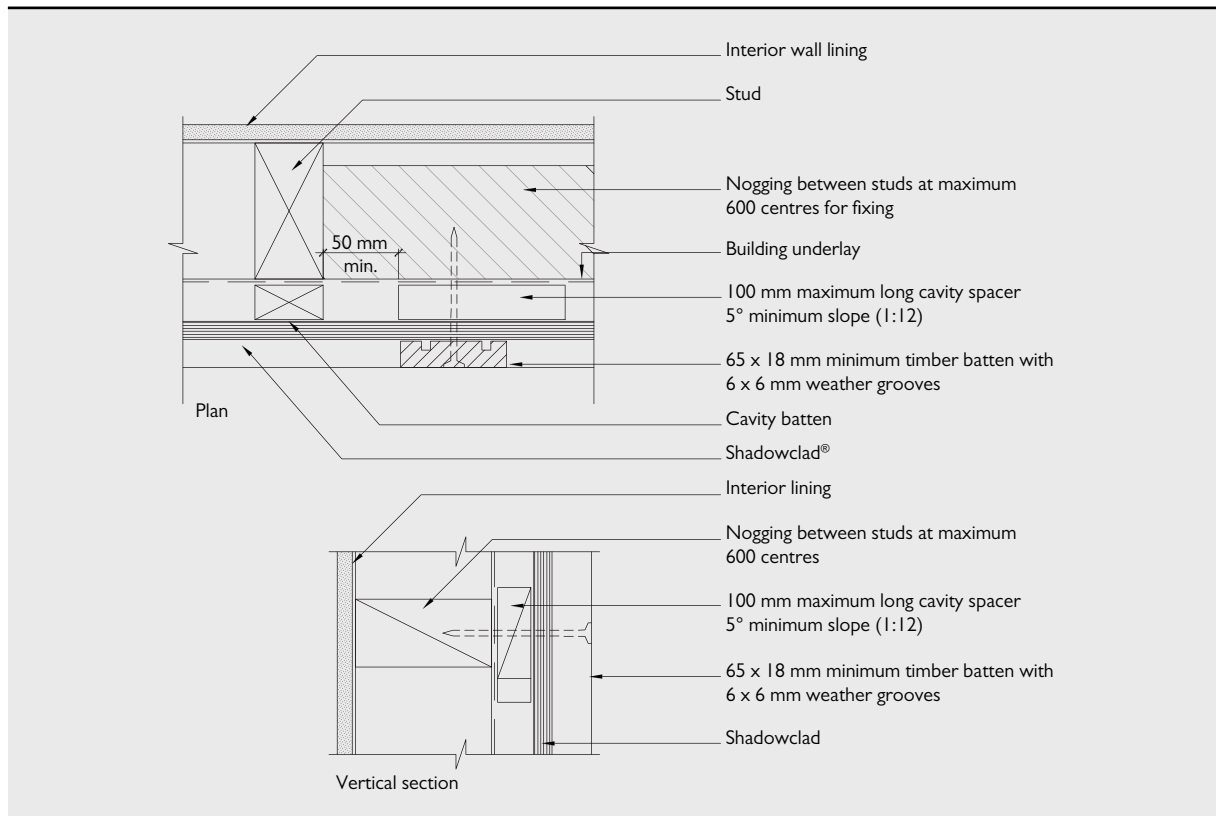


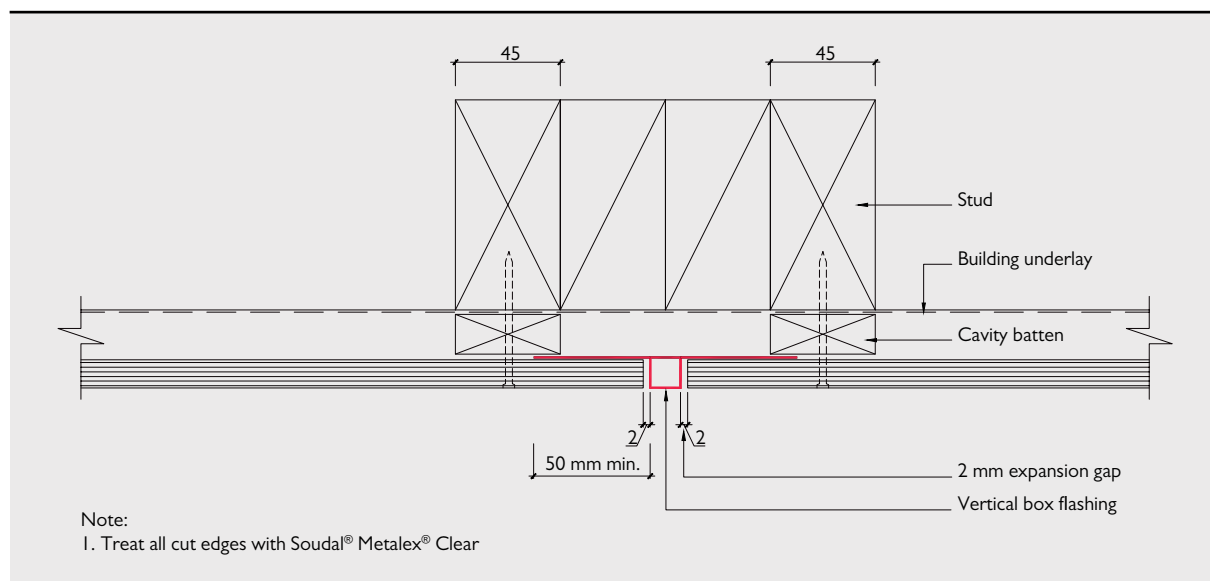
**SC006A: Shadowclad Texture Vertical Joint Fastener Locations (Cavity)****SC008: Shadowclad Groove Vertical Joint (Cavity)****SC008A: Shadowclad Groove Vertical Joint Fastener Locations (Cavity)**

### SC010: Shadowclad Vertical Joint with Optional Cover Batten (Cavity)



### SC012: Shadowclad Nogging for Vertical Cover Batten Between Studs (Cavity)



**SC014: Shadowclad Vertical Joint with Top Hat Flashing (Cavity)****4.1.1 HORIZONTAL SHEET JOINTS**

At floor joist level a horizontal joint must be provided to accommodate the movement resulting from timber joist shrinkage and settlement.

A Shadowclad Horizontal 'Z' flashing should be used for horizontal sheet joints.

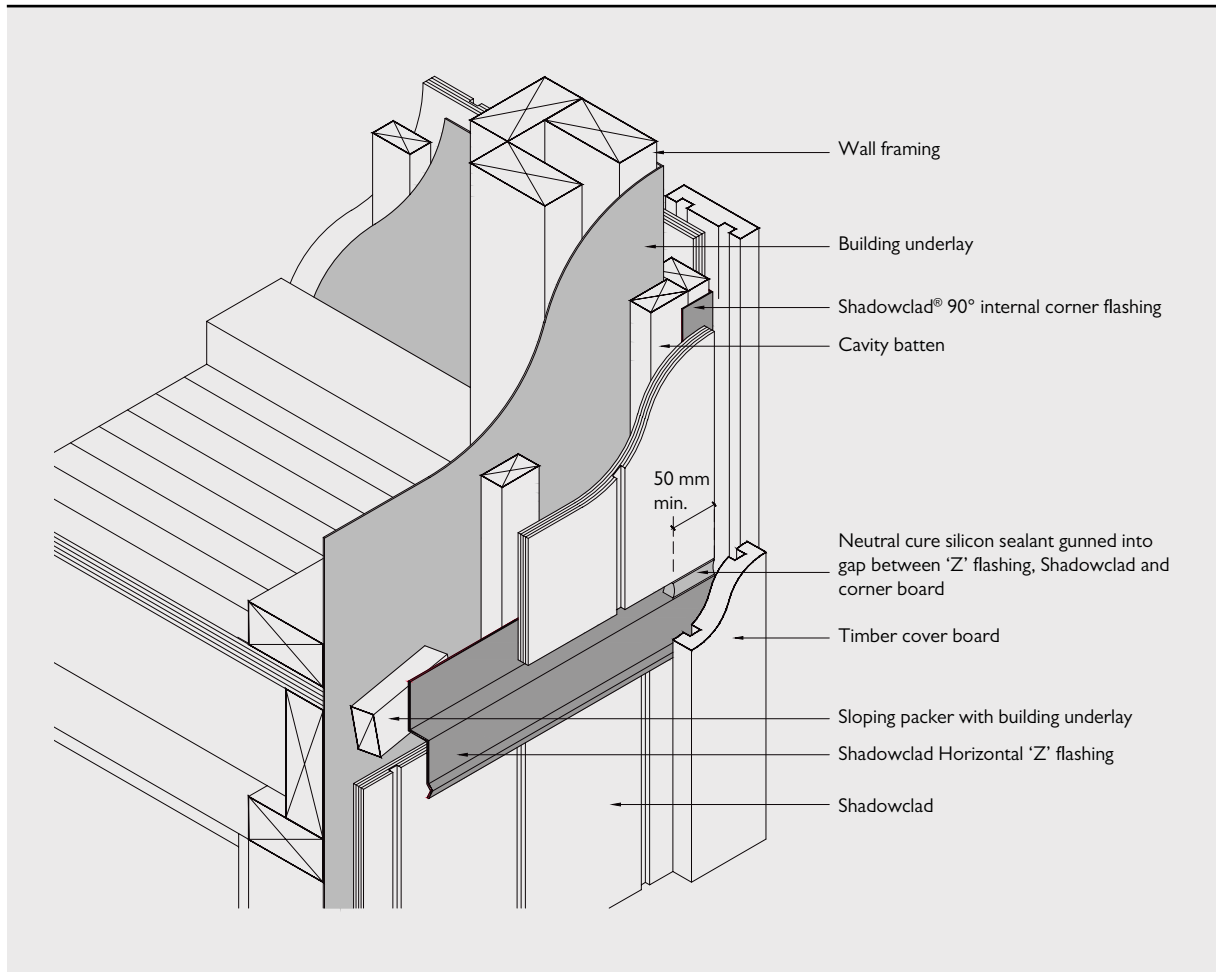
Acceptable Solution E2/AS1 requires drained cavities to be limited to a height of two storeys.

If aluminium 'Z' flashings are being used, all butt joints must include proprietary back flashings. Stainless steel flashings should be lapped by a minimum 150mm at joints.

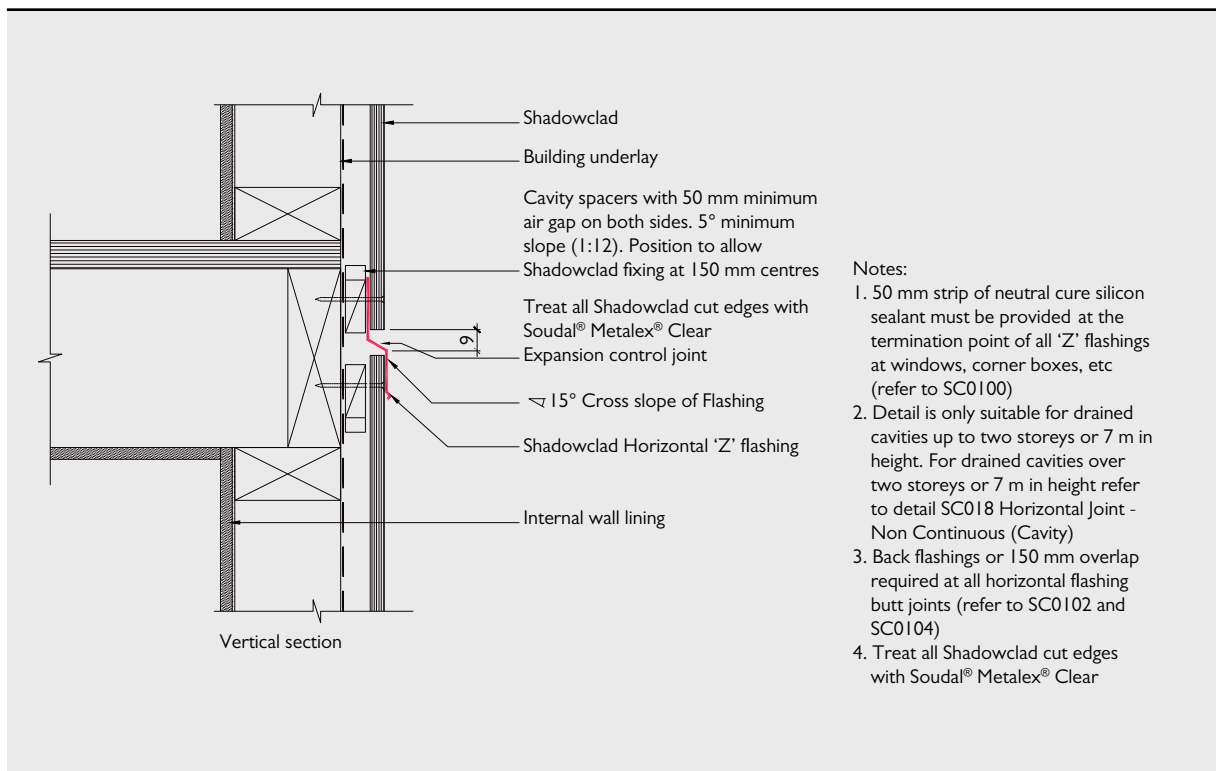
A 50mm strip of neutral cure silicon (refer to SC0100 General Silicon Sealing of Horizontal 'Z' Flashings) or stop ends (as applicable) required at all 'Z' flashing terminations excluding terminations at Shadowclad metal corner flashings.

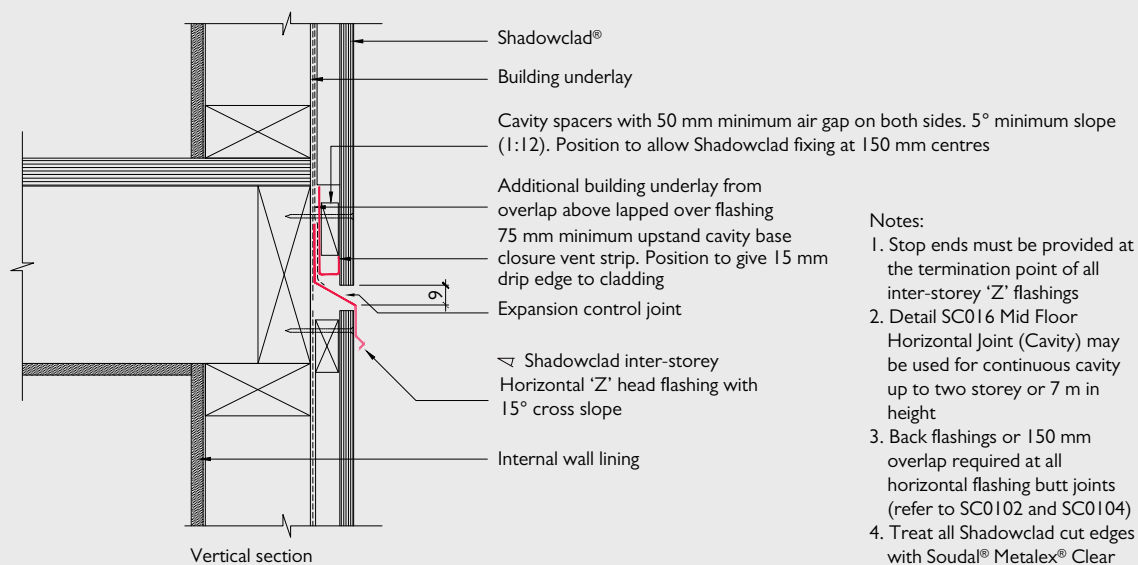
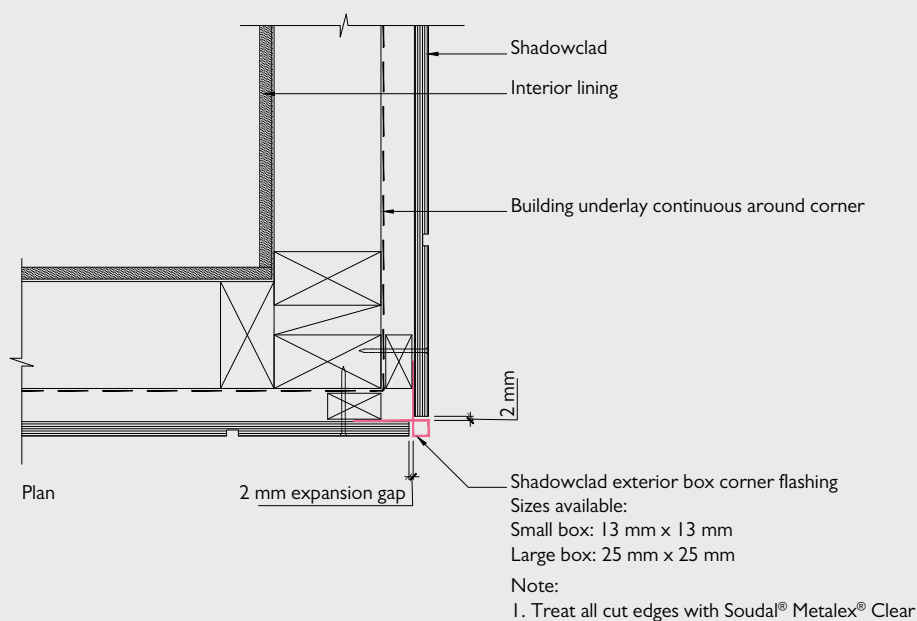


## SC0100: Shadowclad General Silicon Sealing of Horizontal 'Z' Flashings

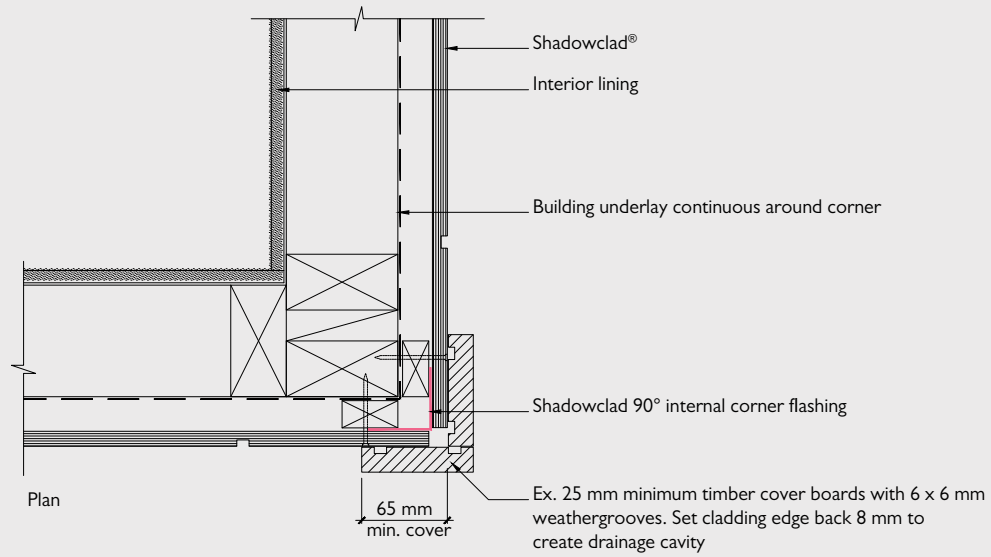


## SC016: Shadowclad Mid Floor Horizontal Joint (Cavity)



**SC018: Shadowclad Mid Floor Horizontal Joint – Non Continuous (Cavity)****4.12 EXTERNAL CORNERS****SC020: Shadowclad External Corner with External Box Flashing (Cavity)**

## SC022: Shadowclad External Corner with Cover Boards (Cavity)

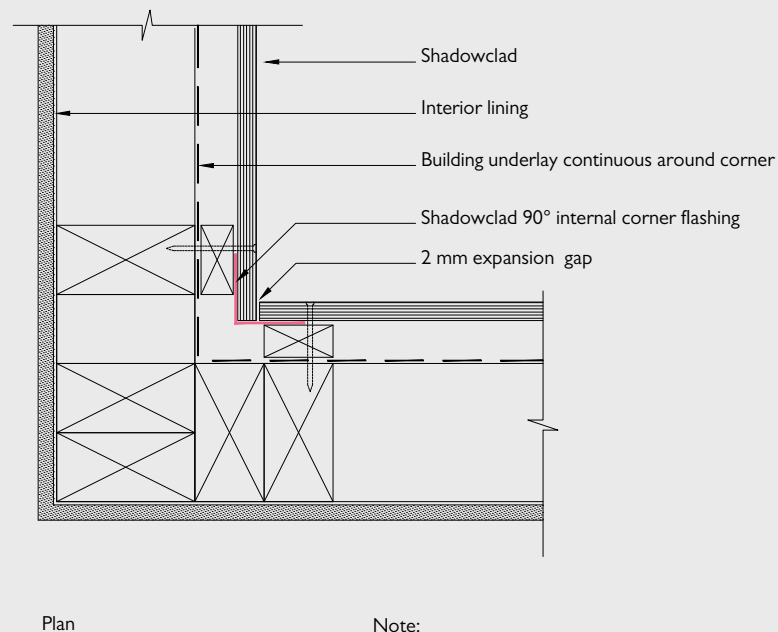


### Note:

1. Treat all cut edges with Soudal® Metalex® Clear
2. 50 mm strip of sealant must be provided at the termination point of all 'Z' flashings at windows, corner boxes, etc. (refer to SC0100)

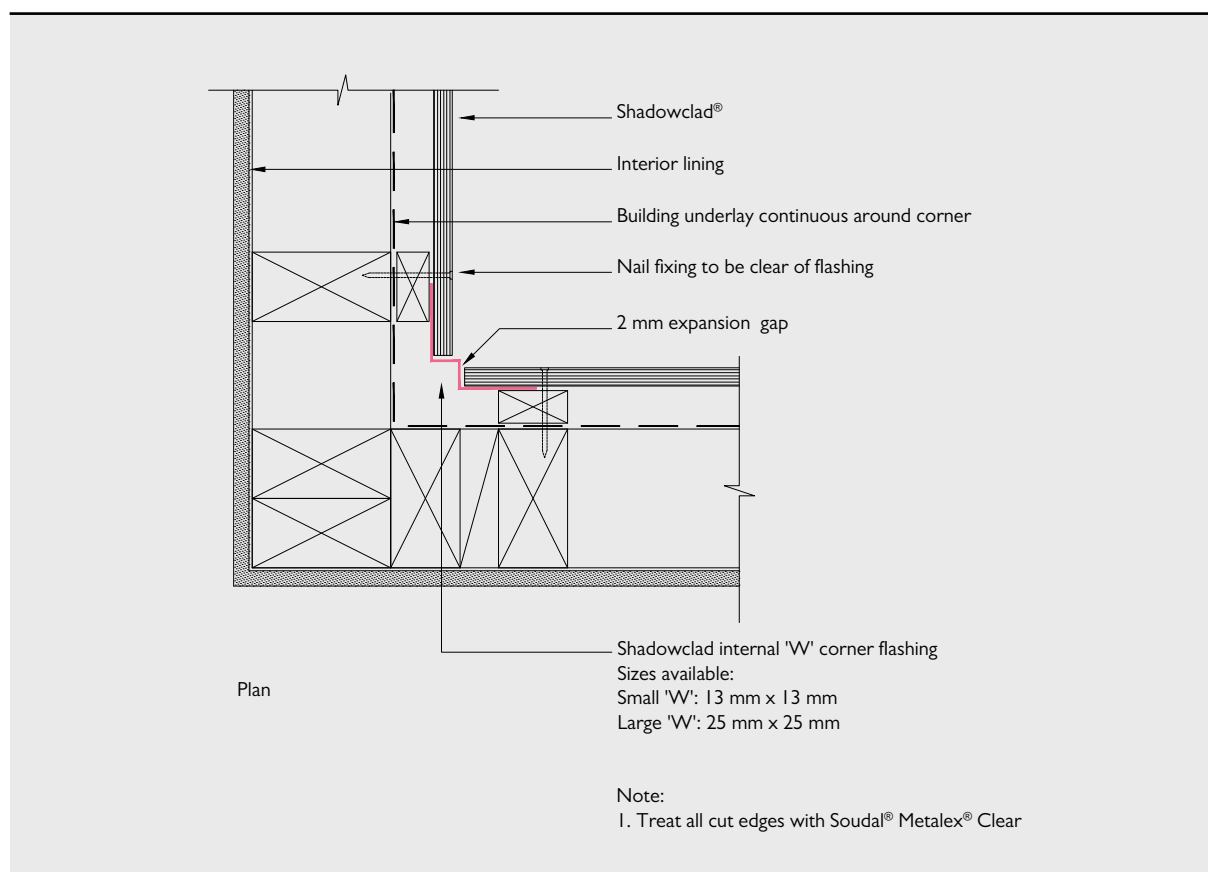
## 4.13 INTERNAL CORNERS

## SC024: Shadowclad Internal Corner with 90° Flashing (Cavity)



### Note:

1. Treat all cut edges with Soudal® Metalex® Clear

**SC026: Shadowclad Internal Corner with 'W' Flashing (Cavity)****4.14 SHADOWCLAD FLASHING JUNCTION POINTS**

Flashings should have expansion joints where necessary to provide adequate allowance for thermal expansion as set out below.

- Expansion joints to be provided for joined flashings when their combined length exceeds 8 metres.
- Even if less than 8 metres in length, where both ends of a flashing are constrained and fixed, allowance should be made for expansion.

**Cavity Base Closure**

Fix Shadowclad cavity base closures to bottom plates through the upstand with 40 x 2.5mm, hot dipped galvanised or stainless steel (as appropriate) flat head nails at 300mm centres.

The cavity base closure should be positioned to allow a minimum drip edge to the wall cladding of 15mm at the base of walls, and 15mm above window head flashings.

**Internal and External Flashings**

Internal and external angles and 'Z' flashings can be nominally fixed with hot dipped galvanised or stainless steel (as applicable) flat head nails and then permanently fixed with the Shadowclad fasteners penetrating the flashing wings/upstands.

**Horizontal 'Z' Flashings**

Horizontal aluminium 'Z' flashings should be butted together with a back flashing to create a weathertight joint (refer to SC0102).

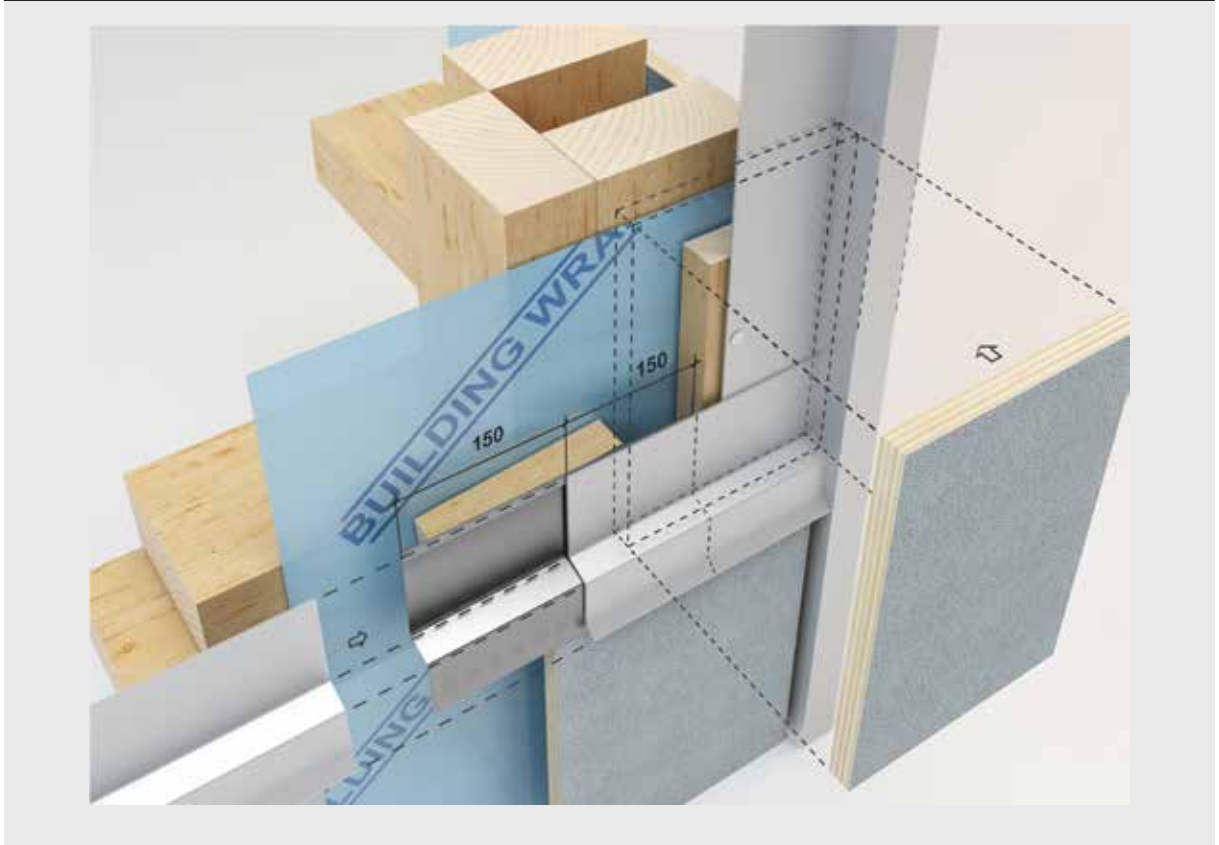
Stainless steel back flashings should overlap by a minimum of 150mm at joints to create weathertight joints where horizontal flashings meet (refer to SC0104).

**'Z' Flashings Terminations**

Where inter-storey 'Z' flashings terminate stop ends must be installed.

A 50mm strip of neutral cure silicon (refer to SC0100 General Silicon Sealing of Horizontal 'Z' Flashings) or stop ends (as applicable) required at all 'Z' flashing terminations excluding terminations at Shadowclad metal corner flashings.

#### SC0102: Shadowclad Aluminium Flashing Junctions and Connections (Cavity)



#### SC0104: Shadowclad Stainless Steel 'Z' Flashing Joins (Cavity)



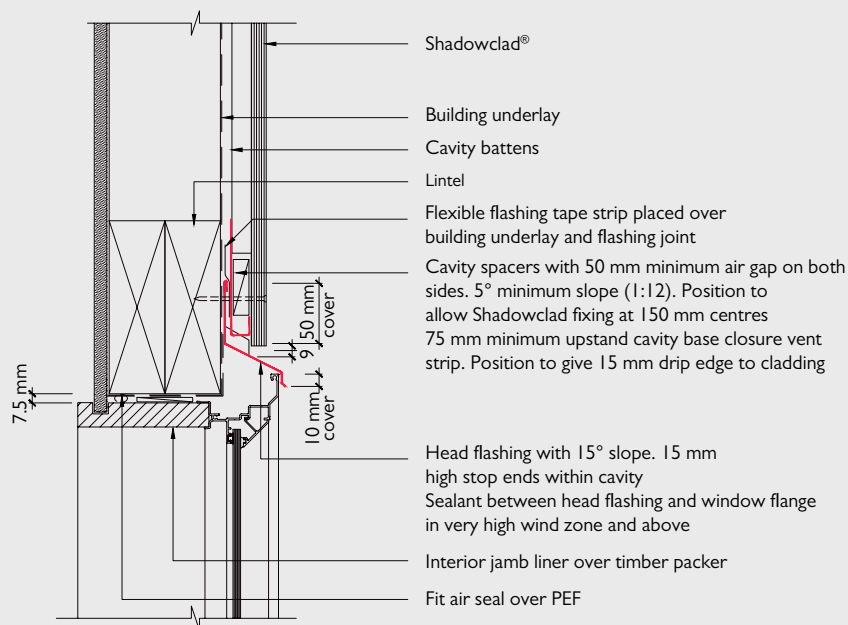


## 4.15 WINDOW PENETRATIONS

Window joinery flashings (i.e. head and sill flashings) should be sourced from the joinery fabricator to meet the requirements of Acceptable Solution E2/AS1 or an Alternative Solution such

as the Window Association of New Zealand Window Installation System (WANZ WIS) which can be downloaded at [www.wanz.org.nz](http://www.wanz.org.nz).

### SC028: Shadowclad Window Head Detail (Cavity)

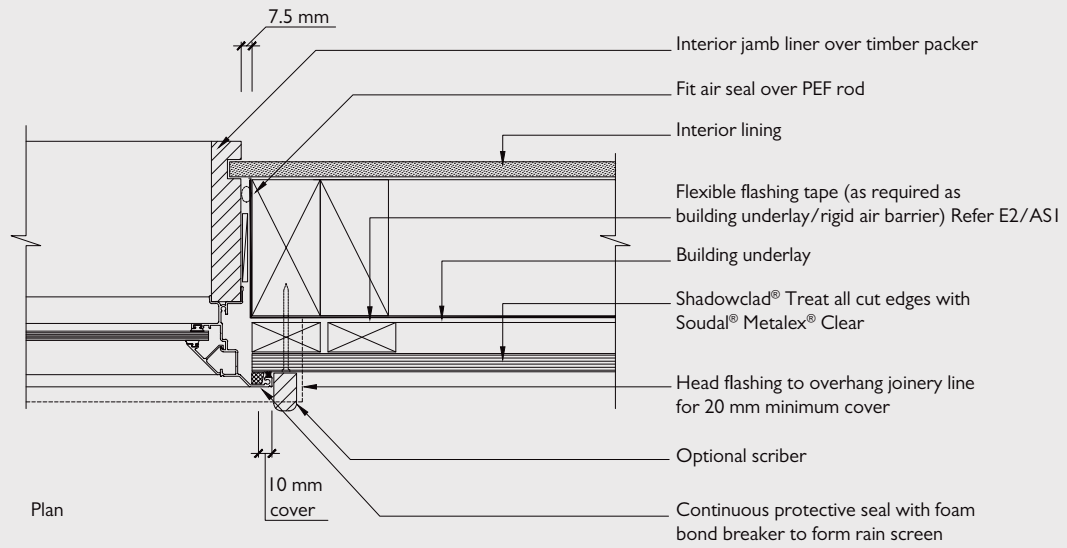


Note:

1. Treat all cut edges with Soudal® Metalex® Clear
2. Stop ends to head flashing terminations



## SC030: Shadowclad Jamb Detail (Cavity)

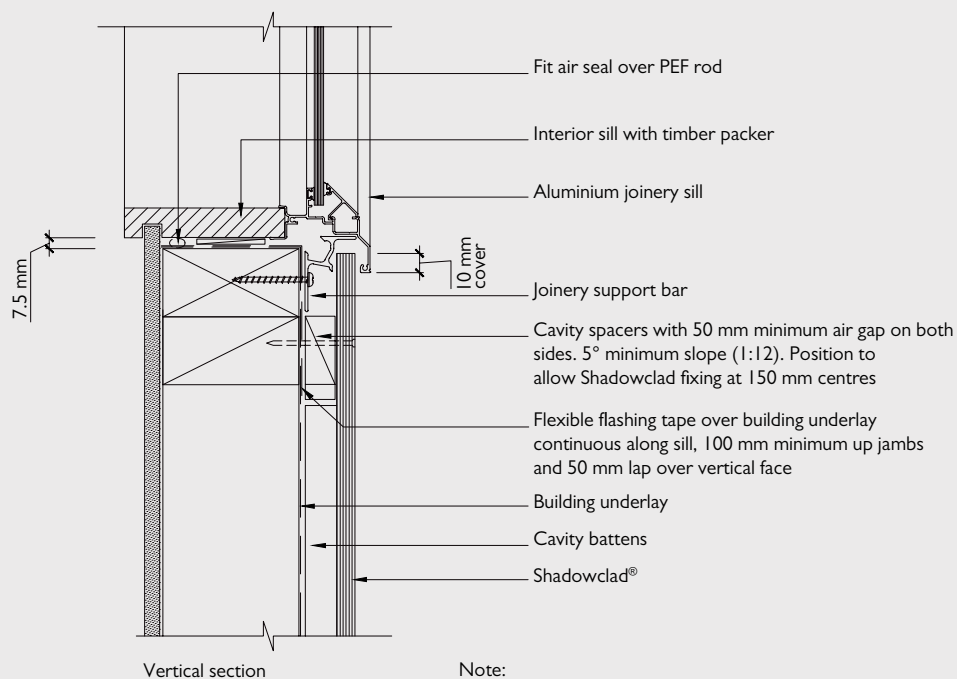


### Note:

1. Treat all Shadowclad cut edges with Soudal® Metalex® Clear
2. 50 mm strip of sealant must be provided at the termination point of all 'Z' flashings at windows, corner boxes, etc

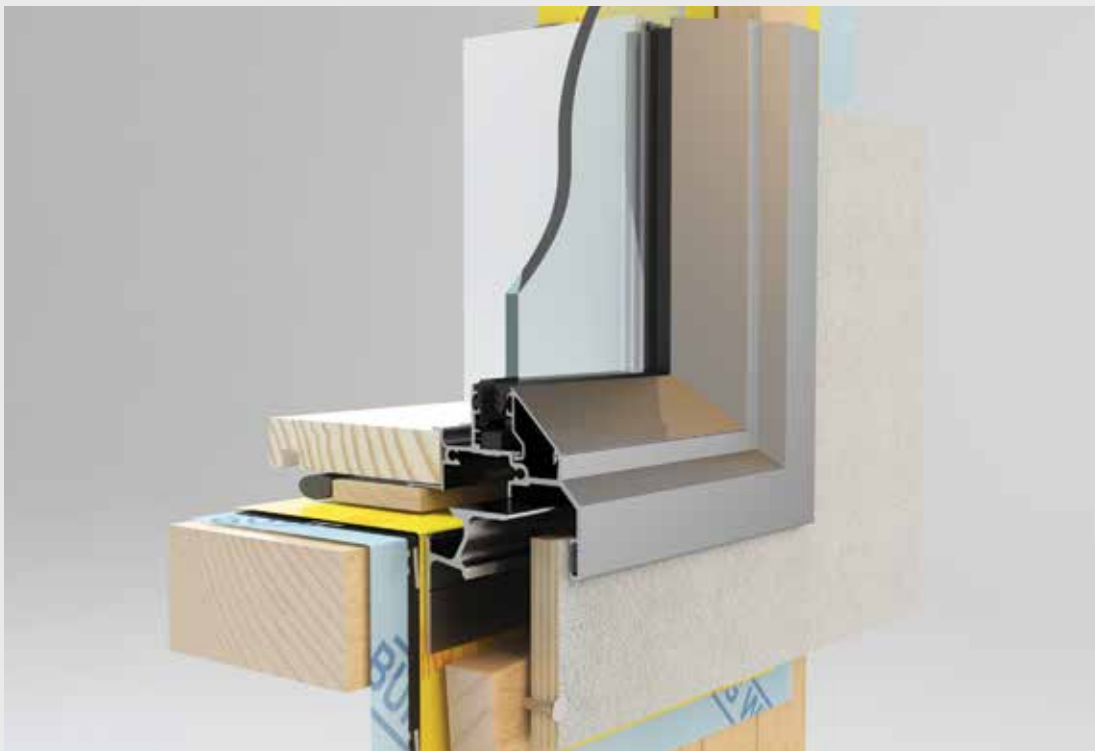


## SC032: Shadowclad Window Sill Detail (Cavity)



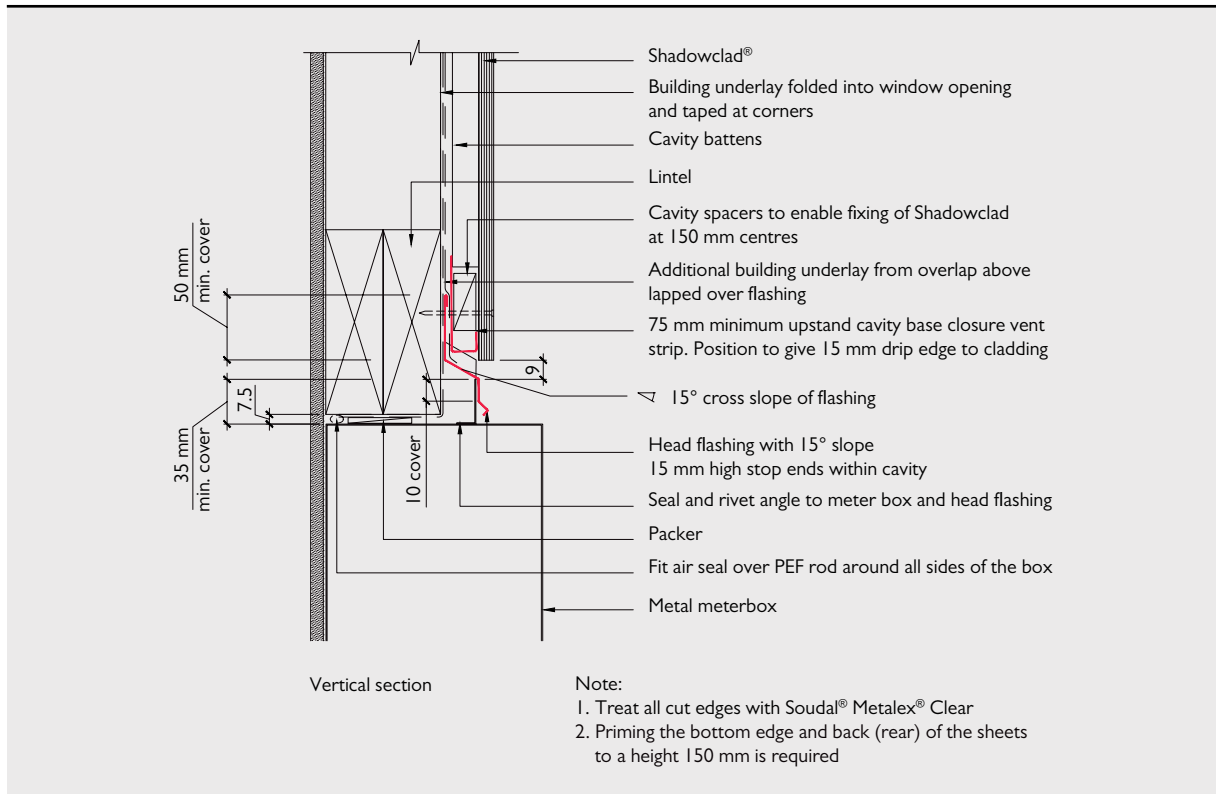
Note:

1. Treat all cut edges with Soudal® Metalex® Clear

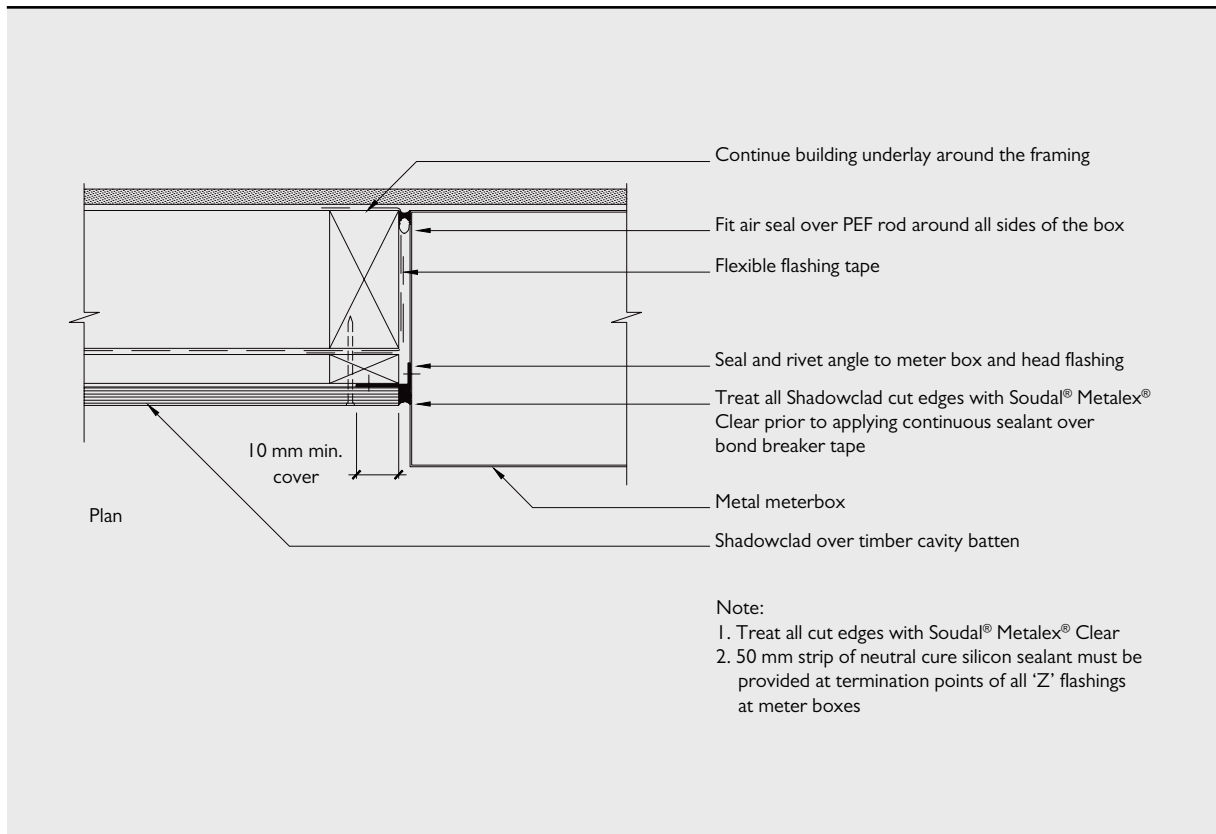


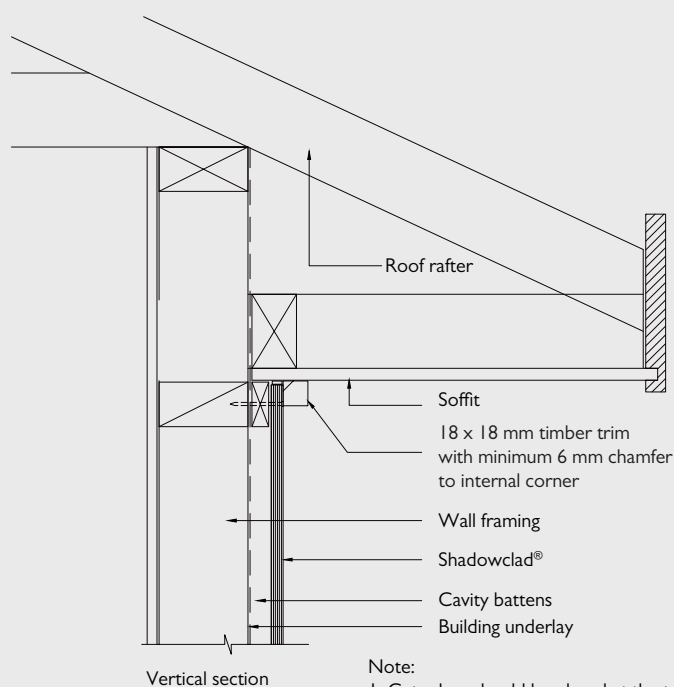
## 4.16 WALL PENETRATIONS

### SC034A: Shadowclad Meterbox Vertical Cross Section (Cavity)



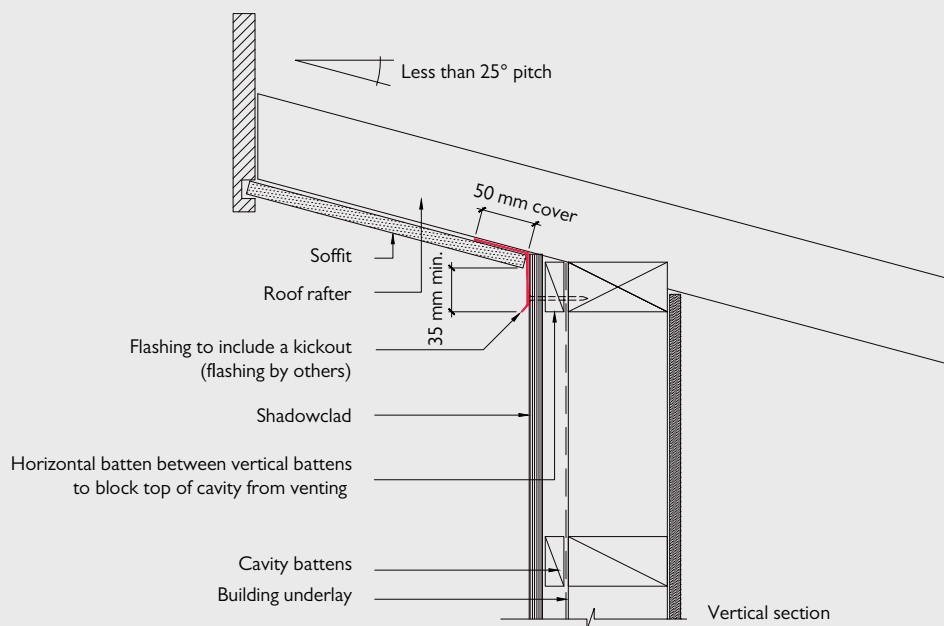
### SC034B: Shadowclad Meterbox Horizontal Cross Section (Cavity)



**SC036: Shadowclad Soffit Detail (Cavity)**

Note:

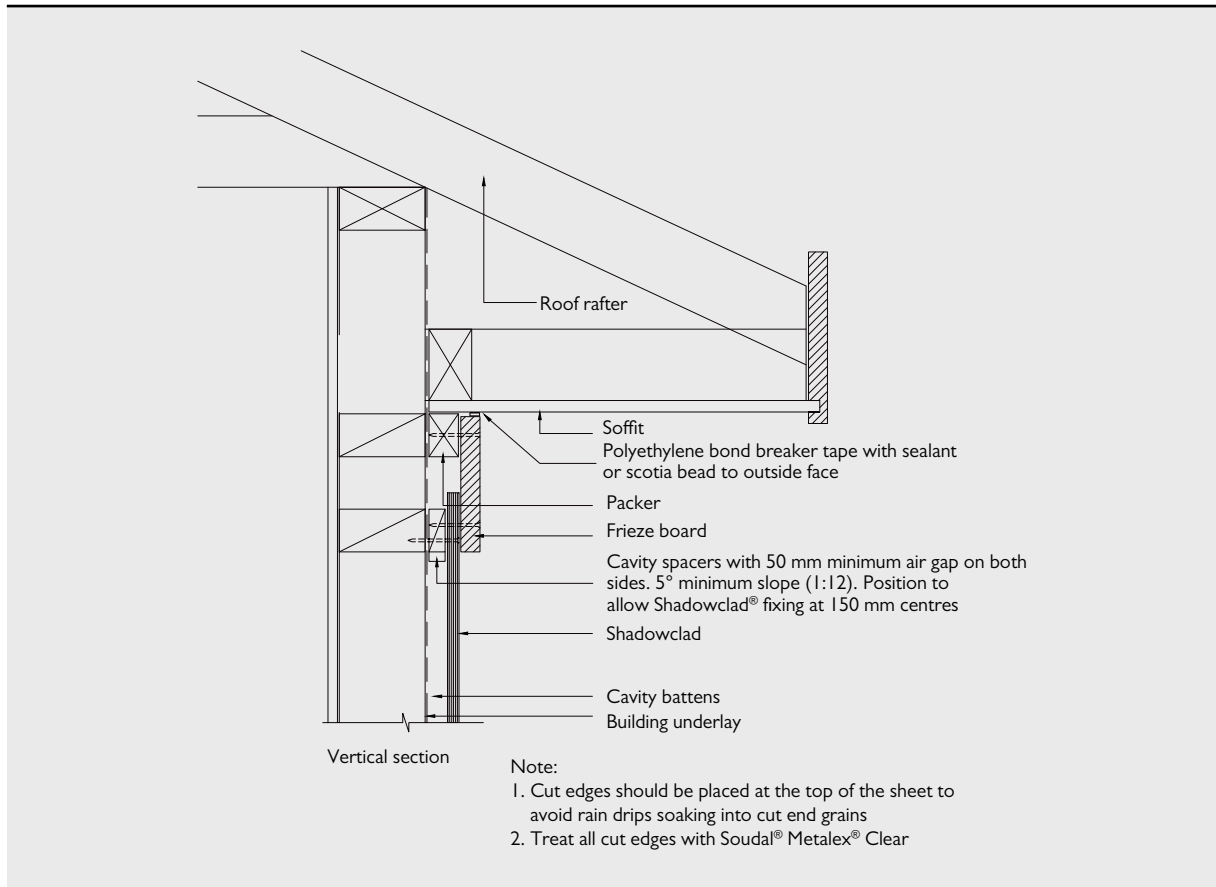
1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear

**SC036A: Shadowclad Alternative Soffit Detail (Cavity)**

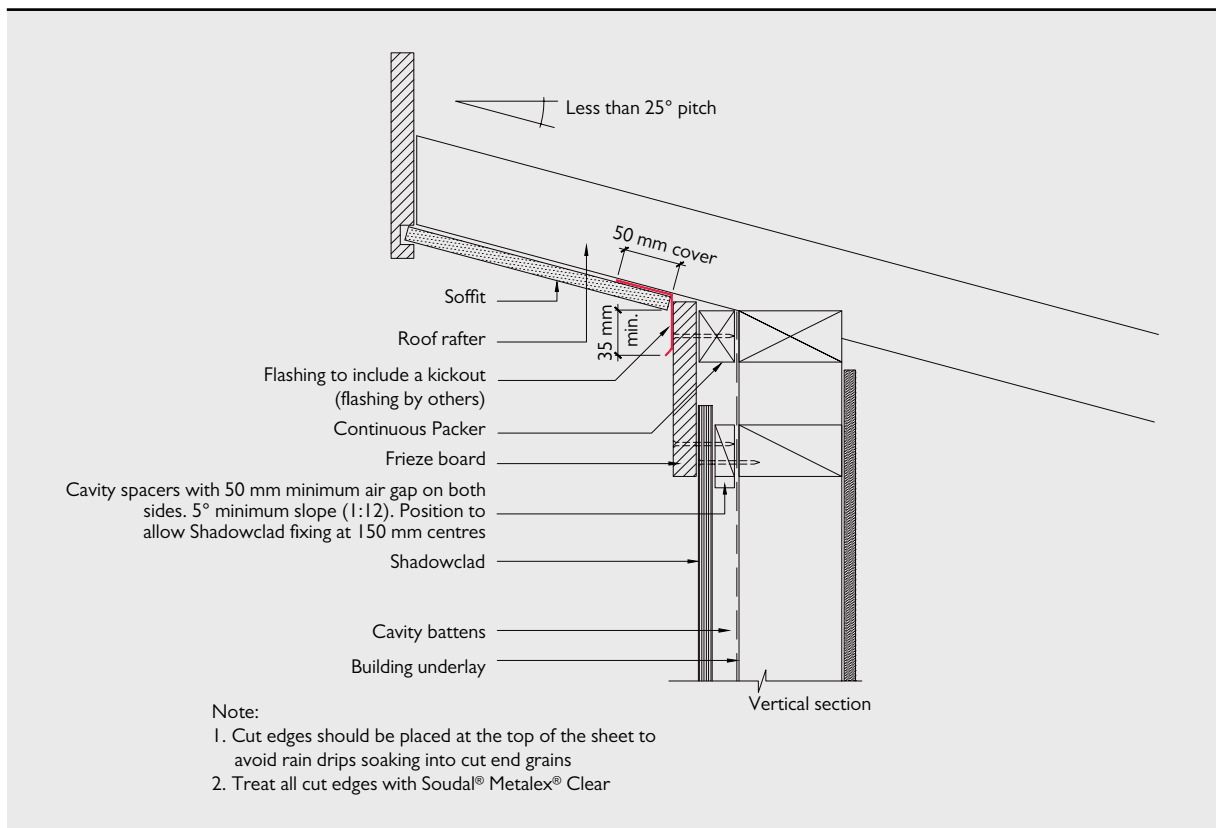
Note:

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear

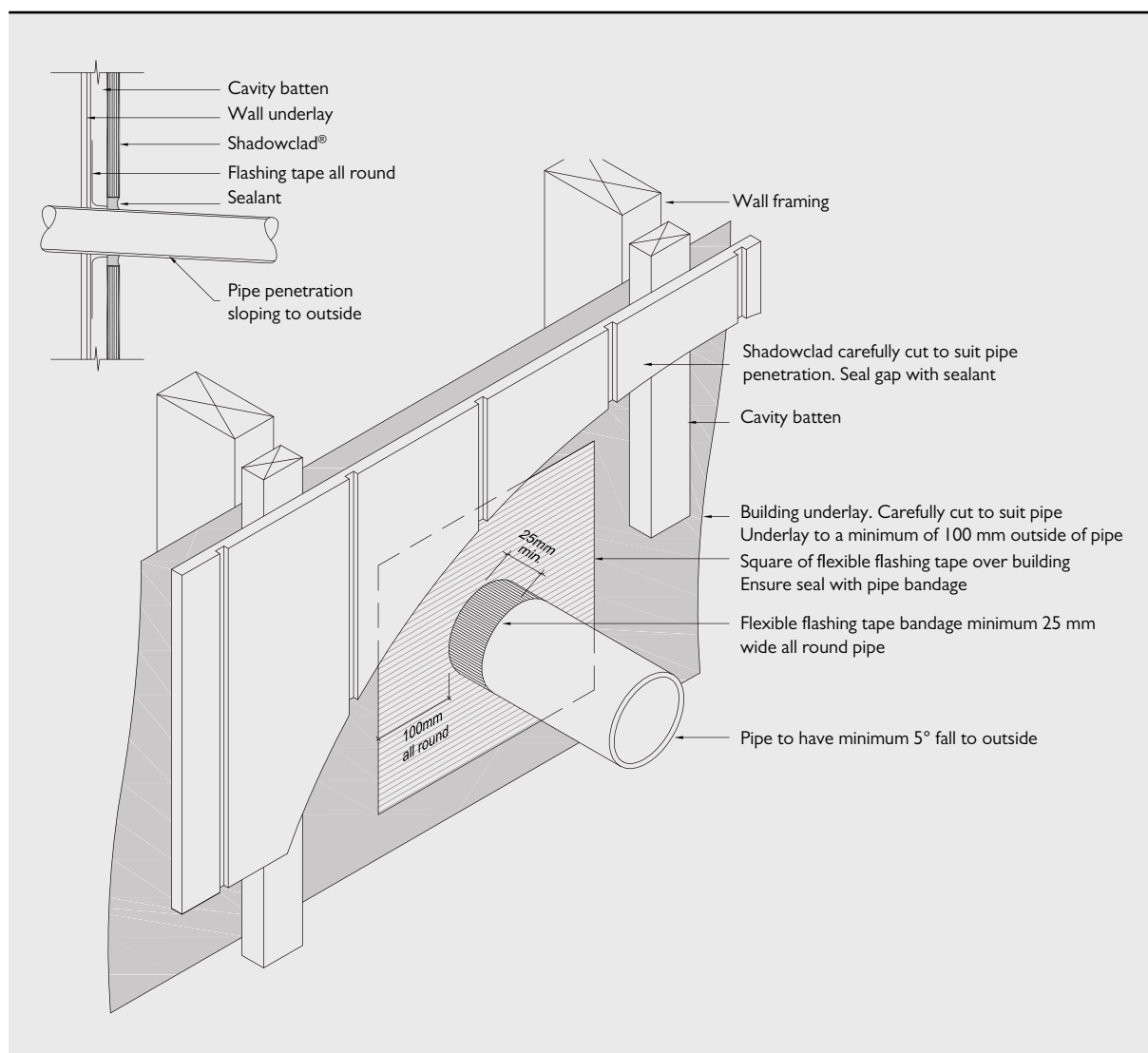
### SC038: Shadowclad Soffit Alternative Detail (Cavity)



### SC038A: Shadowclad Alternative Soffit Detail (Cavity)



## SC040: Shadowclad Pipe Penetration (Cavity)



## 4.17 SHEET CLEARANCES

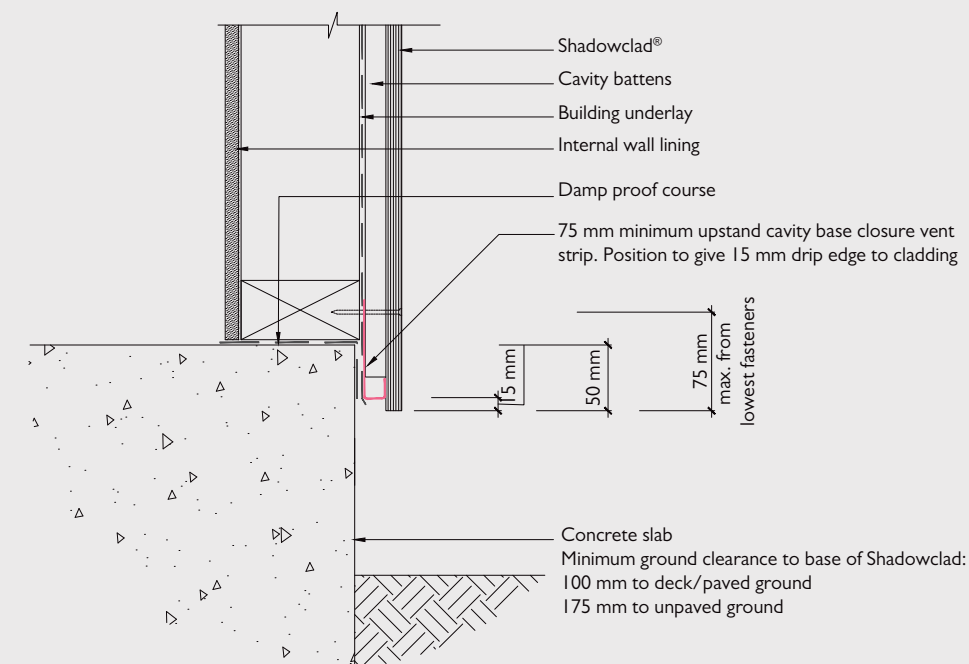
### Ground Clearances

Shadowclad must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZS 3604 and E2 - External Moisture. Maximum distance from the bottom of the sheet to the fixing shall not exceed 75mm.

The bottom edge of the Shadowclad sheet must be a minimum of 50mm above decks and verandahs, 100mm above paved ground and a minimum of 175mm above unprotected ground.

For garage door openings, refer Paragraph 9 "Openings to garages" in Acceptable Solution E2/AS1.

### SC042: Shadowclad Overhangs and Ground Clearances (Cavity)

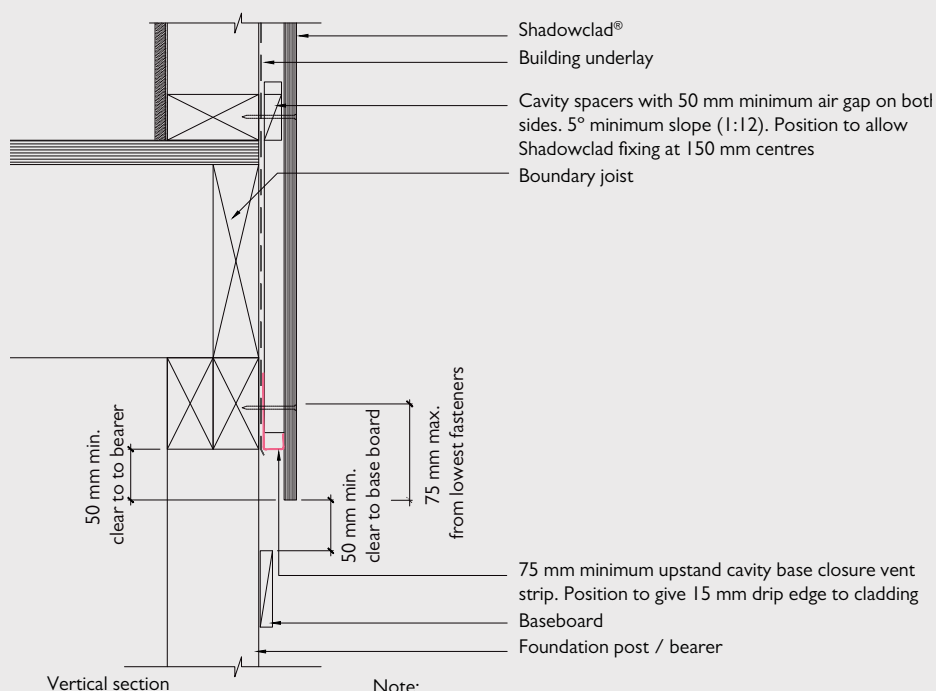


Vertical section

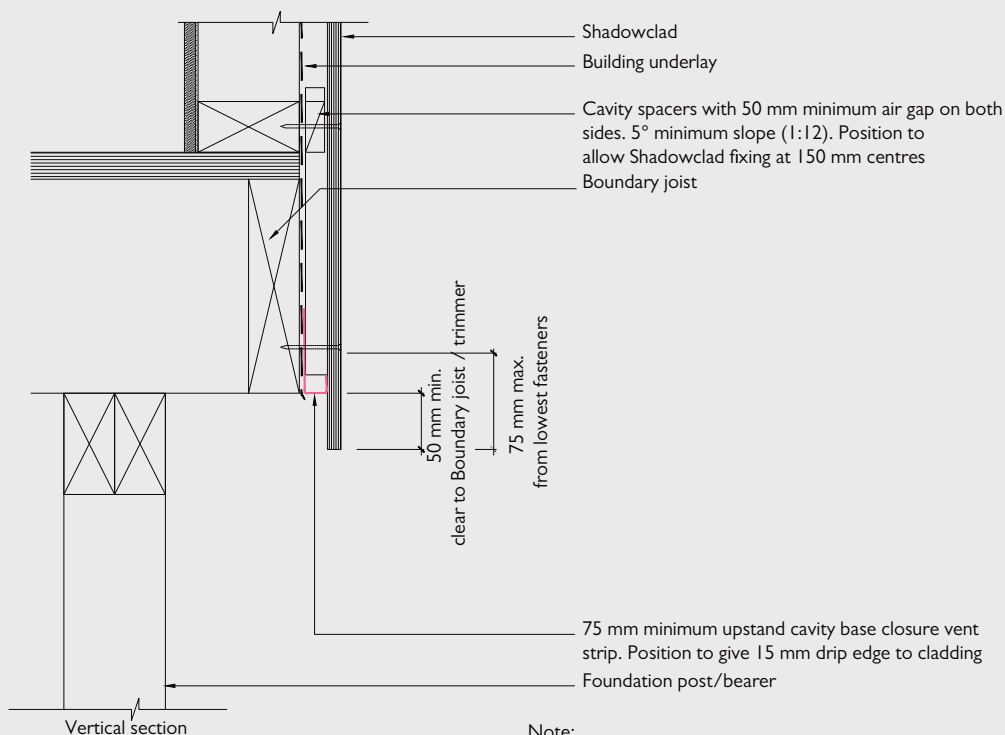
#### Note:

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required



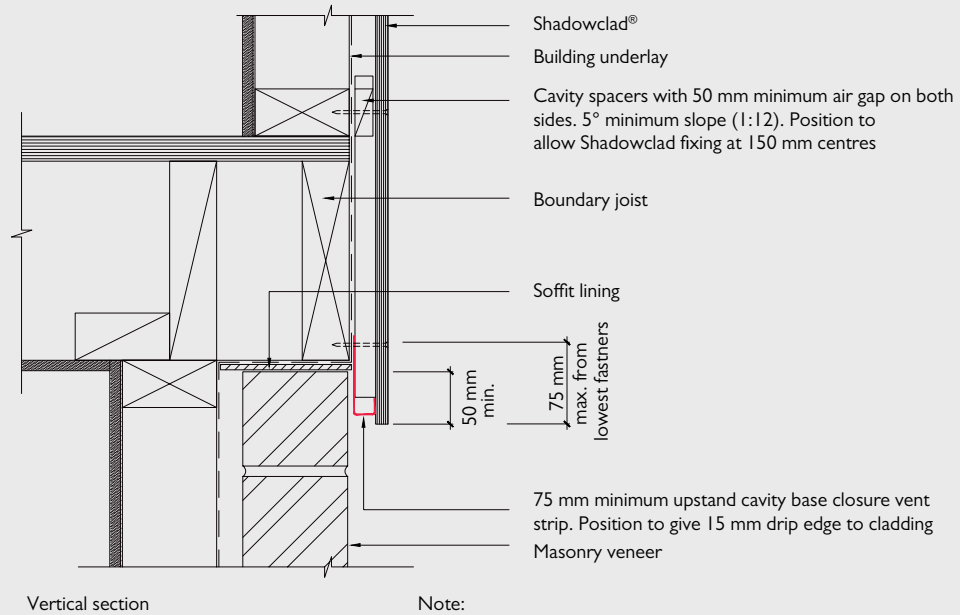
**SC042A: Shadowclad Overhang for Timber Ground Floor to Non-Cantilevered Wall****Note:**

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

**SC042B: Shadowclad Overhang for Timber Ground Floor to Cantilevered Wall****Note:**

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

# SC044: Shadowclad Upper Storey to Masonry Lower Storey (Cavity)

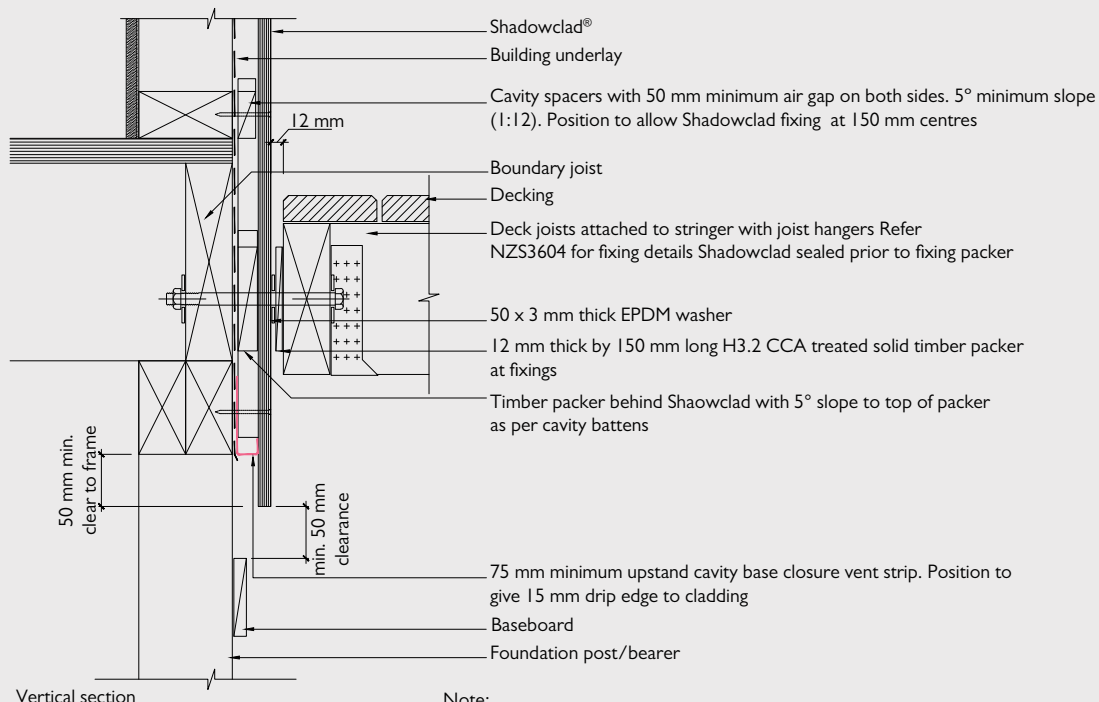


## Note:

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

## 4.18 OTHER DETAILS

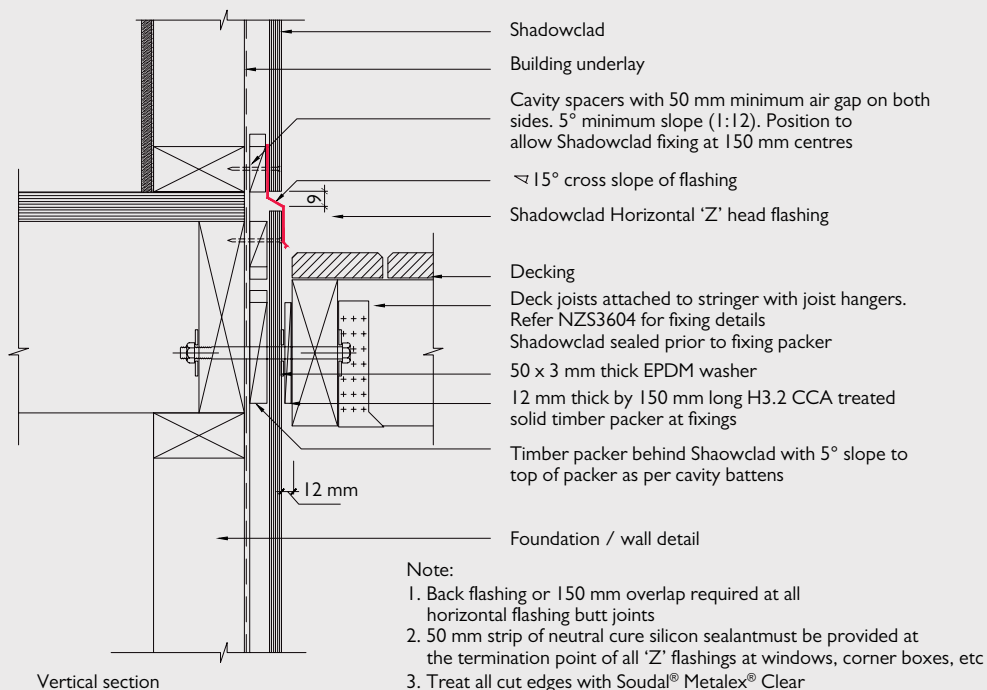
## SC046: Shadowclad® Timber Ground Floor to Non-Cantilevered Deck (Cavity)



## Note:

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

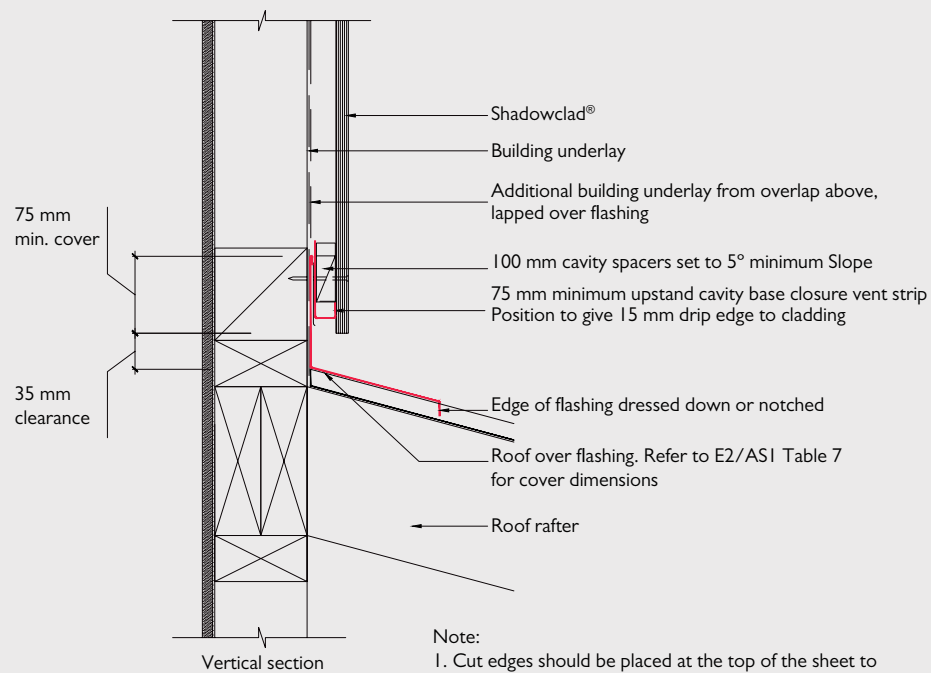
## SC048: Shadowclad Mid Floor to Non-Cantilevered Deck (Cavity)



## Note:

1. Back flashing or 150 mm overlap required at all horizontal flashing butt joints
2. 50 mm strip of neutral cure silicon sealant must be provided at the termination point of all 'Z' flashings at windows, corner boxes, etc
3. Treat all cut edges with Soudal® Metalex® Clear

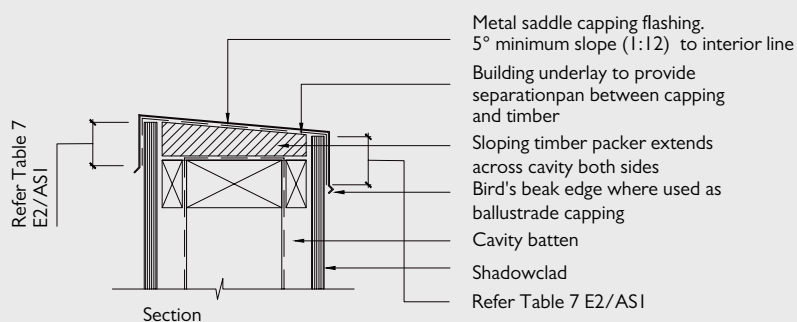
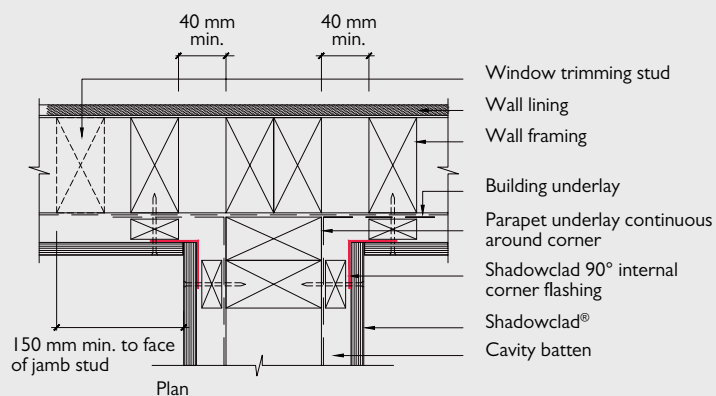
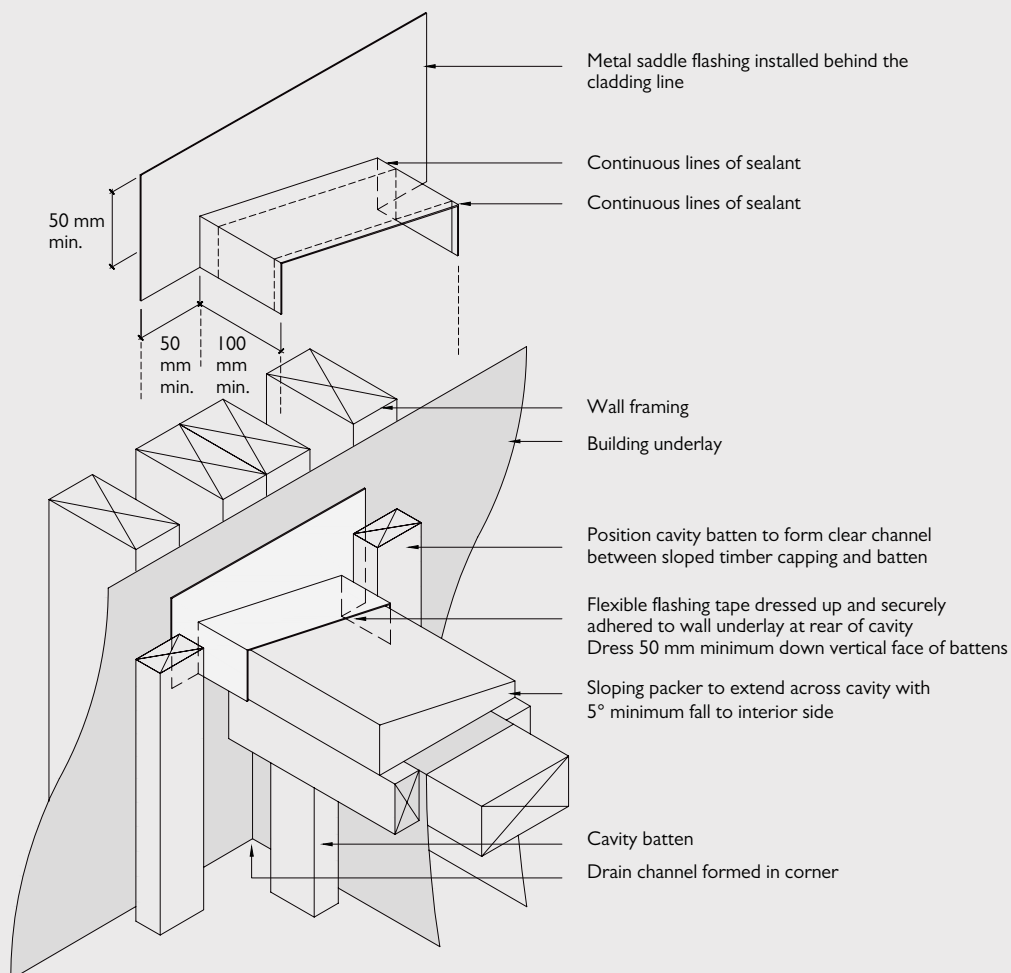
## SC050: Shadowclad Basic Apron Flashing (Cavity)



### Note:

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

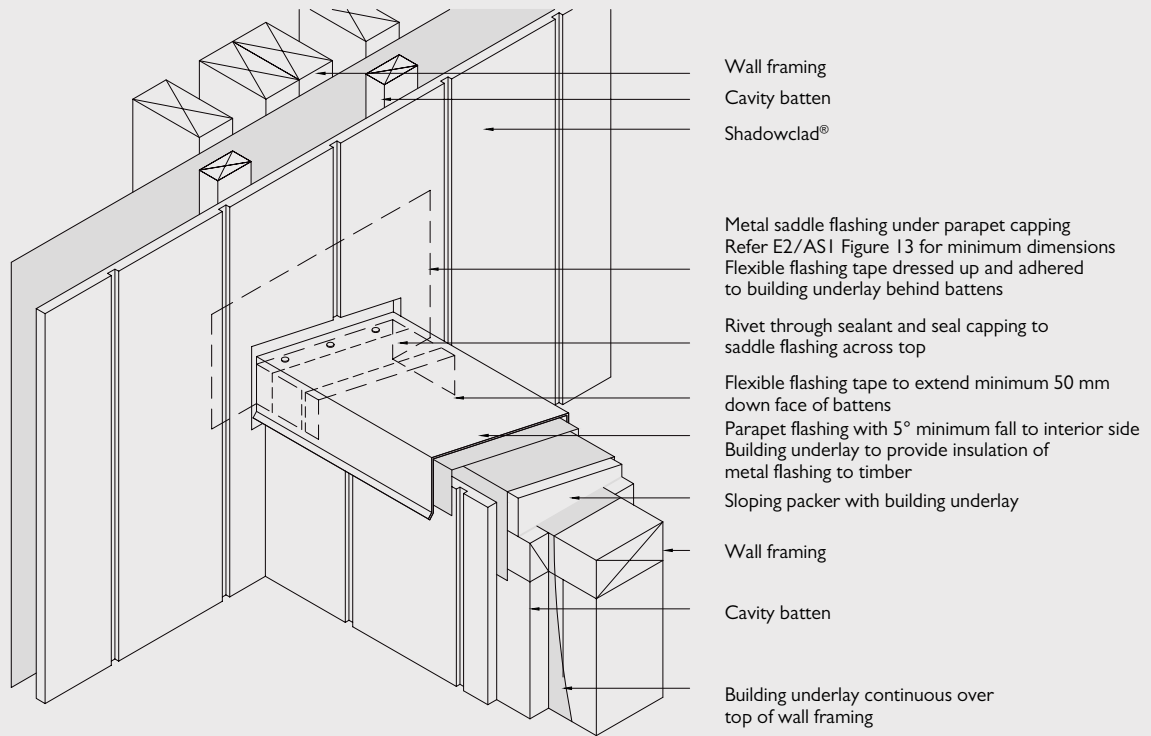
## SC052: Shadowclad Balustrade to Wall Junction (Cavity)



Note:

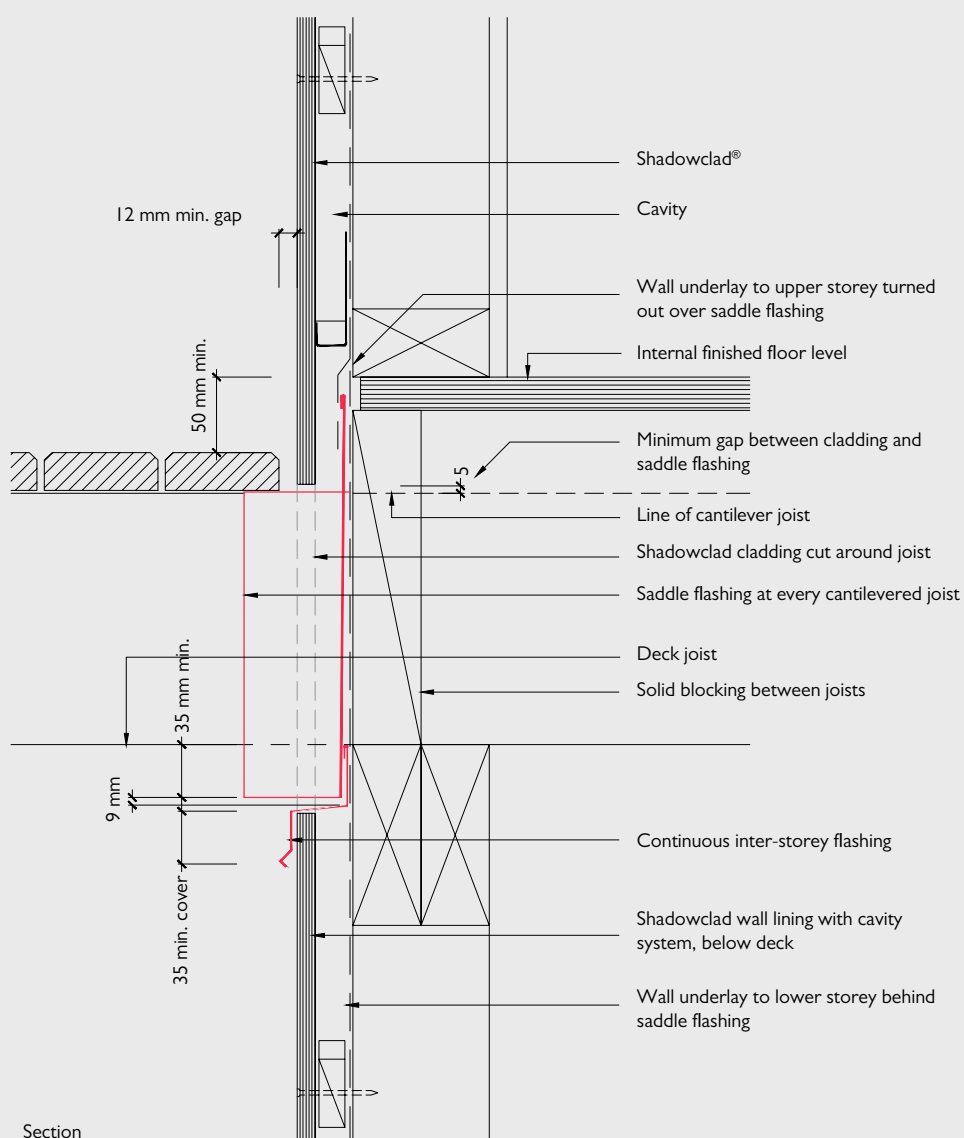
1. Treat all cut edges with Soudal® Metalex® Clear

## SC054: Shadowclad Balustrade to Wall Junction (Cavity)

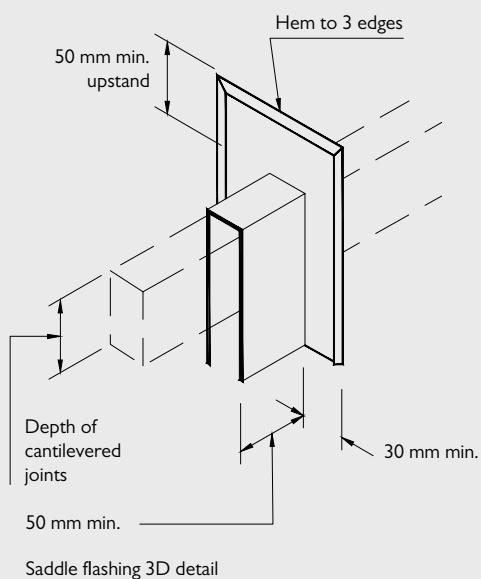


Note:  
1. Treat all cut edges with Soudal® Metalex® Clear

# SC056: Shadowclad Junction with Wall for Cantilevered Deck (Cavity)



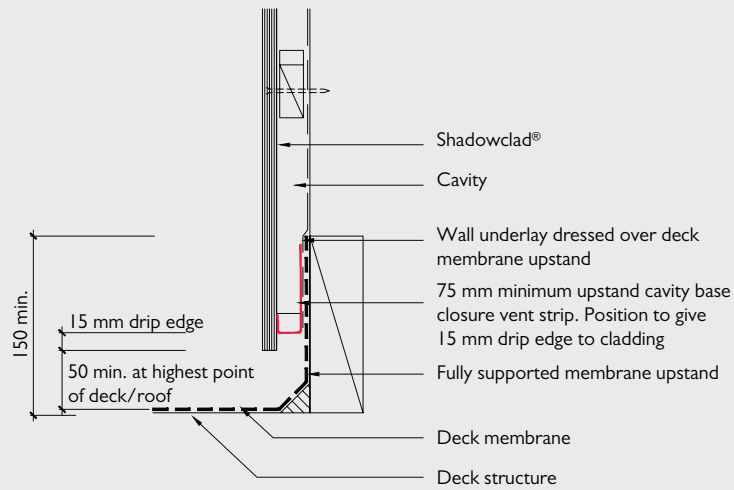
Section



## Note:

1. Building wrap at back of cavity shall be taped around joist penetration
2. The back of the saddle flashing shall be positioned behind the cladding
3. Saddle flashing terminates over inter-story flashing
4. Treat all cut edges with Soudal® Metalex® Clear

**SC058: Shadowclad Detailing for Enclosed Balustrade (Cavity)**



**Note:**

1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required



## 5.0 COATING & APPLICATION – EXTERIOR CLADDING

### 5.1 SURFACE PREPARATION

- Shadowclad is manufactured, treated and stored in dry conditions at CHH Plywood manufacturing facilities. The H3 treatment provides temporary repellence to mould prior to on site coating, however it remains the applicators responsibility to ensure the surface is dry and free from dust and mould prior to coating.
- If Shadowclad has been exposed to external weathering for over 3 months wash surfaces with a mild detergent solution to remove any dirt, dust, mould or sea spray prior to coating.
- If recoating, remove loose, flaking or unsound coatings and wash walls prior to recoating.
- The Shadowclad surface must be dry prior to applying any surface coating.

### 5.2 COATING APPLICATION

- If sheets feel greasy to touch, separate and place in a dry, well ventilated area to allow any residual solvents from the treatment process to flash off prior to applying coatings.
- Shadowclad is envelope preservative treated. Where sheets are cut, cut edges must be coated with a brush on timber preservative in accordance with the relevant manufacturer's instructions. Soudal® Metalex® Clear is recommended. Failure to properly apply preservative to cut edges will negatively affect the durability of cut panels.**
- Coatings should be applied by brush to ensure adequate coating film build is achieved. Application via roller or spray is not recommended.
- Shadowclad Natural panels should be coated within 3 months of installation.
- Priming of sheet edges and on the rear of the sheet to a height of 150mm is considered good practice, and required at the base of all sheets including above window and door joinery and horizontal flashings.
  - Shadowclad Ultra sheets are coated on the rear to a height of 150mm (minimum) to meet this requirement.
- A minimum total coating system film build of 90 microns is recommended when painting or using film forming stains, including a minimum 30 micron thickness per coat, being mindful of achieving an adequate coating in the decorative grooves.
- For detailed advice on surface preparation, coating product suitability and general coating practice always refer to the coating manufacturer prior to application.

### 5.3 COATING SELECTION

The following coating information should be treated as a generic guide to coating systems typically used with Shadowclad exterior cladding. The selection, application and maintenance of coatings is the responsibility of building owners and the professionals that they engage. For advice on specific coating products and their suitability for use on Shadowclad always refer to the coating manufacturer.

It is important to note regardless of the cladding materials selected there will always be a level of coating maintenance required to ensure the cladding material is sufficiently protected from the elements and maintains the desired appearance.

#### Paints & Film Forming Stains

Three coats (1 undercoat, 2 top coats) of a good quality, 100% acrylic paint system with a light reflectance value (LRV) of 50% or greater (i.e. light colours) which is regularly maintained will provide the highest level of protection and durability for Shadowclad and is likely to require the least amount of coating maintenance over the life of the cladding.

Dark colours (LRV of below 50%) increase heat and stress on the panel surface, reducing the panels overall lifespan and increasing the level of coating maintenance required to maintain an acceptable visual appearance. For this reason CHH Plywood does not support the use of dark colours on Shadowclad exterior cladding.

Some film forming stains (i.e. coatings with the consistency of paint but with an appearance similar to penetrating stains)

may offer similar protection qualities to paints however advice and assurance should be sought from the coating manufacturer as to their suitability for use with Shadowclad prior to application.

Where paints or film forming stains are to be used, Shadowclad Ultra is recommended. Shadowclad Ultra features a factory applied performance coating which in most cases eliminates the use of time consuming wet primers. (Refer Table 10).

Shadowclad Natural can also be used with paint however a conventional wet primer is required as part of the coating manufacturers overall system specification.

#### Penetrating Stains

Penetrating stains show the natural texture and character of timber and are widely used on Shadowclad exterior cladding. Penetrating stains offer less protection for panels from exterior weathering than paints and film forming stains which are considerably thicker in surface film build. Due to their translucency, penetrating stains are likely to require additional coating maintenance during the panel's life to maintain an acceptable visual appearance. Penetrating stains should only be used on Shadowclad Natural and are not recommended for use on Shadowclad Ultra.

CHH Plywood does not recommend the use of linseed oil based coating which have the potential to promote mould growth in this product.

### Clear Coatings & Uncoated Shadowclad

If Shadowclad is left uncoated or is clear coated in exterior applications the long term aesthetics of the board will be significantly reduced. While the product will meet durability and weather tightness requirements under E2/AS1 a high visual appearance will not be achieved in the long term.

### Face Checking

Face checks are lengthwise separations of wood fibres in the face veneer of the plywood. They result from the normal swelling and shrinking of wood as it gains and loses moisture which is exacerbated by darker colours. It is important to realise that these checks are superficial, being confined to the face veneer. They do not alter the structural integrity of the plywood in any way. If you are the specifier, it is important to discuss these issues with your client before finalising colour choice. If checking occurs, repaint with a good quality, 100% acrylic exterior house paint in accordance with the manufacturer's instructions, thoroughly working paint into the face checks with a paint brush.

**Table 10: Coating System for Shadowclad Ultra**

<b>Within 3 Months of Erection</b>	<b>Ensure the panel is clean and dry prior to top coating. Top coat with two coats of premium 100% acrylic exterior house paint.</b>
<b>OR</b>	
<b>Within 3 to 6 Months of Erection</b>	<b>Wash the surface with a mild detergent solution to remove any chalky material prior to top coating. Top coat with two coats of premium 100% acrylic exterior house paint.</b>

Note: For best results.

i/ allow 24 hours between coats.

ii/ use a light coloured paint system, LRV above 50%.

iii/ Recommend panel be washed down prior to painting to remove any sea salt spray or dirt deposits.

iv/ Minimum total coating film build of 90 microns is recommended, including a minimum 30 microns per coat.

## 5.4 COATING REQUIREMENTS IF RUN OFF IS USED FOR DRINKING WATER

Chemical manufacturers recommend that any run-off from treated surfaces should not be used for drinking water. Unsealed (e.g. unpainted) plywood claddings should not be used in situations where run-off directly from such claddings

is collected in water tanks for drinking water. Ensure selected coatings act as a sealant and refer to the coating manufacturer's Safety Data Sheets to confirm specified coatings are suitable for use in these applications.

## 6.0 MAINTENANCE

All cladding materials, including Shadowclad, require careful and regular product maintenance by the building owner throughout the cladding's normal service life to ensure long term durability and to maintain visual aesthetics.

Maintenance is the responsibility of the building owner. CHH Plywood will not be responsible for rectifying issues arising from a failure to carry out required maintenance in accordance with the guidance below.

### Claddings:

At a minimum, Shadowclad should be maintained by:

- Regularly washing it down (at least annually) with a mild detergent or solution to remove surface dirt, moss, mould, and sea spray.
- Inspect on at least a yearly basis paying particular attention to sheet joints, corners and bases.
- Keep dirt, soil or leaf build-up at least 150mm away from the base of panels.
- Clean spouting and downpipes as required, so that stormwater is not overflowing onto the cladding.
- Repaint as soon as the first sign of coating deterioration is identified in accordance with the coating manufacturer's specifications (including edges and sheet bottoms).
- Panel recoating requirements may vary depending on climate, orientation to the sun, coating type and coating colour selected.
- Maintain the exterior envelope and connections including joints, penetrations, flashings, heat pumps, and sealants that may provide a means of moisture entry beyond exterior cladding to comply with the requirements of the NZBC Clause E2 - External Moisture.
- Prune back vegetation which is close to or touching the building as well as ensuring the NZBC ground clearance requirements are maintained especially where gardens are concerned.
- **Do not** use water blasters to wash down the cladding.

### Flashings:

- Flashings should be periodically cleaned on a similar basis to the glass in windows.
- Clean Shadowclad flashings with a diluted solution of mild liquid detergent avoiding excessively hot solutions. Use a soft bristle brush. **Do not** use abrasive tools or cleaners on the coating.
- After cleaning, rinse thoroughly with fresh water. **Do not** use strong solvent type cleaners. Where the use of solvents is required, such as cleaning paint spills, use nothing other than methylated spirit. Ensure contact time is as short as possible, and rinse the solvent cleaner thoroughly from the surface with copious amounts of quality drinking water.
- Where cavity base closures are installed, ensure drainage holes are kept clear.

**Also, refer to the Shadowclad Information Bulletin: Shadowclad Maintenance March 2021.**

## 7.0 FREQUENTLY ASKED QUESTIONS

**Q:** Where can Shadowclad be used?

**A:** Shadowclad can be used as an exterior wall cladding within the scope of the Acceptable Solution E2/AS1 - External Moisture. Shadowclad is recommended for a drained and ventilated cavity, where the cladding is fixed onto timber battens fixed over the timber frame and building underlay. Shadowclad is not recommended where a risk score >20 in accordance with E2/AS1 is established.

**Q:** Do I have to re-treat cut edges of Shadowclad panels?

**A:** H3 treated Shadowclad is envelope preservative treated. All cuts made in treated plywood **must** have a brush on preservative treatment applied fully to the cut area. CHH Plywood recommends the use of Soudal® Metalex® Clear.

**Q:** When used as an exterior cladding what are the durability expectations of Shadowclad?

**A:** Under the NZBC Shadowclad (when used as an exterior cladding) is required to meet a 15 year minimum durability level.

To achieve a 15 year durability Shadowclad must be:

- H3 preservative treated.
- Uncoated Shadowclad will meet the durability and weathertightness requirements, but a high visual appearance will not be achieved in the long term.
- Coated with a good quality penetrating stain, film forming stain or paint system.
- Coatings must be regularly maintained as part of a normal building maintenance program throughout the life of the building.

**Shadowclad is not recommended to be left uncoated when used as an exterior cladding.**

**Note** – durability according to the NZBC refers to the products ability to continue to perform its primary function as protection for the building structure. Appearance including the performance of the coating product is not covered under the NZBC durability requirements.

**Q:** Can Shadowclad, when used as an exterior cladding, be coated in dark colours?

**A:** While dark colours (coatings with an LRV of below 50%) will achieve a 15 year durability however customers must expect

an increased level of recoat and general product maintenance compared to where light coating colours are used. For this reason CHH does not support the use of dark colours on Shadowclad exterior cladding.

The greatest level of cladding protection and least amount of coating maintenance can be achieved by using a good quality paint system (applied as per the coating manufacturers specifications) with an LRV of 50% or greater and a minimum total coating system film build of 90 microns, including a minimum 30 micron thickness per coat. For further information on coatings always refer to the applicable coating manufacturer's specification material.

**Q:** Does Shadowclad comply with the NZBC Requirements?

**A:** Shadowclad has been tested in accordance with E2/VMI and AS/NZS 4284 "Testing of Building Facades" for compliance with the NZBC requirements and has been BRANZ appraised for use in cavity fix construction.

**Q:** In the Shadowclad exterior flashing range can I colour the flashings to match the colour of my building?

**A:** Shadowclad aluminium exterior flashings are available in either anodised or mill finishes. Anodised flashings are silver in colour and can be installed immediately. Mill finished flashings can be powder coated to specific colours by the customer.

**Q:** Does face checking affect the performance of Shadowclad?

**A:** Face checks are lengthwise separations of wood fibres in the face veneer of the plywood. They result from the normal swelling and shrinking of wood as it gains and loses moisture which is exacerbated by darker coloured coatings. These checks are superficial, being confined to the face veneer. They do not alter the structural integrity of the plywood in any way.

**Q:** Where can I download the Shadowclad sTe App?

**A:** The Shadowclad sTe App can be downloaded from [www.chhply.co.nz/site-app](http://www.chhply.co.nz/site-app) or the respective device APP procurement marketplace.

**Q:** Where can I get a Shadowclad Stick from?

**A:** Shadowclad Sticks may be ordered by contacting CHH Plywood direct by phoning 0800 326 759, ordering via the Shadowclad sTe App, or contacting your local merchant.

## 8.0 GLOSSARY OF TERMS

**Sealant:** A flexible neutral cure sealant for filling of spaces/ gaps and weatherproofing that complies with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use. It is the designers' and builders' responsibility to ensure that sealants are fit for purpose and compatible with Shadowclad products and any other building materials or components used within the Shadowclad installation.

**Air Seal:** A continuous seal fitted between a window or door reveal and the surrounding wrap and associated tape enclosing wall framing to prevent the flow of air into the building interior. Air seal must be weathertight so that moisture is not able to access the structure. Refer to NZBC E2/AS1 for further detail.

**Foam Bond Breaker:** A tape that is polyethylene backed that prevents "3-Point" adhesion mating surfaces that ensures that the sealant only attaches to two surfaces (and not the third which would create an anchor point preventing the sealant moving as its designed to).

**PEF Rod:** A foam formed polyethylene "noodle" that is designed to be inserted between two surfaces. Should have a 25-33% larger diameter than the gap/space you are inserting it into.

**Soudal® Metalex® Clear:** A supplementary preservation treatment that preserves the treatment envelope of timbers with a Class H3.1 and above.

## 9.0 REFERENCES & SOURCES OF INFORMATION

- New Zealand Building Code (NZBC).
- AS/NZS 2269:2012 "Plywood Structural".
- AS/NZS 1604.3:2010 "Specification for Preservative Treatment, Part 3: Plywood".
- NZS 3602:2003 "Timber and Wood-Based Products for use in Buildings".
- AS/NZS 4284:2008 "Testing of Building Facades".
- NZS 3603:1993 "Timber Structures Standard".
- NZS 3604:2011 "Timber Framed Buildings".
- AS 3715:2002 "Metal Finishing – Thermoset powder coating for architectural application of aluminium and aluminium alloys".
- NZBC Clause E1 Surface Water.
- NZBC Acceptable Solution, E1/AS1.
- NZBC Clause E2 External Moisture.
- NZBC Acceptable Solution, E2/AS1.
- NZBC Clause E3 Internal Moisture.
- NZBC Acceptable Solution, E3/AS1.
- NZBC Clause B2 Durability.
- NZBC Acceptable Solution, B2/AS1.
- Product Technical Statement and Building Product Information Sheet - Shadowclad Cladding for Cavity Construction.
- Ecoply® Specification and Installation Guide.
- Ecoply® Barrier Specification and Installation Guide.
- CHH Plywood technical notes – downloadable from [www.chhply.co.nz/librarytools/](http://www.chhply.co.nz/librarytools/).
- Safety Data Sheet.
  - SDS Shadowclad Azole Treated Plywood.
  - SDS Shadowclad CCA Treated Plywood.
  - SDS Stainless Steel flashings.
  - SDS Aluminium flashings.
  - SDS Shadowclad Ultra CCA Pre-primed Treated Plywood.
  - SDS Shadowclad Ultra LOSP Pre-primed Treated Plywood.
- Producer Statement – Compliance for Surface Treated Aluminium Products.
- Window Association of New Zealand ([www.wanz.org.nz](http://www.wanz.org.nz)).
- APA ([www.buildabetterhome.org](http://www.buildabetterhome.org)).
- EWPAA ([www.ewp.asn.au](http://www.ewp.asn.au)).
- BRANZ Appraised 764 – Shadowclad® Cavity Fixed Cladding System.
- BRANZ Recommendations for Building Maintenance.

Standards can be purchased online at [www.standards.co.nz](http://www.standards.co.nz).

Building Code Compliance Documents can be downloaded free of charge at [www.building.govt.nz/building-code-compliance/](http://www.building.govt.nz/building-code-compliance/).

Line drawings within this literature can be downloaded from [www.chhply.co.nz/librarytools/](http://www.chhply.co.nz/librarytools/).

## 10.0 LIMITATIONS

The information contained in this document is current as at February 2024 and is based on data available to CHH Plywood at the time of going to print.

All photographic images are intended to provide a general impression only and should not be relied upon as an accurate example of Shadowclad products installed in accordance with this document or the NZBC compliance documents.

This publication replaces all previous CHH Plywood design information and literature relating to Shadowclad structural plywood products and flashings installed using a drained and vented cavity. CHH Plywood reserves the right to change the information contained in this document without prior notice. It is your responsibility to ensure that you have the most up to date information available, including at the time of applying for a building consent. You can call toll free on 0800 326 759 or visit [www.chhply.co.nz](http://www.chhply.co.nz) to obtain current information.

**CHH Plywood has used all reasonable endeavours to ensure the accuracy and reliability of the information contained in this document. However, to the maximum extent permitted by law, CHH Plywood assumes no responsibility or liability for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.**

## 11.0 SHADOWCLAD STICK USER GUIDE

CHH Plywood developed the Shadowclad Stick, an installation tool for Shadowclad, to remove the need for builders to develop their own 'jigs' and ensure that critical clearances, nail spacings, etc. are applied during the installation of Shadowclad sheets.

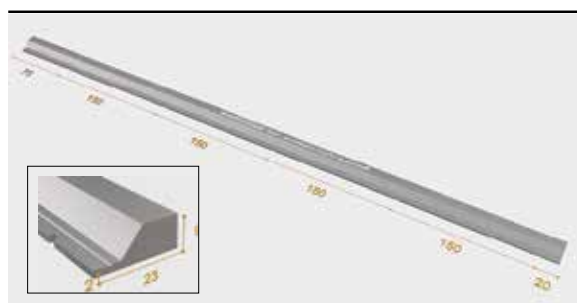
The Shadowclad Stick does not replace the need to follow good building practice and the requirement to read and understand the Shadowclad Specification & Installation Guides and the NZBC.

### 11.1 THE COMPONENTS OF THE SHADOWCLAD STICK

The Shadowclad Stick has been developed specifically to deal with expansion gaps, catering for both Shadowclad texture and Shadowclad groove as well as horizontal and vertical joints. The Shadowclad Stick also provides guidance around nail spacings to suit:

- 150 mm spacing around sheet edges and 300 mm to intermediate studs and nogs;
- 75 mm distance for the bottom of the sheet; and
- 20 mm for the top of the sheet.

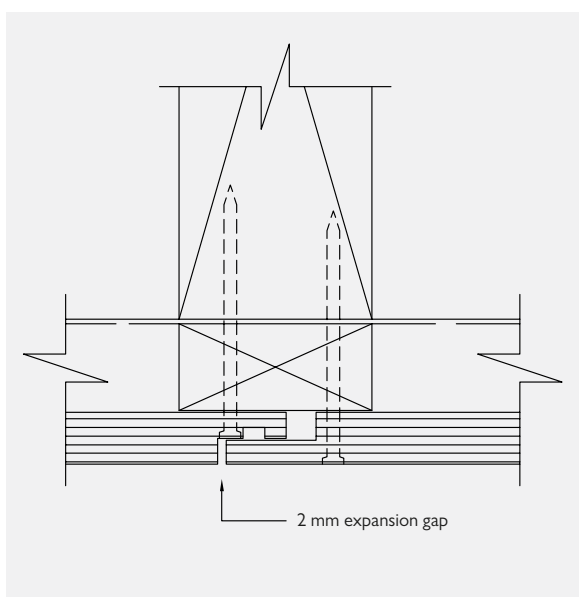
Figure 1: The Shadowclad Stick



### 11.2 VERTICAL JOINTS

The Shadowclad Stick is contoured to be 2 mm thick on one edge and 9 mm thick on the other. At 695 mm long, the Shadowclad Stick can be placed in the middle of sheets to provide minimum clearance requirements. Figure 2 illustrates the 2 mm expansion gap required for Shadowclad texture together in use with the Shadowclad Stick. Figure 3 illustrates the 9 mm expansion gap required for Shadowclad Groove, together in use with the Shadowclad Stick.

Figure 2: Shadowclad Texture - 2 mm Vertical Expansion Gap



Refer to SC006 for the installation detail

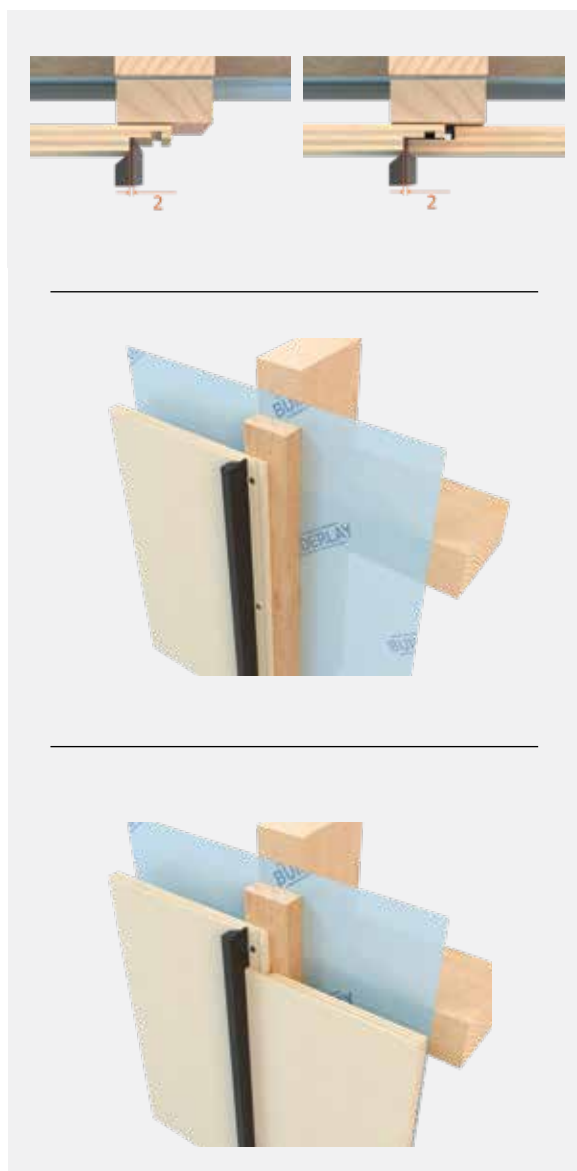
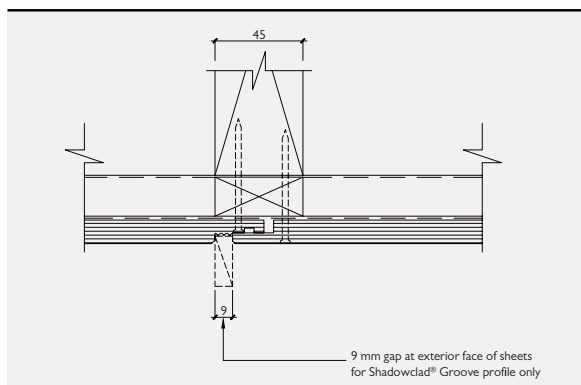


Figure 3: Shadowclad Groove - 9 mm Vertical Expansion Gap

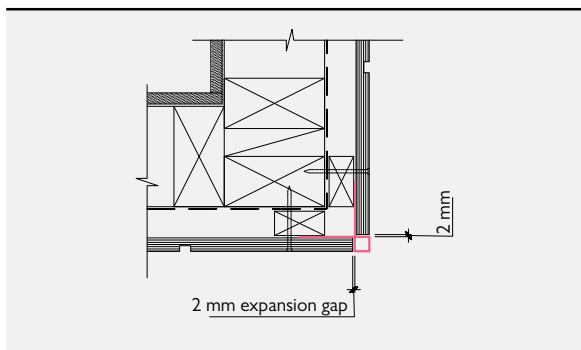


Refer to SC008 for the installation detail

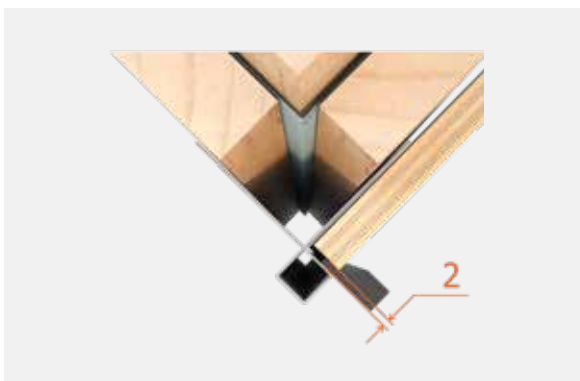


The 2 mm thick edge of the Shadowclad Stick can also be used to measure the 2 mm expansion gap required between vertical flashings and Shadowclad as detailed in Figure 4 (Vertical Top Hat Flashing and 'W' Flashing similar).

Figure 4: 2 mm Vertical Expansion Gap on Shadowclad External Box Corner



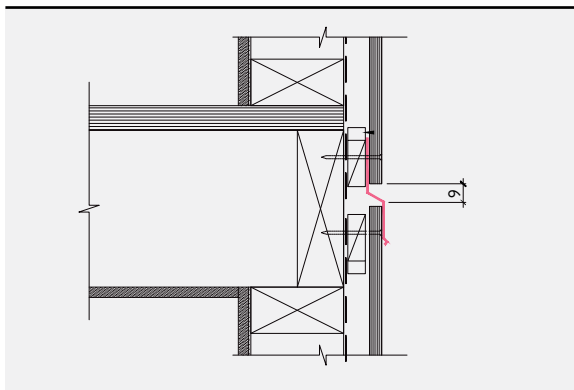
Refer to SC020 for the installation detail



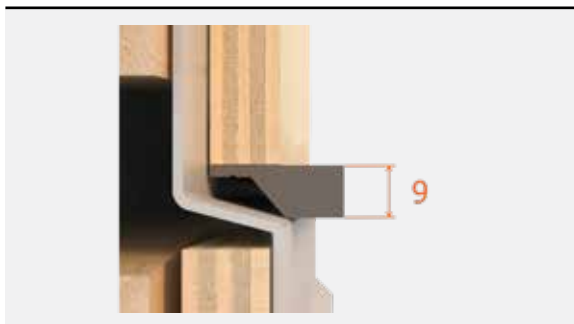
## 11.3 HORIZONTAL JOINTS

The 9 mm thick edge on the Shadowclad Stick can also be used to provide the appropriate clearance between the top of the horizontal flashings and bottom of sheets as detailed in Figure 5 (Window head and metre box similar) as noted in the detail SC016.

Figure 5: Shadowclad 9 mm Gap at Horizontal 'Z' Flashing



Refer to SC016 for the installation detail





## 11.4 FASTENER LOCATIONS

The Shadowclad Stick has been detailed to support the correct placement of fastenings corresponding to the Shadowclad Specification & Installation Guides.

## 11.5 NAIL SPACING'S

Section 4.7 notes "Standard fixing pattern: fasten sheet edges at 150mm centres and within the panel on all supports at 300mm centres". Figure 6 details the use of the Shadowclad Stick at sheet edges with 150 mm nail spacing provided for between half rounds spaced at exactly 150 mm centres. Figure 7 details the use of the Shadowclad Stick at the centre of the sheet to provide fixings at 300 mm centres, whilst figure 8 provides a pictorial representation of the Shadowclad fastener layout.

Figure 6: Sheet fastening around sheet edges at 150 mm

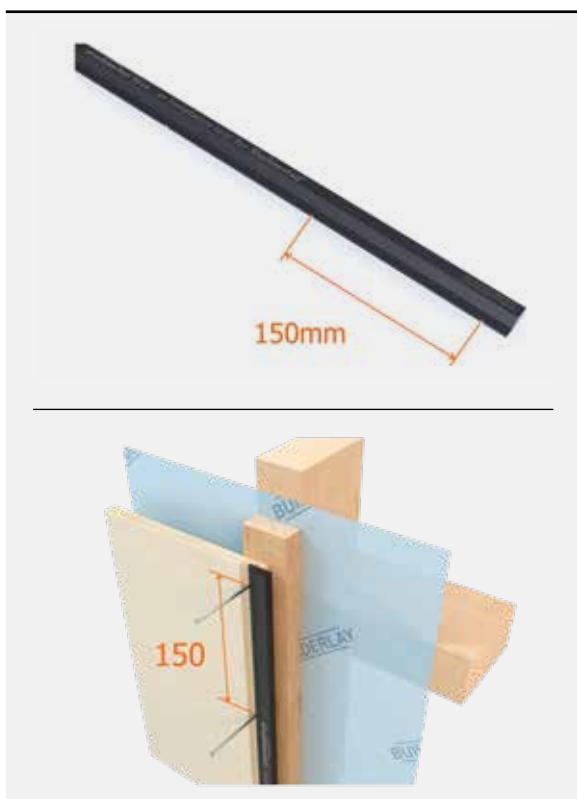


Figure 7: Sheet fastening within the panel at 300 mm

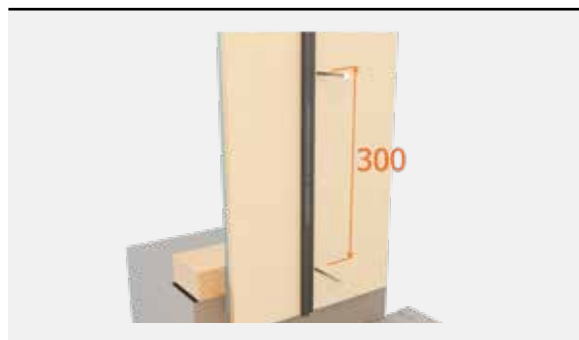
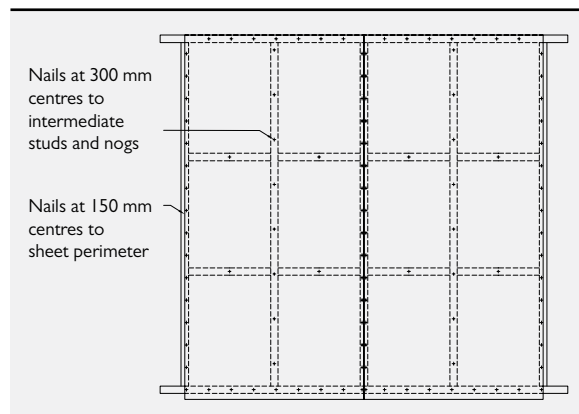


Figure 8: Pictorial representation of nail spacings for sheet edges and intermediate supports



## 11.6 NAILING OF THE SHIP LAP

Nailing of the ship lap is an important step in ensuring the Shadowclad system's weathertightness. Each Shadowclad sheet is independently nailed off to allow for expansion and contraction of the sheets over their service life, whilst maintaining a weathertight connection. The Shadowclad Stick has two distinct locating devices for the ship lap joint. Figure 9 illustrates the location of the ridge, exactly 13 mm from the edge of the Shadowclad Stick, in combination with the diameter 3 mm half round provides the exact location for nails within the underlap portion of the ship lap. The ridge should be lined up with the edge of the underlap edge of the sheet. Figure 10 details the use of the Shadowclad Stick in this application.

The Shadowclad Stick is exactly 23 mm wide as detailed in Figure 11. To ensure that the Shadowclad sheets are fixed independently of each other, the top of the ship lap should be fixed 23 mm from the edge. The Shadowclad Stick should be placed along the sheet and nailed at 150 mm centres as detailed in Figure 12.

Figure 9: Shadowclad Stick 13 mm dimension

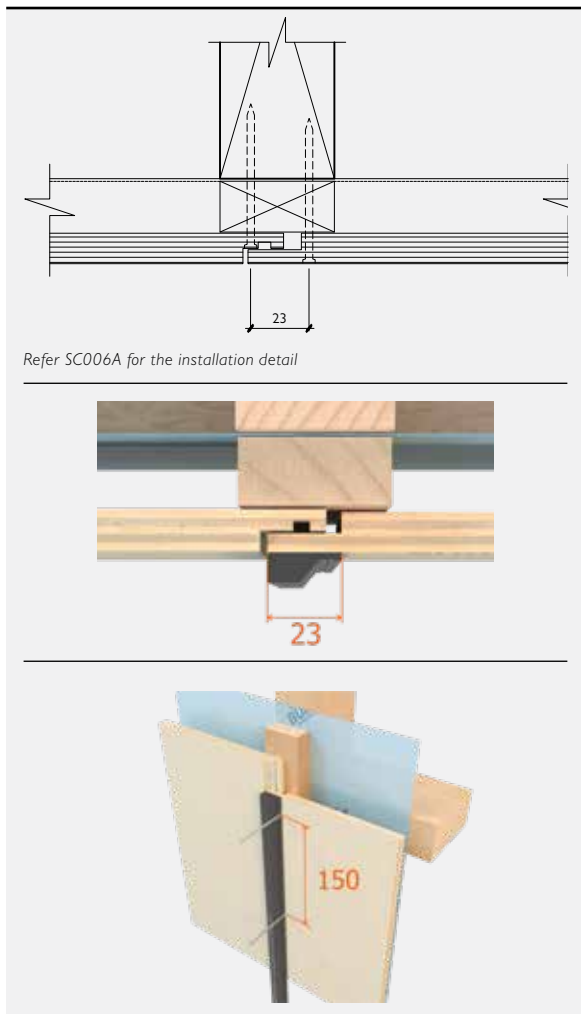




Figure 11: Shadowclad Stick 23 mm dimension



Figure 12: Shadowclad Stick and ship lap nailing



## 11.7 END DISTANCE FASTENER LOCATIONS

Compliance with the end distance nailing is an important step in achieving the weathertight solution. The Shadowclad Stick has two end of sheet identifiers, including a 75 mm edge distance from the bottom of the Shadowclad Stick to the first nail locator as detailed in Figure 13. The top of the Shadowclad Stick has a 20 mm end distance from the top of the Shadowclad Stick to the first nail locator, to suit nailing of the top of the sheet to the centre of the top plate, as detailed in Figure 14.

## 11.8 END DISTANCE FASTENER LOCATIONS

Compliance with the end distance nailing is an important step in achieving the weathertight solution. The Shadowclad Stick has two end of sheet identifiers, including a 75 mm edge distance from the bottom of the Shadowclad Stick to the first nail locator as detailed in Figure 13. The top of the Shadowclad Stick has a 20 mm end distance from the top of the Shadowclad Stick to the first nail locator, to suit nailing of the top of the sheet to the centre of the top plate, as detailed in Figure 14.

Figure 13: 75 mm end distance



Refer to SC042 for the installation detail

Figure 14: 20 mm end distance



## 11.9 SHADOWCLAD SPECIFICATION & INSTALLATION GUIDE & SHADOWCLAD APP

The Shadowclad Stick has been developed to compliment the Shadowclad Specification & Installation Guides and the Shadowclad APP all of which are available to download from [www.chhply.co.nz](http://www.chhply.co.nz).

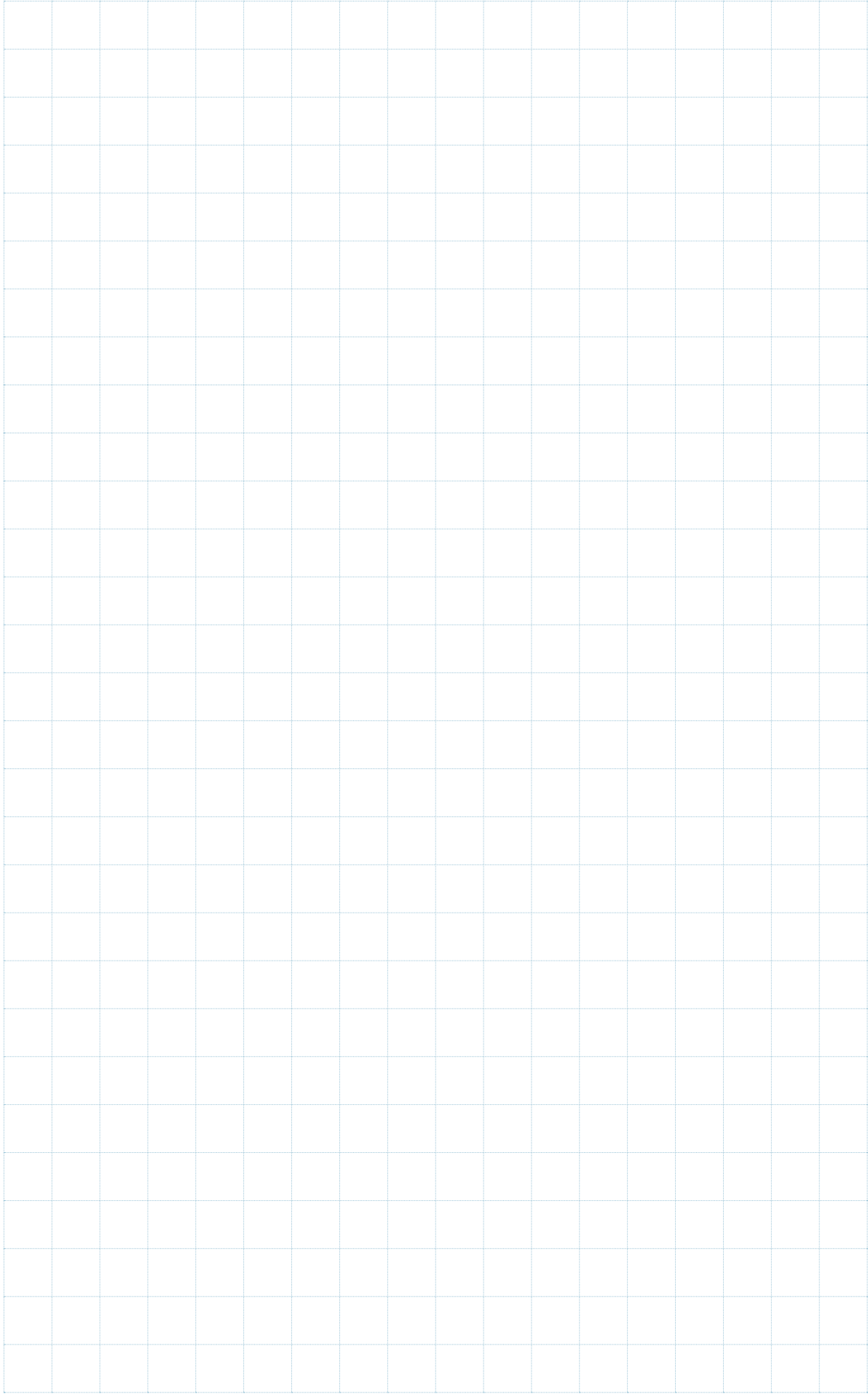
# SHADOWCLAD KEY INSTALLATION & DESIGN POINTS

## EXTERIOR CLADDING APPLICATIONS

The following tasks are provided to installers to point out key installation and design factors when used as an exterior cladding. These do not detract from the requirements to read and understand this literature as a whole.

Task	Tick when checked
<b>Prior to Specification and Installation</b>	
Inspect panels for visual defects prior to installation.	<input type="checkbox"/>
Read the Shadowclad Specification and Installation Guide in its entirety	<input type="checkbox"/>
<b>Framing Plan</b>	
Framing setout drawings to suit Shadowclad fixing and installation guidelines	<input type="checkbox"/>
<b>Sheet Cuts</b>	
Coat all sheet cuts with a preservative timber treatment such as Soudal® Metalex® Clear	<input type="checkbox"/>
After applying Soudal® Metalex® Clear, apply the surface coating (e.g. paint or stain) to cut edges	<input type="checkbox"/>
Place uncut edge to bottom	<input type="checkbox"/>
<b>Fastener Material Type</b>	
Galvanised fasteners or better used (Stainless steel annular groove nails required in sea spray zones and with H3.2 CCA treated Shadowclad Ultra)	<input type="checkbox"/>
<b>Sheet Fastener Pattern</b>	
Around sheet edge – maximum 150mm centre spacing	<input type="checkbox"/>
Within sheet body – maximum 300mm centre spacing	<input type="checkbox"/>
<b>Horizontal Sheet Joints</b>	
Minimum 9mm separation gap between sheets above all Horizontal 'Z' flashings	<input type="checkbox"/>
Prime the bottom of the sheet edge and 150mm up the back (rear) of the sheets	<input type="checkbox"/>
50 mm strip of neutral cure silicon sealant or stop ends at all 'Z' flashing terminations excluding terminations at Shadowclad metal corner flashings	<input type="checkbox"/>
Back flashings or 150 mm overlap to all flashing butt joints	<input type="checkbox"/>
<b>Expansion Gaps Between Sheets (Vertical Sheet Joints)</b>	
Texture Profile Sheets - 2mm gap between vertical edges of sheets	<input type="checkbox"/>
Groove Profile Sheets - 9mm gap (i.e. full groove space) between vertical edges of sheets	<input type="checkbox"/>
Note: Expansion gaps required between vertical edges of sheets to accommodate natural expansion and contraction of sheets	
<b>Ground Clearances</b>	
Paved/Sealed Ground - minimum 100mm distance from the ground to sheet bottom	<input type="checkbox"/>
Broken Ground - minimum 175mm distance from the ground to sheet bottom	<input type="checkbox"/>
Prime the bottom of the sheet 150mm up the back (rear) of the sheet	<input type="checkbox"/>

Refer to the current Shadowclad Specification and Installation Guide for full installation specifications and suggested details.





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