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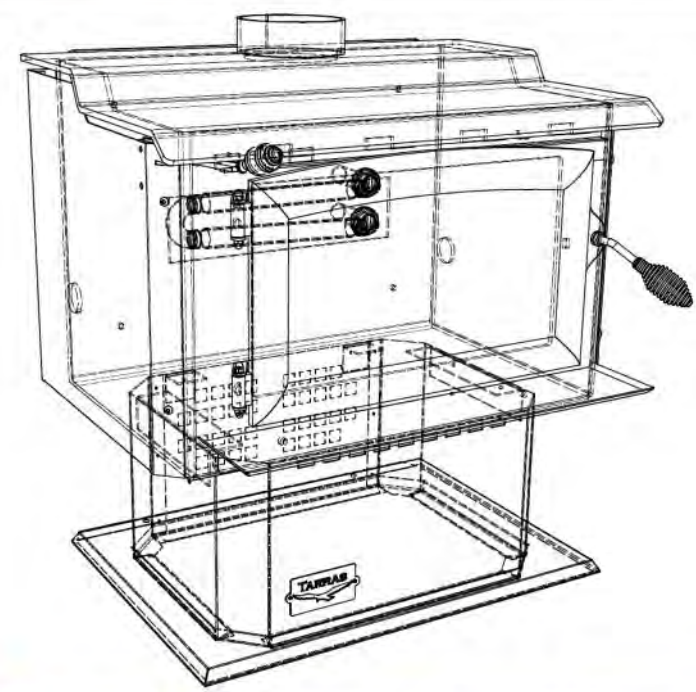
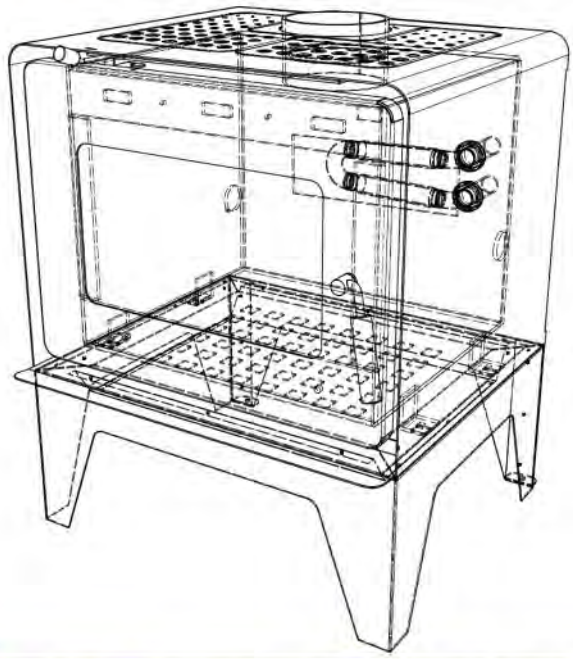
WOODSMAN

Warming kiwi homes since 1887.

Specifications and Installation Instructions for Woodsman Solid Fuel Burners





The installation of any Woodsman solid fuel burner requires a Building Consent prior to installation commencing. We recommend the installation of a Woodsman solid fuel burner or flue system be undertaken by the holder of a current SFAIT (Solid Fuel Appliance Installation Technician) qualification issued by the NZHHA (NZ Home Heating Association Inc.).
www.nzhha.co.nz

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Contents

Testing and Certification

MODEL	AS/NZS 2918:2001, APP B	AS/NZ 2918:2001, APP E	AS/NZS 4012:1999	AS/NZS 4013:1999	ECan Cert Number
ECR NoVo	Complies	N/A	67%	0.9g/kg	153733
ECR NoVo Wet	Complies	N/A	65%	0.9g/kg	155148
Totara	Complies	Complies	67%	0.9g/kg	110220
Flare - Wood	Complies	N/A	68%	0.97g/kg	134775
Flare - Wood WB	Complies	N/A	65%	0.89g/kg	135021
Brunner MKII	Complies	N/A	71%	0.5g/kg	142896
Brunner MKII WB	Complies	N/A	65%	0.5g/kg	142897
Tasman MKII	Complies	N/A	71%	0.5g/kg	142898
Tasman MKII WB	Complies	N/A	65%	0.5g/kg	142899
Tarras MKIII	Complies	N/A	69%	0.37g/kg	143492
Tarras MKIII WB	Complies	N/A	65%	0.5g/kg	143494
RMF	Complies	N/A	83%	3.9g/kg	N/A
Strongman	Complies	N/A	N/A	N/A	N/A
The Stag	Complies	N/A	N/A	N/A	N/A
The Coaster	Complies	N/A	N/A	N/A	N/A

Minimum Safe Installation Clearances to COMBUSTIBLE Materials

	BRUNNER MKII & TASMAN MKII	BRUNNER MKII & TASMAN MKII With Rear Deflector Fitted (see Page 7)	FLARE	TARRAS MKIII	TARRAS MKIII With Rear Deflector Fitted (see Page 7)
A	200	120	100	230	160
B	450	450	320	480	460
C	300	300	300	300	300
D	118	118	110	67	67
E	230	240	120	250	220
F	345	265	281	372	302
G	758	758	635	863	843
H	535	545	449	611	581
J	850	850	850	898	898
K	1025	945	933	1052	982
L	1437	1451	1287	1544	1500
M	1220	1230	1122	1304	1274
N	680	680	652	680	680
O	615	615	600	600	600
Flue Shield Requirements (See Page 7)	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted	1200 With flue shield deflector fitted

Notes:

Dimensions **A**, **B** & **E** are taken from the combustible wall to the closest point of the appliance including panels.

Dimension **C** is measured from the edge of the hearth to the closest point of the firebox door frame as in AS/NZS 2918:2001 3.3.2

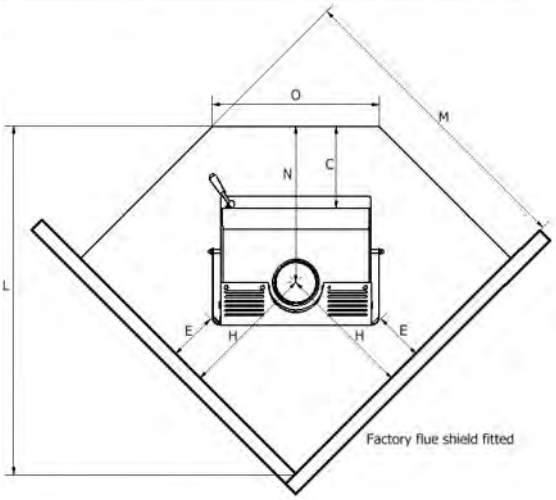
Dimensions **F**, **G** & **H** are not clearances that need to be adhered to. They are measurements for the purpose of locating the flue centre when the appliance is installed with the minimum safe clearances.

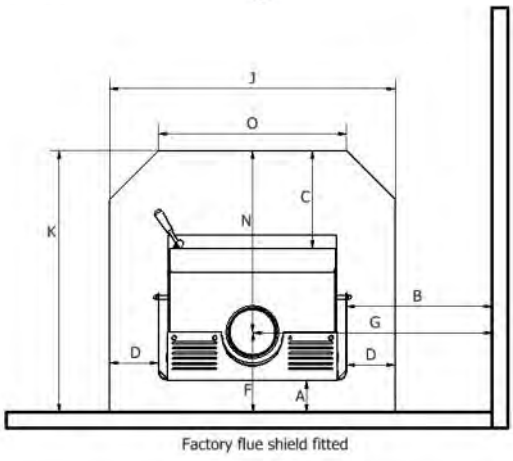
*610mm with firebox side panels fitted.

**968mm with firebox side panels fitted.

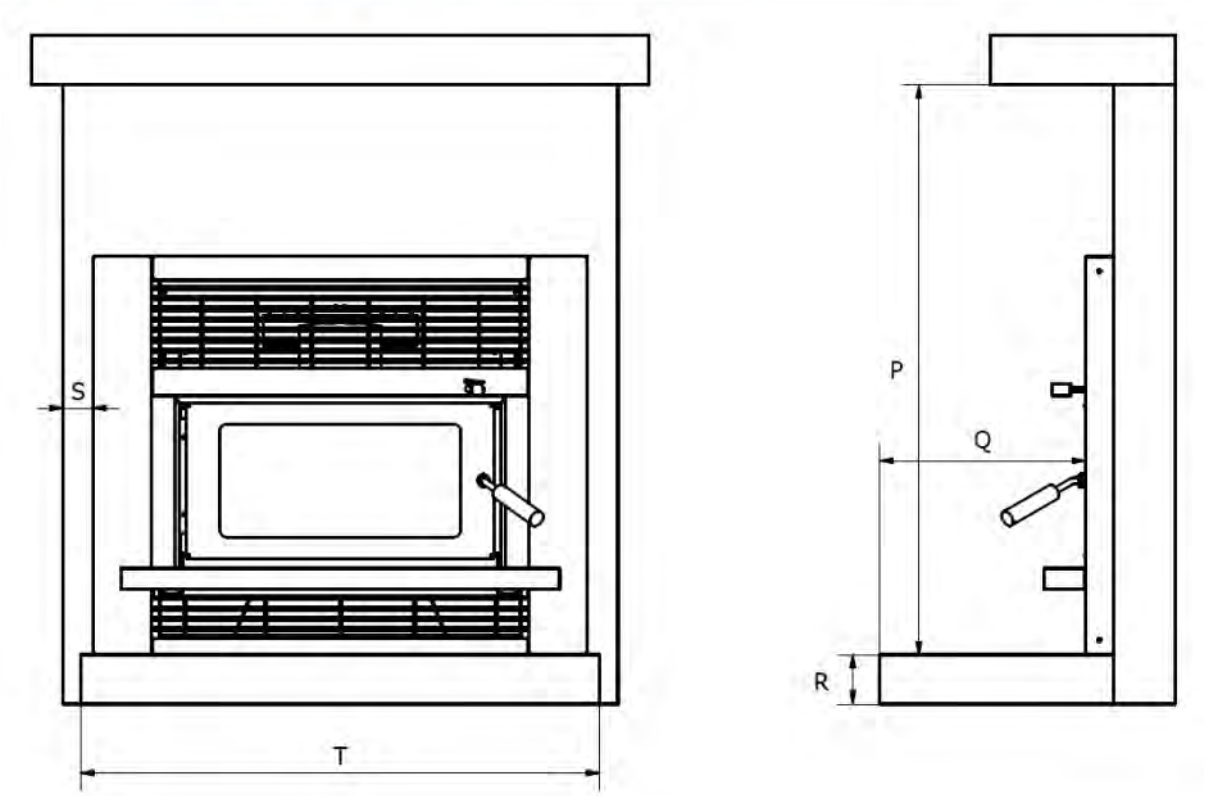
All dimensions are given in millimetres (mm).

	ECR NoVo With Rear Deflector Fitted (see Page 7)	RMF	THE COASTER	THE STAG	STRONGMAN
A	110	125	250	250	300
B	490	500	550	550	875*
C	300	300	300	300	GRAPH 1
D	115	150	150	150	150
E	200	180	225	225	380
F	265	276	391	391	441
G	800	790	858	858	1233**
H	517	492	516	516	711
J	850	880	915	915	1015
K	792	832	1071	1071	1364
L	1259	1252	1410	1410	1928
M	1049	1060	1152	1152	1616
N	527	556	680	680	923
O	450	580	440	440	715
Flue Shield Requirements (See Page 7)	1200	900	1200	1200	1200





Minimum Safe Installation Clearances to COMBUSTIBLE Materials

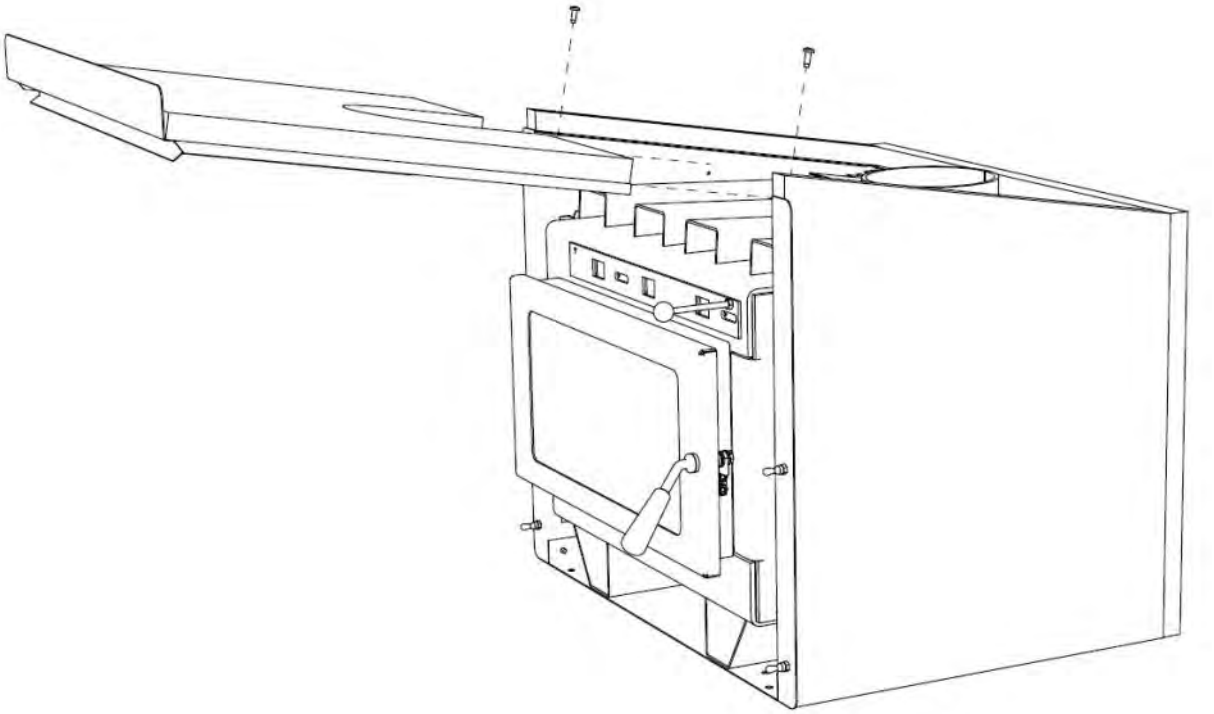


	IMF	Totara
P	980	1060*
Q	Graph 1	Graph 1
R	Graph 1	Graph 1
S	50	50
T	840	840

* Dimension P can be 920mm with a factory supplied heat deflector fitted

Totara Insert Installation

When installing the Totara into a masonry situation, it is important to ensure that the flue is sealed and secured into the flue spigot.
In some tight situations, it may be very difficult to get access. In those cases, the top section of the cabinet is able to be removed by removing 2 screws and sliding it forward (as shown below).
You then have access to the flue spigot to perform the task. Once completed, ensure that the top section of the cabinet is properly put back in its correct position, otherwise heat will escape into the cavity.



Additional Insulation in Cavity

In some installations, the cavity size leaves large open spaces around the insert cabinet. Even though the fascia may cover the opening, it is not air tight and there can be significant heat loss up the chimney.
This can reduce the effectiveness of the appliance and is likely to cause problems for the owner.

It is recommended that additional **non**-**combustible** insulation be used to pack around the cavity between the fire and the masonry to reduce (but not completely eliminate) air flow up the chimney and heat loss.

Ceiling Heights

All Woodsman free standing fires have been tested and approved to ASNZ 2918:2001 App B with a ceiling height of 2.4m and with the factory flue shield fitted in the below configurations. In some cases, the top of the flue shield terminates within 600mm of the ceiling height (refer to ASNZ 2918:2001 **4.5.2**) but all ceiling temperatures did not exceed the allowable limit in these cases and are therefore able to be installed. Reports are available on request for Councils.

If the ceiling height is less than 2.4m, then heat shielding is required as per AS/NZ 2918:2001 Table 3.2

Factory Flue Shields

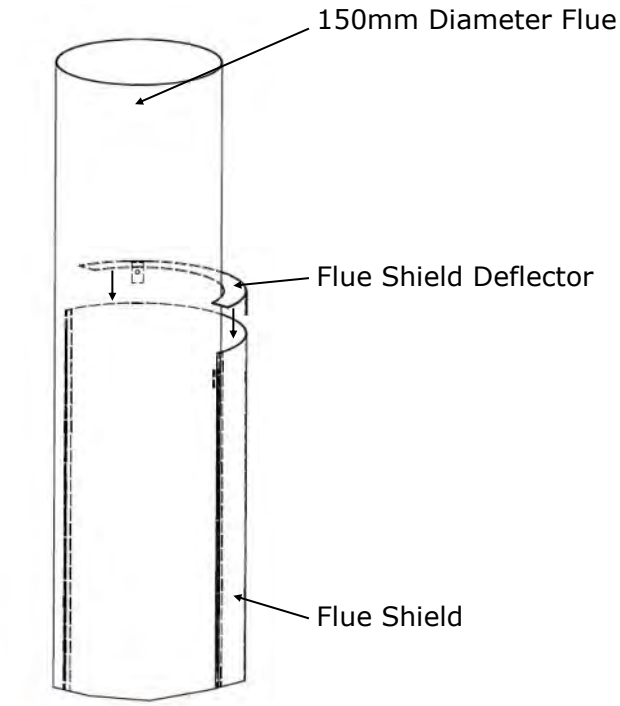
Standard 900mm high flue shield:
RMF

Standard 1200mm high flue shield:
ECR NoVo & Strongman, The Coaster, The Stag.

1200mm high flue shield with flue shield deflector (REQUIRED)
Tarras MKII, Tarras MKIII, Brunner/Tasman MKII & Flare (All Variants) - See Below

*IMPORTANT - Flue shields should be no further than 10mm off the top of the fire box.

Fitting the Flue Shield Deflector
for Tarras MKII, Tarras MKIII, Brunner/Tasman MKII and Flare



To fit the heat shield deflector:

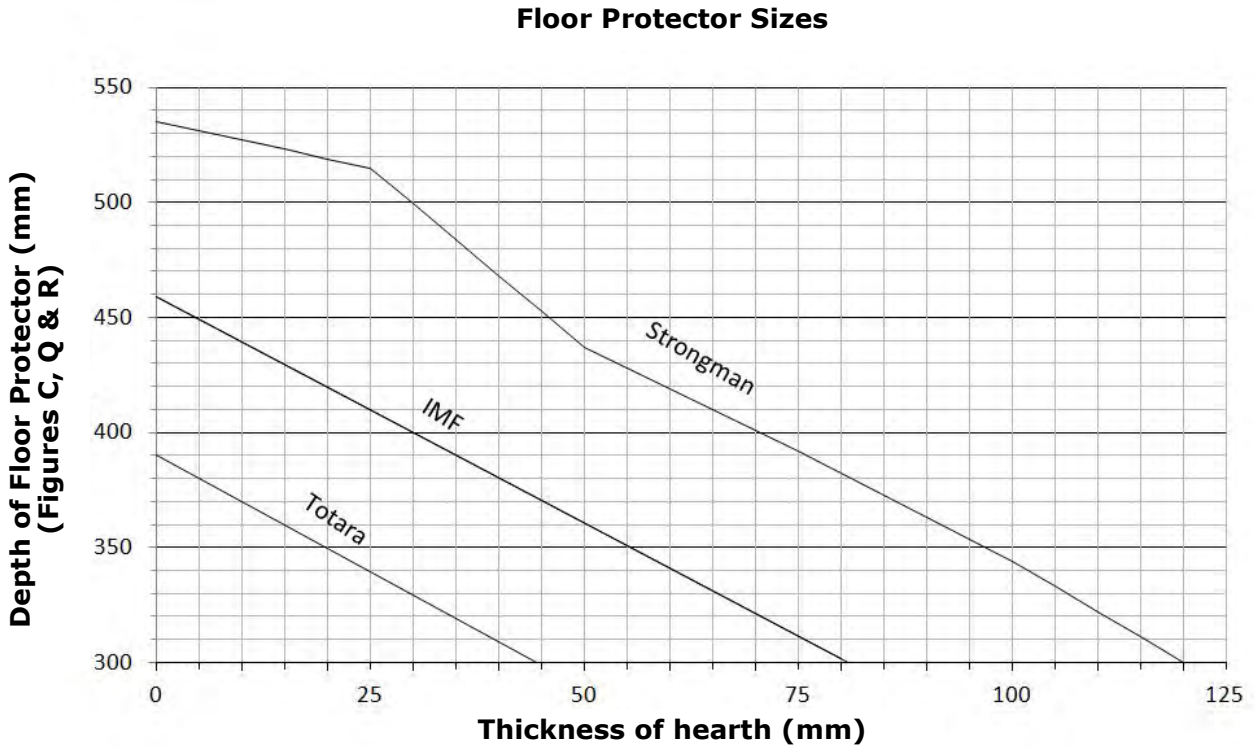
- Place the deflector on top of the heat shield and ensure no large gaps
- Fix in place by securing the tabs with rivets to the heat shield

WARNING

This part is required to be installed on the listed models with ALL types of flue kits. Failure to do so, may cause the ceiling to over heat. The part is located in the fire itself and not the flue kit packaging.

Floor Protector Graph

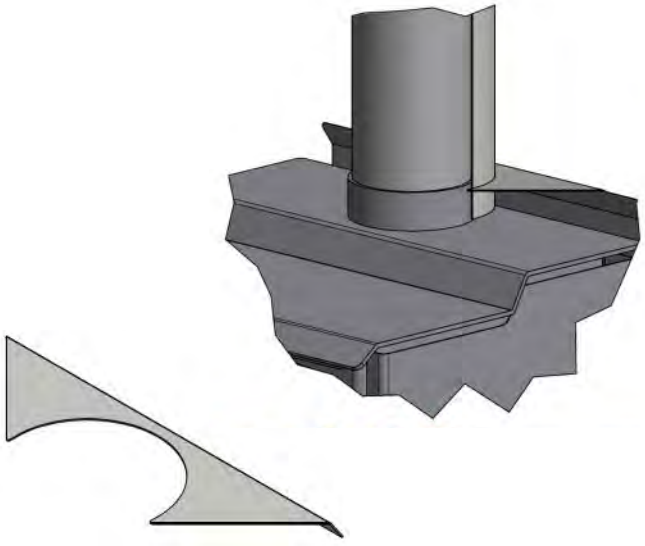
Graph 1



This graph refers to Page 4 dimension C and Page 5 dimension Q & R.

The floor protector distance out in front of the fire (taken from the door), is dependent on the thickness of the floor protector. The thicker the floor protector is above the surrounding combustible floor, the less this distance is out in front of the fire.

Rear Deflector



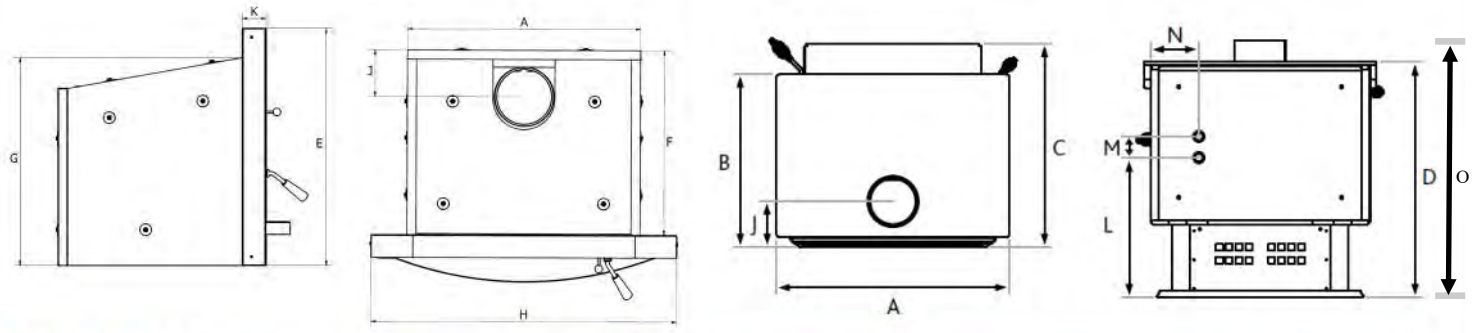
The rear deflector is used for reducing rear clearances for applicable fires (see page 4 for details). It is located loose in the firebox.

To fit the rear deflector, simply attach it to the rear shield of the fire using 2 rivets in the predrilled holes.

The rear deflector should be positioned tight up against the flue shield as shown.

Available for:
Brunner MKII, Tasman MKII, ECR NoVo & Tarras MKIII

Dimensions



	All Dimensions In MM	TOTARA	ECR NoVo	BRUNNER MKII	TASMAN MKII	TARRAS MKIII	FLARE WOOD	RMF	THE COASTER	THE STAG	STRONGMAN
A	Overall Stove Width	642	620	615	615	765	630	580	615	615	715
B	Stove Depth Door Frame to Rear		382	525	525	522	540	390	514	514	521
C	Overall Stove Depth Ledge to rear		466	630	630	640	602	450	633	633	590
D	Floor to Stove Top Plate		651	758	758	774	768(Ped) 764 (Box & Leg)	593	726	726	697
E	Insert Fascia Height	650									
F	Insert Depth	506									
G	Insert Maximum Height	570									
H	Insert Fascia Width	840									
J	Flue Centre to Back of Unit	136	155	145	145	142	181	150	149	149	141
K	Insert Fascia Depth	62									
L	Wetback Height		414	478	478	479	502				
M	Wetback Centres		65	65	65	65	65				
N	Wetback Position		108	107	107	180	133				
O	Overall Stove Height		701	808	808	824	780	643	777	777	747

Disclaimer;
While every attempt is made to ensure this information is as accurate as possible, a tolerance of +/- 5mm should be allowed for in these dimensions

Reducing Clearances

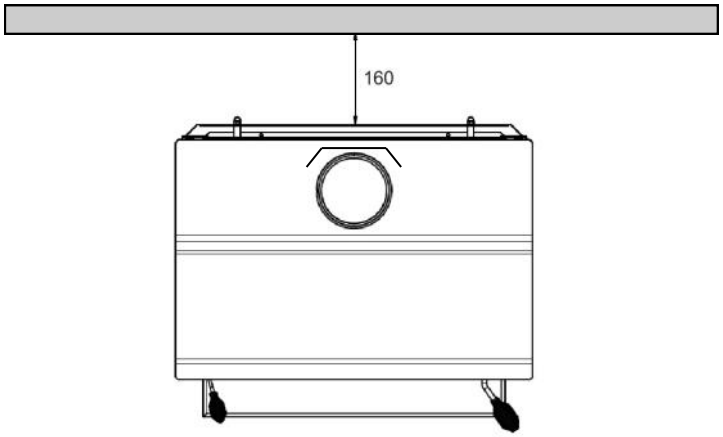
The clearances that are provided on page 4 are to combustible materials. You can safely reduce those clearances by following the instructions located in AS/NZS 2918:2001 table 3.1 and 3.2

You can reduce the clearances by placing a non-combustible heat shield, with an air gap behind it and vented top and bottom, between the fire and the combustible wall. Masonry may be used as a heat shield material. The heat shield must extend a minimum of **450mm** beyond the top of the appliance and must be of appropriate width to ensure that the unshielded rear clearance is adhered to beyond the sides of the heat shield. See example below.

Clearance factors for heat shields which are within 45 degrees of the vertical

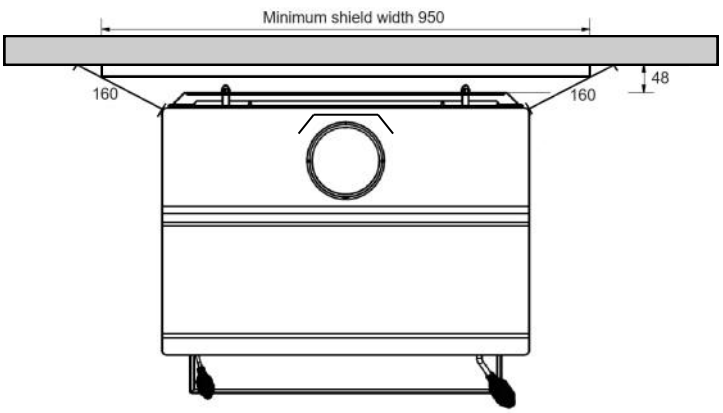
Heat Shield Construction	Minimum Air Gap Dimension	Clearance Factor
Single layer of continuous material	12mm	0.4
Single layer of continuous material	25mm	0.3
Two spaced layers of continuous material	12mm + 12mm	0.2

A non-combustible material in direct contact with a combustible material, with no air gap, is **NOT** considered a heat shield (unless the material has been tested in accordance with AS/NZS 2918:2001 Appendix A).
All clearance dimensions are taken from the combustible material to the appliance, ignoring the non-combustible in-between.



Unshielded Dimension for Woodsman Tarras MKIII

Rear Clearance - 160mm
(combustible to rear of stove)



Heat shield with 25mm air gap with Woodsman Tarras MKIII

Heat Shield - Single layer of continuous non-combustible material with 25mm air gap.
Minimum size 950mm wide x 1224mm high.

Reduced Rear Clearance - 48mm
(combustible to rear of stove)
Calculation: **160mm x 0.3 = 48mm**

WARNING - This is only an example, you must refer to the full AS/NZS 2918:2001 document for more details and consult your local building inspector. Where heat shields are used to reduce appliance dimensions, additional flue shielding may be required (refer 4.5.2).

Installation Instructions

It is recommended this appliance should be installed by a trained and NZHHA qualified installer.

Warning: the appliance and flue system shall be installed in accordance with AS/NZS 2918 and the appropriate requirements of relevant building code/codes.

Warning: appliances installed in accordance with this standard shall comply with the requirements of AS/NZS 4013 where required by the regulatory authority, i.e. the appliance shall be identifiable by a compliance plate with the marking "Tested to AS/NZS 4013".

Any modification of the appliance that has not been approved in writing by the testing authority is considered to be in breach of the approval granted for compliance with AS/NZS 4013.

Caution: mixing of appliance or flue system components from different sources or modifying the dimensional specification of components may result in hazardous conditions. Where such action is considered, the manufacturer should be consulted in the first instance.

Caution: cracked and broken components e.g. glass panels or ceramic tiles, may render the installation unsafe.

- Maintain a clearance of at least 1 metre between front of the appliance and building structure or any other substantial immovable object.
- If the appliance is installed on a heat sensitive floor, the floor should be protected with a floor protector, which shall extend entirely beneath the heater. For the correct floor protector sizes, refer to dimensions on page 4. For the minimum required material, see table below.
- Your appliance shall be seismically restrained, including the floor protector using the provided holes or brackets. The restraints should be sufficient enough to resist a seismic loading equal to 0.4 times the mass of the appliance. We recommend a minimum of 8mm dynabolts on concrete floors and 8mm coach screws for wooden floors of appropriate length.
- **Important notes on Ventilation** - Where an appliance is installed in a well-sealed area such as a modern well-insulated home, ventilation must be provided to permit unrestricted operation of the fire and flue. **NOTE**: the minimum recommended ventilation area is one-half the cross-sectional area of the flue. Where exhaust fans or additional combustion appliances are installed in the sealed area, additional ventilation may be required. **WARNING:** failure to allow for ventilating and combustion air for the fire in well sealed areas can lead to performance issues.

Minimum Material Specifications For Floor Protectors on a Floor of Combustible Material

MODEL	SPECIFICATION
RMF THE STAG THE COASTER TOTARA*	8mm ceramic tiles only (or equivalent)
STRONGMAN	24mm Eterpan LD (or equivalent)
BRUNNER MKII TASMAN MKII TARRAS MKIII FLARE (All Variants) ECR NoVo	Ash Floor Protector. Any non-combustible material of any thickness

*The Totara is also approved with 1mm sheet steel with a 10mm spacing above combustible material. For use when extending hearths.

Minimum Flue Height

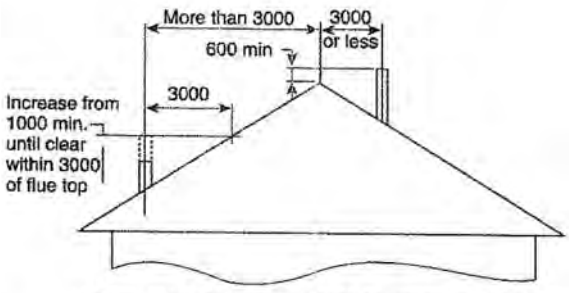
The top of the flue system should be at least 600mm above the highest point of the roof ridgeline, if the point of intersection of the flue system and the roof-line is less than 3 metres from the ridgeline horizontally.

If the point of intersection of the flue system and the roofline is greater than 3 metres horizontally, the top of the flue system shall be at least 1 metre above the point of inter-section with the roofline. (refer FIG 3)

The total flue height should be no less than 4.6m from the level of the hearth.

FIG 3.

DIMENSIONS IN MILLIMETRES



MINIMUM HEIGHT OF FLUE SYSTEM EXIT

These are considered to be **minimum dimensions,** and depending on local conditions, **taller flue system heights may be required for satisfactory performance.**

Flue Installation Detail

Your Woodsman appliance should be installed with a HeatSaver Flue System.

A HeatSaver Flue System is available from all authorised Woodsman dealers throughout New Zealand.

The HeatSaver Flue System contains a complete installation drawing and correct clearances from the ceiling level up. Minimum clearances from the appliance to nearby combustible surfaces are given in FIGS 1 & 2.

Use of a flue system other than a genuine HeatSaver Flue System may affect the safety of the installation, and may affect your Woodsman warranty.

Insist on a genuine HeatSaver Flue System.

Installation requirements for Woodsman fireplace inserts and flue system where timber framing is less than 50mm from the chimney structure.

Installation should be carried out by a qualified installer who will ensure:

- That the minimum clearances determined by tests in accordance with AS/NZS 2918:2001 are complied with to prevent overheating of nearby combustibles.
- That the minimum opening size of **600mm wide x 600mm high x 500mm deep** is availa-ble when firebricks are removed, and that extra provision also be made for plumbing where a hot water booster is fitted (where permitted).
- That any flue requirements specific to the model being installed are met in full - refer HeatSaver Flue System Instructions.
- Where the fireplace opening is in a heat sensitive wall, a non-metallic heat resistant material shall extend not less than 50mm beyond each side of the appliance and 150mm beyond the top of the appliance.
- Clearance of at least 1 metre between the front of the appliance and building structure, or any other substantial material object.
- That the insulating floor protector of non-combustible material is provided, extending not less than the dimensions shown in the chart. (Refer Table 2)
- A fireplace appliance shall not be connected to a flue common with an open fireplace.

Sealing Flue Joints

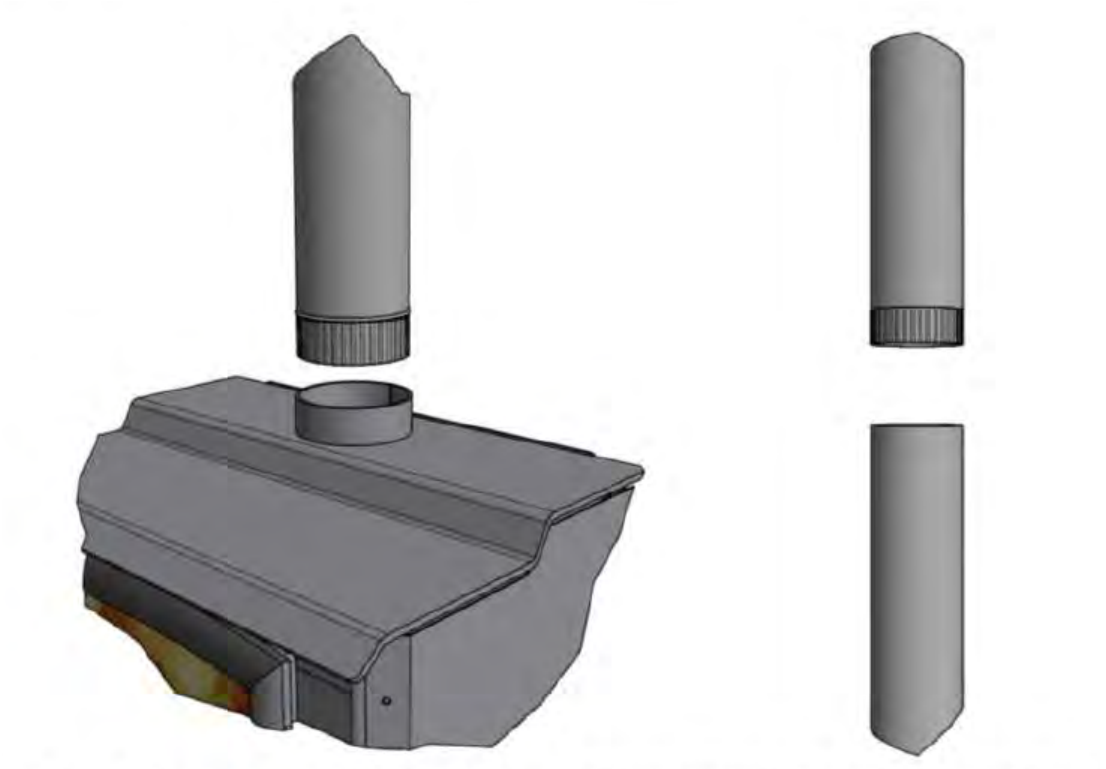
IMPORTANT

All Flue Joints Are Required To Be Sealed Using Flue Cement

It is extremely important that ALL flue joints are sealed at the time of installation using flue cement or a suitable exhaust cement.
If flue joints are not sealed properly, it can lead to performance issues with the fire such as;

- Lower heat output of the fire, due to decreased performance
- Blocked flue
- Smoke coming out the door when open, due to decreased suction
- Hard to light

The formation of soot and creosote will not seal the flues, especially on the lower lengths, as the high temperatures inhibit its formation.



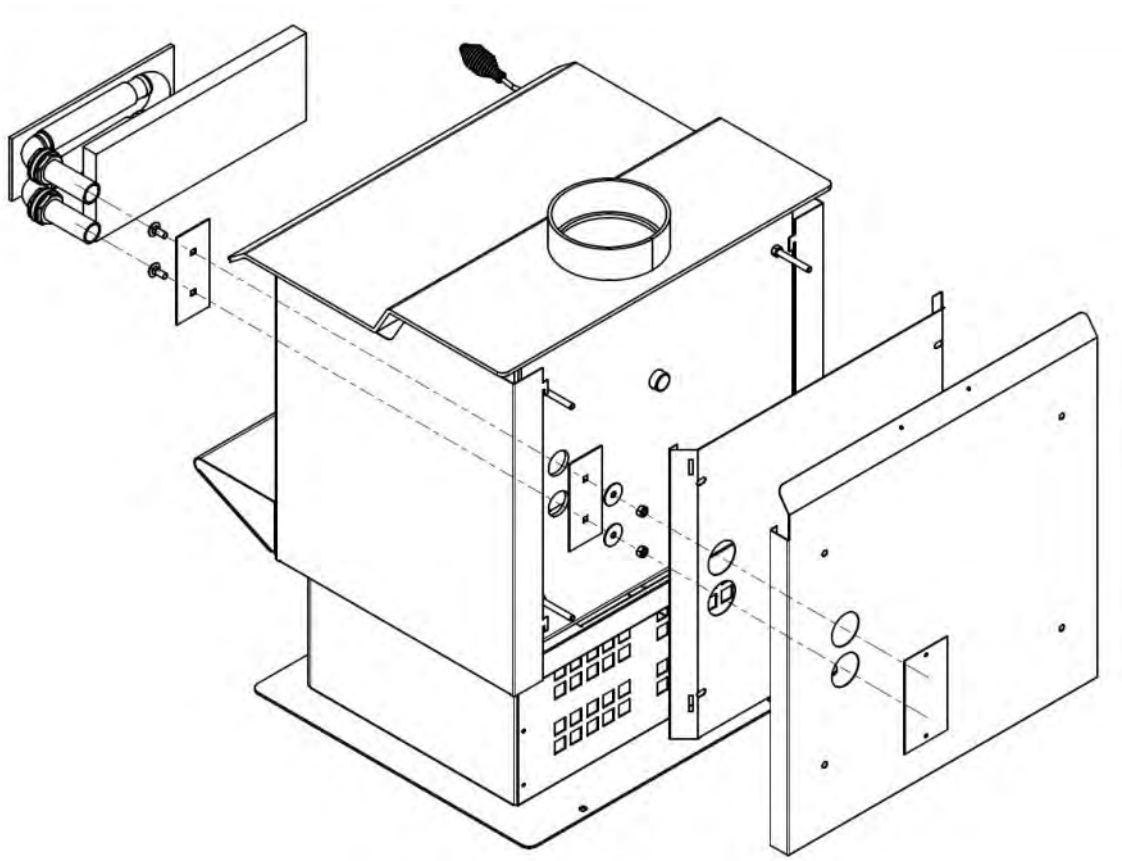
Any issues that arise as a result of the flues not being sealed, are not covered by the warranty and are not the responsibility of the manufacturer.
It is the installers responsibility to ensure that this is done at the time of installation.

Fitting the Wetback To The Firebox

Instructions for fitting a <u>loose</u> wetback to the firebox where the fire has been pre-punched with wetback holes.

- Remove knock-outs and cover plates in the rear panels
- Remove top rear firebrick
- Undo coach bolts on firebox plug to expose wetback holes
- Cut rear firebrick with a saw only enough to expose the wetback holes on the inside and to allow for the placement of the wetback in front of the brick
- Remove 1 nut off each wetback tube
- Place wetback into fire with firebrick behind it
- Replace nuts onto the rear of the wetback. Ensure the wetback is level before tightening using a 40mm tube socket

This task should be completed before the fire is positioned in place.



<u>Note</u>: Rear panels do not need to be removed if a tube socket is used for tightening

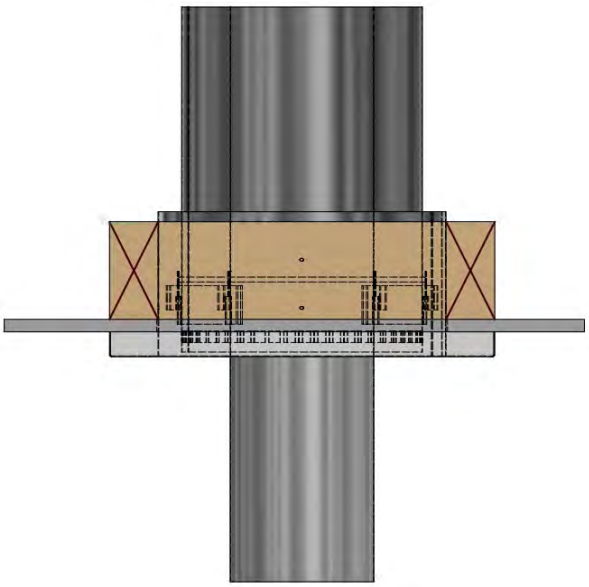
WETBACK WARNINGS:

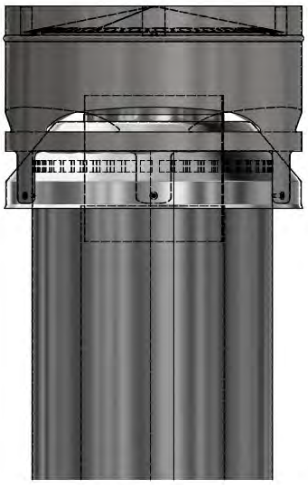
- Do not connect to an unvented hot water system.
- **NEVER** burn the appliance without the wetback connected to the water system. This will immediately damage the wetback and void the warranty.
- AS/NZS 2918:2001 states; "all water connections to an appliance shall be in accordance with the appropriate requirements of AS 3500.4.1 or NZS 4603 and the regulatory authority, as appropriate".

HeatSaver Flue Kit Installation Instructions

For Solid Fuel Appliances

HeatSaver FLUE SYSTEM





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www.nzhha.co.nz

KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

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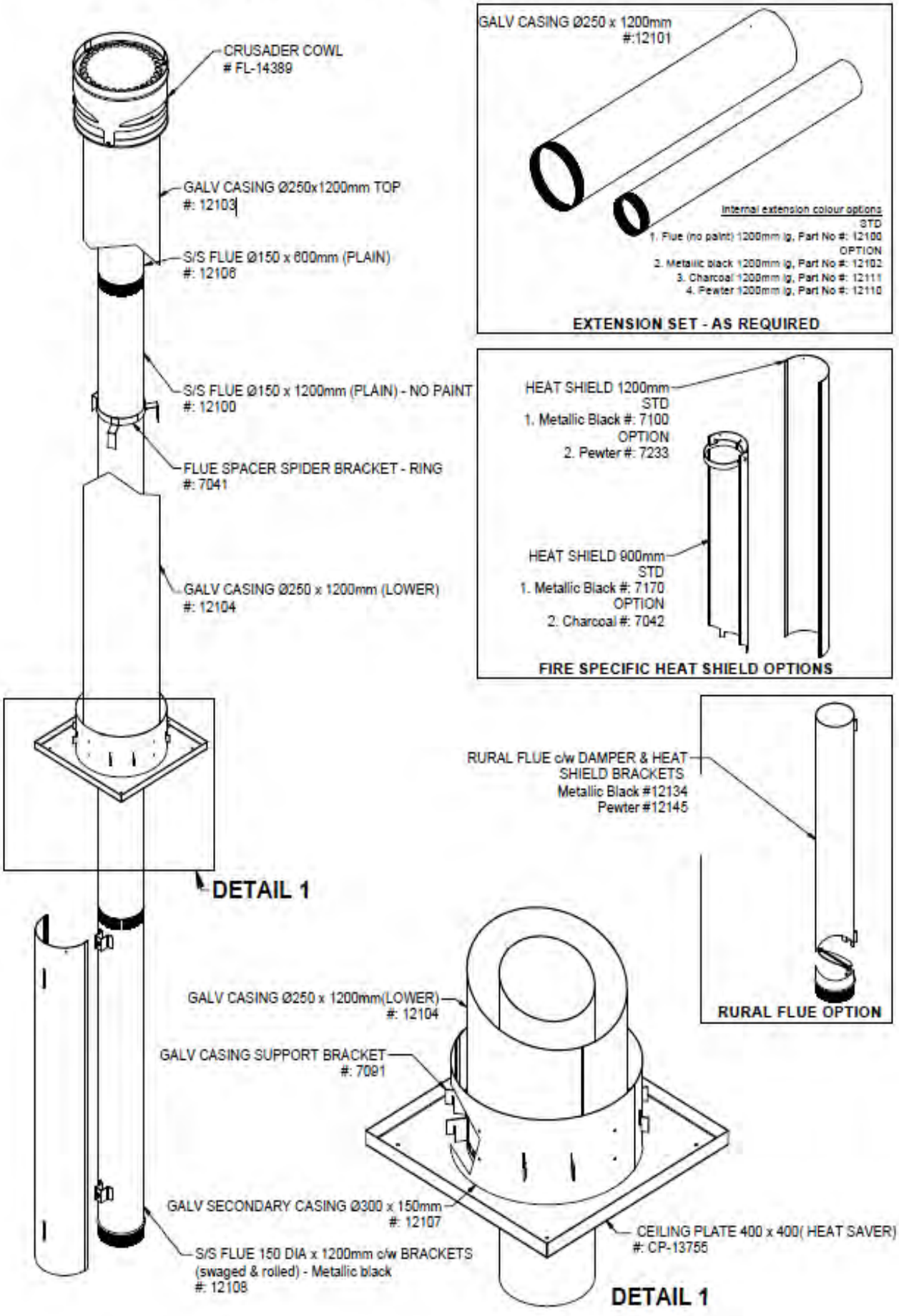
HEAT SAVER II FLUE KIT



INSTALLATION INSTRUCTIONS

- This HeatSaver flue system is tested and certified to AS/NZS 2918:2001 Appendix F,

  which means it is approved for use on all solid fuel appliances with a flue diameter of 150mm.
- A copy of the Laboratory Test Certificate for this HeatSaver Flue System is included as part of these Installation Instructions, (refer to paperwork with flue kit).
- Installation of any solid fuel appliance should only be carried out by suitably trained and qualified personnel.
- Position the stove to the desired position, always ensuring that the manufacturer's minimum clearances to combustibles are complied with.
- Check that there are no roofline ridges or valleys in the way, or if they cannot be avoided, that the installer knows how to weatherproof the penetration and reinstate the full strength of the structure.
- At the ceiling level, construct a square frame of 300mm x 300mm internal dimensions and cut away the ceiling materials from the inside of this frame.
- Lower the 300mm flue pipe casing into this frame and nail in place when the bottom edge is 25mm below the ceiling level and the 8 nail holes provided are touching the timber frame.
- Check all 4 locating brackets are securely in place and drop 250mm diameter lower casing in place. This will naturally settle so it protrudes 25mm below the ceiling.
- Make roof penetration, assemble and fit required flue length and install with upper casing. Secure all joins with at least 3 stainless steel rivets or self tapping screws.
- Frame and brace upper installation as required and flash the roof to shield penetration.
- Fit ceiling plate to ceiling.
- When trimming the stainless steel flue length, ensure the flue is flush with the casing at the top. If it is higher than the casing, the cowl can not be fitted correctly.
- Fix the bottom section of the HeatSaver Columbia Cowl in place and ensure that it is firmly down on top of the casing. Then attach top section by bending tab away from the shaft to allow the top section to slide down onto the washer. Bend tab back in place once done. Do not over bend tab so that it touched the shaft. See page 6
- Secure the flue to the fire, drill through flue neck on fire and secure with 2 to 3 s/s screws or rivets.
- **All flue joints should be sealed using a flue cement. (see page 4)**

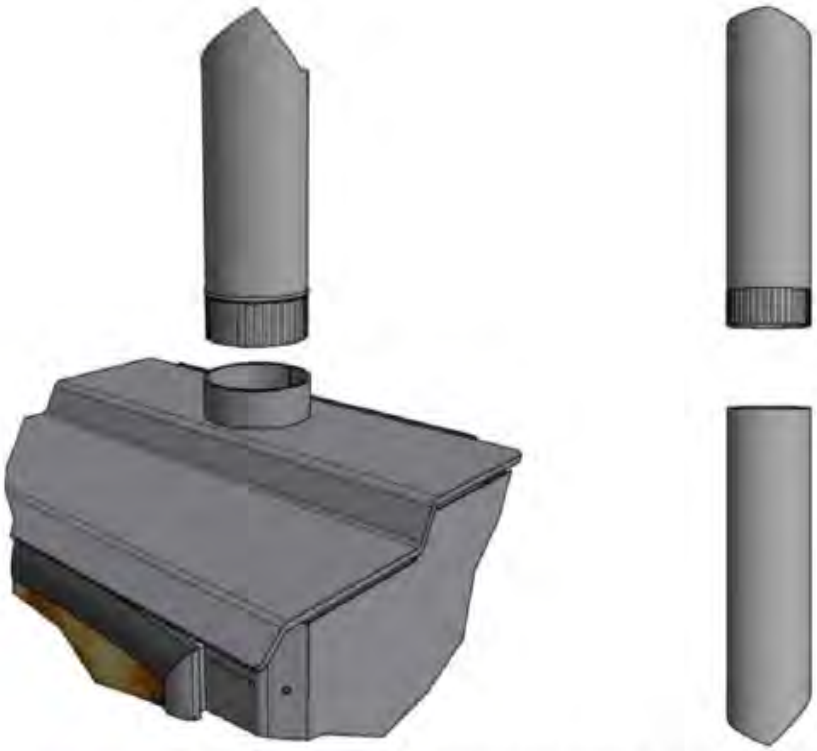
IMPORTANT
All Flue Joints Are Required To Be Sealed Using Flue Cement

It is extremely important that ALL flue joins are sealed at the time of installation using flue cement or a suitable exhaust cement.
Woodsman fires are designed and tested with all flue joins sealed.

If flue joins are not sealed properly, it can lead to performance issues with the fire such as;

- Lower heat output of the fire, due to decreased performance
- Blocked flue
- Smoke coming out the door when open, due to decreased suction
- Hard to light

The formation of soot and creosote will not seal the flues, especially on the lower lengths, as the high temperatures inhibit its formation.



Any issues that arise as a result of the flues not being sealed, are not covered by the warranty and are not the responsibility of the manufacturer.
It is the installer's responsibility to ensure that this is done at the time of installation.

Fitting Factory Flue Shields

Your HeatSaver Flue System comes standard with a factory flue shield of one of 2 types;

- **900mm high**, contains 1 x painted metal strap. This is used for the Woodsman ECR, Blaze, Boston, Manhattan, RMF and Milford.
- **1200mm high**, This is suitable for the Woodsman Brunner, Tasman, Aspen, Tarras, Strongman and other branded fires which can use 1200mm high single heat shields.

Fitting the 900mm High Flue Shield

1. The heat shield has 2 'tabs' at the bottom which corresponds to 2 slots on the fire behind the flue neck. Insert the tabs.
2. Take the metal strap and fold the two ends around the flue until the meet at the back of the flue at about the height of the top of the heat shield.
3. Hold both ends together and push the tabs through the single slot at the back of the heat shield and fold out tabs to secure in place.

Fitting the 1200mm high heat shield

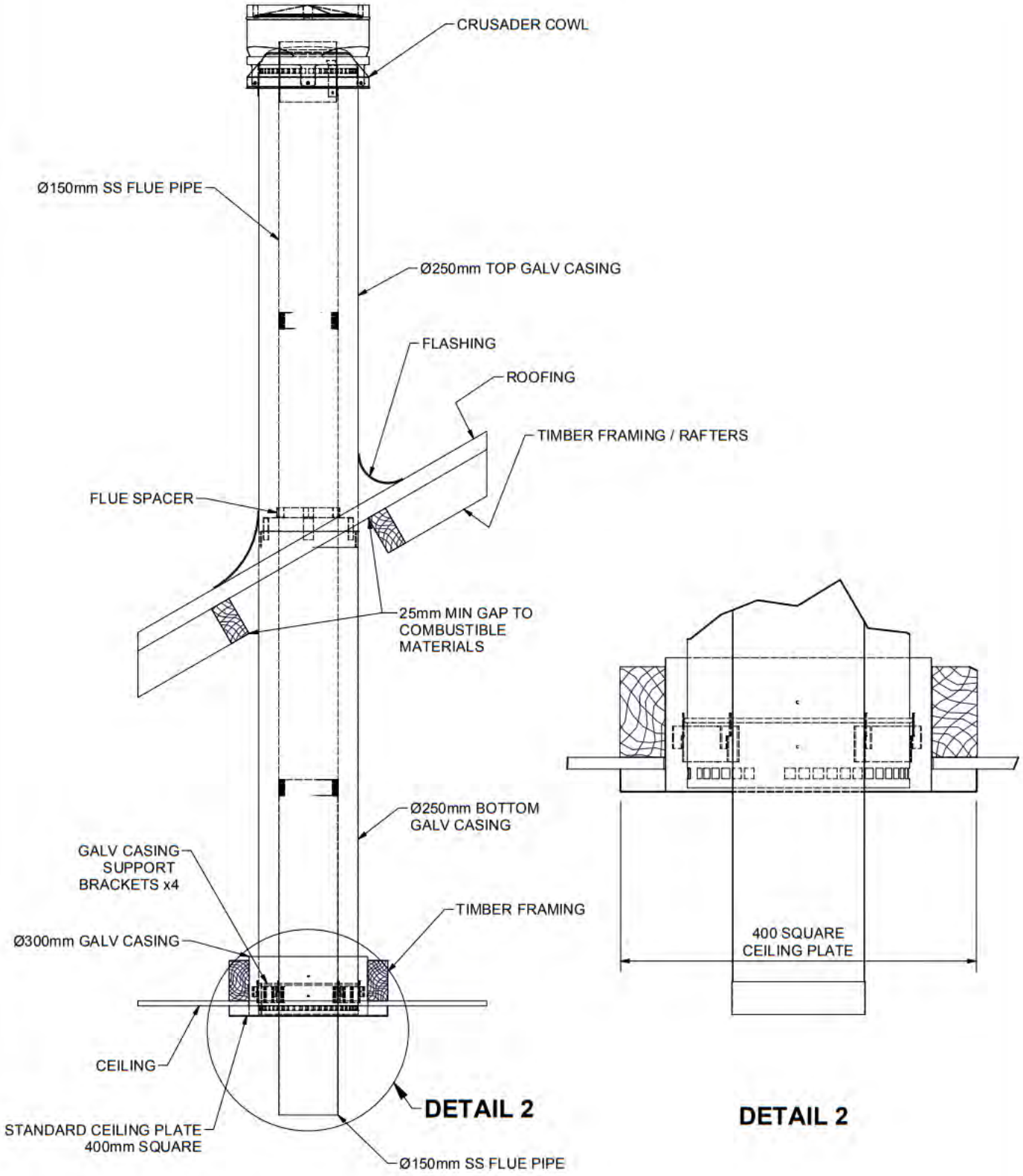
Your lower length of painted flue already has 2 location brackets attached.
1. Ensure these brackets are facing towards the back wall and centralised.
2. Secure the flue shield in place with screws

1200mm Flue Shield

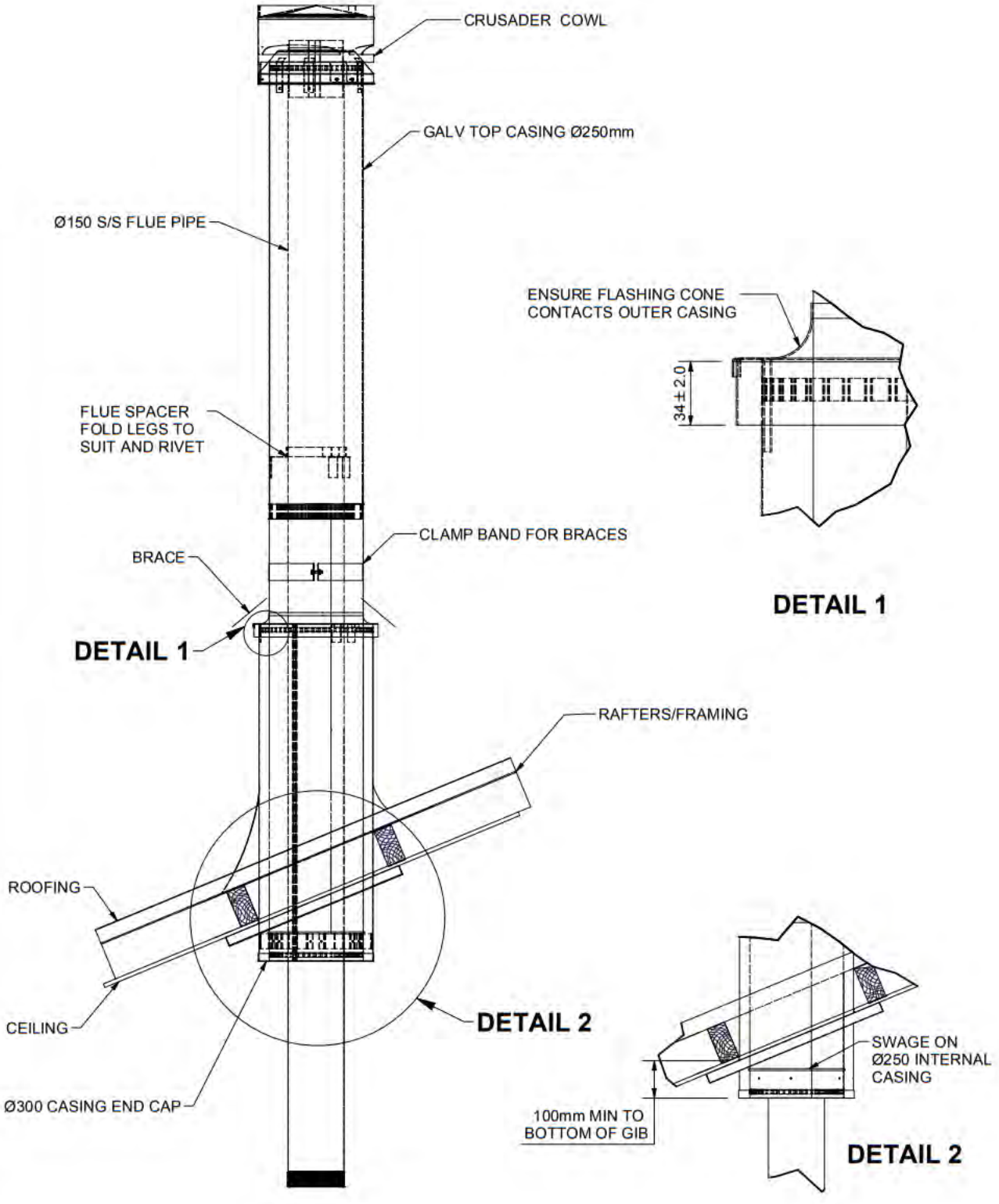
900mm Flue Shield

IMPORTANT - Flue shields should be no further than 10mm off the top of the fire box

Standard Ceiling



No Cavity
(Requires Sloping Ceiling Kit)



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Report 09/1943 | January 27th, 2009 | Page 1/1

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COPY

P701/1

Accreditation — Laboratory Registration Number 395

This laboratory is accredited by International Accreditation New Zealand (IANZ). The tests reported herein have been performed in accordance with the terms of our accreditation. This accreditation does not extend to any opinions or any interpretations of test results contained in this report.

IANZ has a Mutual Recognition Arrangement (MRA) with the National Association of Testing Authorities (NATA), Australia, such that both organizations recognize accreditations by IANZ and NATA as being equivalent. Users of test reports are recommended to accept test reports in the name of either accrediting body.

Compliance Certificate

Appliance: HeatSaver 150 mm Diameter Flue Kit

Test Standard: AS/NZS2918:2001 Appendix F

Full Report: 02/749R

(The full report contains the information on the test methods, details of the appliance tested and the results of the test)

This report:

Prepared by: W. S. Webley

Approved by: W. S. Webley

Release Date: 2/3/09

BRANZ Appraised

Appraisal No. 764 (2023)

SHADOWCLAD® VENTILATED CAVITY CLADDING SYSTEM

Appraisal No. 764 (2023)

This Appraisal replaces BRANZ Appraisal No. 764 (2017)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 Shadowclad® Ventilated Cavity is a cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 The system consists of Shadowclad® sheets, timber cavity battens, flashings and accessories and is finished with either an acrylic paint system or a penetrating or film-forming stain.

1.3 Shadowclad® Ventilated Cavity incorporates a primary and secondary means of weather resistance (first and second line of defence) against water penetration by separating the cladding from the external wall frame with a nominal 20 mm drained cavity.

Scope

2.1 Shadowclad® Ventilated Cavity has been appraised as an external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High; and,
- with a building height of ≤ 10 m and at a distance of ≥ 1 m to the relevant boundary.

2.2 Shadowclad® Ventilated Cavity has also been appraised as an external wall cladding for specifically designed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa; and,
- with a building height of ≤ 10 m and at a distance of ≥ 1 m to the relevant boundary.

2.3 Shadowclad® Ventilated Cavity is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *(Note: The Appraisal of Shadowclad® Ventilated Cavity relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.)*

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Shadowclad® Ventilated Cavity, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. Shadowclad® Ventilated Cavity meets the requirement for loads arising from self-weight, wind, impact and creep [i.e. B1.3.3 (a), (f), (j) and (q)]. See Paragraphs 9.1–9.3.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.2. Shadowclad® Ventilated Cavity meets these requirements. See Paragraphs 10.1-10.7.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Shadowclad® Ventilated Cavity meets this requirement. See Paragraphs 14.1-14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Shadowclad® Ventilated Cavity meets this requirement.

Technical Specification

4.1 System components and accessories supplied by Carter Holt Harvey Plywood Ltd are as follows:

Shadowclad® Sheets

- Shadowclad® sheets are nominal 12 mm thick structural plywood sheets manufactured from New Zealand pinus radiata veneers. They are 1,216 mm wide and either 2,440 mm or 2,745 mm long. They have a textured surface finish on the exposed face.
- Shadowclad® sheets are available as either Shadowclad® Natural or Shadowclad® Ultra finish. Shadowclad® Natural is an uncoated panel for use with penetrating stains, film-forming stains and paints. Shadowclad® Ultra has a factory-applied powder coat exterior primer for use with paints and film-forming stain topcoats. Shadowclad® Ultra is not suitable for use with penetrating stains.
- Shadowclad® Natural and Shadowclad® Ultra are both available as Texture and Texture Groove surface finish. Texture Groove has 9 mm wide by 5 mm deep grooves at 150 mm centres running vertically down the outside face of the sheet.
- Shadowclad® Natural sheets are available as Hazard Class H3.1 treated only. Shadowclad® Ultra sheets are available in either H3.1 or H3.2 CCA treated.

Shadowclad® Accessories

- **Shadowclad® flashings** - horizontal 'Z' flashing, inter-storey 'Z' flashing, internal 90° angle, internal 'W' angle, large internal 'W' angle, external box angle, large external box angle and flat flashing for vertical negative detail. Shadowclad® flashings are available in extruded aluminium and folded stainless steel.
- **Cavity vent strip** - manufactured from aluminium or stainless steel, available in 3,600 mm lengths.

4.2 Accessories used with Shadowclad® Ventilated Cavity which are supplied by the building contractor are:

- **Shadowclad® sheet fixings** - 60 x 2.8 mm hot-dip galvanised or ring shank stainless steel flat head nails, 8 g x 65 mm AS 3566 Corrosion Class 4 mechanically zinc plated wood screws or 8 g x 65 mm stainless steel wood screws. *(Note: Stainless steel fixings must be Grade 316 and hot-dip galvanising must comply with AS/NZS 4680).*
- **Exterior battens** - 65 mm wide x 18 mm thick timber batten, dressed or band-sawn, treated to Hazard Class H3.1 and with 6 x 6 mm weathergrooves.
- **Cavity battens** - nominal 45 mm wide x 20 mm thick or 75 mm wide x 20 mm thick merchant grade timber treated to Hazard Class H3.1.

- **Cavity batten fixings** - 40 x 2.5 mm hot-dip galvanised or stainless steel ring shank flat head nails.
- **Flexible wall underlay** - wall underlay complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlay.
- **Rigid wall underlay** - sheet complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.
- **Brush on timber preservative** - brush on timber preservatives as listed in the Technical Literature for Shadowclad® Ventilated Cavity.
- **Flexible flashing tape** - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- **Window and door trim cavity air seal** - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal suitable for use around window, door and other wall penetration openings.
- **Joinery head flashings** - folded from aluminium or galvanised steel to suit the window or door trim opening. Refer to NZS 3604, Section 4 and NZBC Acceptable Solution E2/AS1, Table 20 for durability requirements.
- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.

Finishing System Specification

4.3 Paint and stain systems are not supplied by Carter Holt Harvey Plywood Ltd and have not been assessed by BRANZ and are therefore outside the scope of this Appraisal.

4.4 All exposed faces, including top edges at sills and all bottom edges of Shadowclad® sheets must be finished with a latex exterior paint system complying with any of Parts 7, 8, 9, or 10 of AS 3730, or at least two coats of a film-forming or penetrating stain to protect the Shadowclad® and give the desired finish colour to the exterior walls. *[Note: Carter Holt Harvey Plywood Ltd does not recommend that Shadowclad® is left uncoated when used as an exterior cladding. 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, Carter Holt Harvey Plywood Ltd does not support the use of dark colours on Shadowclad® exterior cladding.]*

Handling and Storage

5.1 Handling and storage of all materials supplied by Carter Holt Harvey Plywood Ltd or the building contractor, whether on-site or off-site, is under the control of the building contractor. Shadowclad® sheets must be stacked flat, clear of the ground on at least three evenly spaced timber bearers. They must be kept dry at all times either by storing within an enclosed building or under cover when stored externally. Care must be taken to avoid damage to edges, ends and the primed surfaces.

5.2 Accessories must be stored so they are kept clean, dry and undamaged. All accessories must be used within the maximum storage period recommended by the manufacturer.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Shadowclad® Specification & Installation Guide for Cavity Construction, March 2021.

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

7.1 Timber wall framing behind Shadowclad® Ventilated Cavity must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

7.3 Additional framing may be required at soffits, internal and external corners and window and door openings for the support and fixing of cavity battens and Shadowclad® Ventilated Cavity.

7.4 Timber wall framing and cavity battens must have a maximum moisture content of 20% at the time of the cladding application. *(Note: If Shadowclad® is fixed to framing with a moisture content of greater than 20% problems may occur at a later date due to excessive timber shrinkage.)*

General

8.1 When Shadowclad® Ventilated Cavity is used for specifically designed buildings up to 2.5 kPa design differential ULS wind pressure, only the weathertightness aspects of the cladding and maximum framing centres are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.

8.2 Punchings in the cavity vent strip provide a minimum ventilation opening area of 1,000 mm^2 per lineal metre of wall in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3 b).

8.3 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level, paved surfaces such as footpaths must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Table 18.

8.4 At balcony, deck or roof/wall junctions, the bottom edge of Shadowclad® Ventilated Cavity must be kept above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.

8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for Wind Zones up to and including Very High, and rigid underlays for buildings in the Extra High Wind Zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the cavity batten fixing lengths must be increased by a minimum of the thickness of the underlay.

8.6 Where cladding penetrations are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities by leaving a minimum gap of 10 mm between the bottom of the cavity and the flashing to the opening.

8.7 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. These details have not been assessed and are outside the scope of this Appraisal.

Inter-storey Junctions

8.8 Inter-storey junctions must be constructed in accordance with the Technical Literature. Inter-storey joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 m in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 b).

Structure

Mass

9.1 The mass of Shadowclad® Ventilated Cavity is approximately 6.6 kg/m^2 at equilibrium moisture content. The system is therefore considered a lightweight cladding in terms of NZS 3604.

Impact Resistance

9.2 Shadowclad® Ventilated Cavity has good resistance to impact loads likely to be encountered in normal residential use. The likelihood of impact damage to Shadowclad® Ventilated Cavity when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be considered for vulnerable areas.

Wind Zones

9.3 Shadowclad® Ventilated Cavity is suitable for use in all Building Wind Zones of NZS 3604, up to and including Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to 2.5 kPa design differential ULS wind pressure where buildings are specifically designed.

Durability

10.1 Shadowclad® Ventilated Cavity meets the performance requirements of NZBC Clause B2.3.1 (b) 15 years for the Shadowclad® and flashings when used as a non-structural cladding installed in accordance with the Technical Literature.

10.2 Shadowclad® is envelope preservative treated. Where sheets are cut, all cuts must be coated with a brush on timber preservative specified in the Technical Literature for Shadowclad® Ventilated Cavity. Failure to correctly apply preservative to these areas may negatively affect the durability of the cut sheets.

Serviceable Life

10.3 Shadowclad® Ventilated Cavity installations finished with penetrating stain or non-penetrating film-forming stain, are expected to have a serviceable life of at least 15 years provided they are maintained in accordance with this Appraisal. *(Note: This opinion only covers serviceability with regards to structural and weathertightness performance. It does not cover appearance, which may deteriorate significantly, especially when proper and regular maintenance is not carried out. Carter Holt Harvey Plywood Ltd does not recommend that Shadowclad be left uncoated when used as an exterior cladding.)*

10.4 The use of dark colours with an LRV of less than 50% and failure to adequately maintain the coating increases the risk of aesthetic related issues such as face checking. For this reason, Carter Holt Harvey Plywood Ltd does not support the use of dark colours on Shadowclad® exterior cladding.

10.5 Coastal locations can be very corrosive to fasteners, especially locations within distances of up to 500 m from the sea including harbours, or 100 m from tidal estuaries and sheltered inlets, and otherwise as shown in NZS 3604, Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D. It is recommended that Shadowclad® sheets be fixed with stainless steel fasteners in these situations.

10.6 When using CCA treated Shadowclad®, aluminium extrusions must be coated in accordance with the requirements of NZBC Acceptable Solutions E2/AS1, Table 20, and are not suitable for use in NZS 3604 Corrosion Zone D. When used with CCA treated Shadowclad®, horizontal Z-flashings must be manufactured from stainless steel in all Corrosion Zones.

10.7 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert a mildly corrosive atmosphere into an aggressive environment for fasteners. The fixing of Shadowclad® sheets in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

11.1 Regular maintenance is essential to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.

11.2 Regular cleaning (at least annually) of the paint coating is required to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent. Paint systems must be recoated at approximately 7–10 yearly intervals in accordance with the paint manufacturer's instructions. Penetrating and non-penetrating stains must be recoated every 2–3 years in accordance with the stain manufacturer's instructions.

11.3 Annual inspections must be made to ensure that all aspects of the cladding system, including the selected finishing system, flashings and any sealed joints remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress must be repaired immediately. Sealant and paint coatings must be repaired in accordance with the relevant manufacturer's instructions.

11.4 Minimum ground clearances as set out in this Appraisal and the Technical Literature must be maintained at all times during the life of the system. *[Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of Shadowclad® Ventilated Cavity installations.]*

Prevention of Fire Occurring

12.1 Separation or protection must be provided to Shadowclad® Ventilated Cavity from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

Vertical Fire Spread

13.1 This Appraisal only covers buildings 10 m or less in height. NZBC Functional Requirement C3.2 identifies that external vertical fire spread to upper floors only needs be considered for buildings with a building height greater than 10 m. Control of external vertical fire spread is therefore outside the scope of this Appraisal.

Horizontal Fire Spread

13.2 Shadowclad® Ventilated Cavity has not been assessed for a peak heat release or total heat released rating and therefore cannot be used within 1 m of the relevant boundary or on Risk Group SI Buildings.

13.3 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and Verification Method C/VM2 for fire resistance rating and control of external fire spread requirements for external walls.

External Moisture

14.1 Shadowclad® Ventilated Cavity, when installed in accordance with this Appraisal and the Technical Literature will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 The cavity must be sealed off from the roof and sub-floor space to meet code compliance with NZBC Clause E2.3.5.

14.3 Shadowclad® Ventilated Cavity allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with NZBC Clause E2.3.6.

14.4 The details given in the Technical Literature for weather sealing are based on the principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

14.5 Shadowclad® Ventilated Cavity, where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirements for junctions, penetrations etc. to remain weather resistant.

Internal Moisture

15.1 Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

15.2 Shadowclad® Ventilated Cavity is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal will not create a risk of moisture damage resulting from condensation.

Installation Information

Installation Skill Level Requirement

16.1 All design and building work must be carried out in accordance with the Shadowclad® Ventilated Cavity Technical Literature and this Appraisal by competent and experienced tradespersons conversant with the Shadowclad® Ventilated Cavity Cladding System. Where the work involves Restricted Building Work (RBW), this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License Class.

Shadowclad® Ventilated Cavity Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

17.1 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturers' instructions prior to the installation of the cavity battens and the rest of the Shadowclad® Ventilated Cavity system. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid underlay materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

Cavity Batten Installation

17.2 The cavity battens must be installed over the wall underlay to the wall framing at maximum 300 mm horizontal centres where the studs are at 600 mm centres or at 400 mm centres when studs are at 400 mm centres.

17.3 Cavity battens are fixed in place with 40 x 2.5 mm hot-dip galvanised or stainless steel ring shank flat head nails at 300 mm centres when over studs or plates, and to the top and bottom plates and dwangs when between studs.

Shadowclad® Sheet Installation

17.4 Shadowclad® sheets may be cut on-site by power or hand saw. Holes and cut-outs may be formed by using a hole saw.

17.5 Shadowclad® is envelope preservative treated. Where sheets are cut, all cuts must be coated with a brush on timber preservative specified in the Technical Literature for Shadowclad® Ventilated Cavity. Failure to correctly apply preservative to these areas may negatively affect the durability of the cut sheets.

17.6 Shadowclad® sheets must be dry prior to installation. Before the sheets are installed, cut edges must be sealed with a brush-on timber preservative. The bottom edges and back of the Shadowclad® sheets to a height of 150 mm must be primed or stain coated at ground level and where the sheets are installed above apron flashings on roofs.

17.7 Shadowclad® sheets must be installed starting at the bottom of the wall. The bottom of the Shadowclad® sheets must overhang the bottom plate by a minimum of 50 mm.

17.8 Before the Shadowclad® sheets are installed, the corner detail must be prepared to suit the selected option, e.g. external box angle or boxed corner. The necessary flashings must be installed before commencing sheet fixing.

17.9 The Shadowclad® sheets are fixed with 60 x 2.8 mm hot dip galvanised or ring shanked stainless steel flat head nails, or 8 g x 65 mm mechanically zinc plated or stainless steel wood screws at 150 mm centres around the edge of the sheets starting at the corners and at 300 mm centres in the body of the sheet. The fasteners must be no closer than 7 mm to the sheet edges, and on the rebated edge the fasteners must be inside the weather groove.

Aluminium Joinery Installation

17.10 Aluminium joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A 7.5–10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

Finishing

17.11 The coating manufacturer's instructions must be followed at all times for application of the paint or stain finish. Shadowclad® sheets must be painted or stained as soon as practicable following fixing and must be clean and dry before commencing. If Shadowclad® sheets are exposed to the weather for more than 3 months, the surfaces must be washed with a mild detergent solution to remove any dirt, dust, mould or sea spray prior to coating. Allow the recommended drying time between coats and follow the temperature limitations for application. Carter Holt Harvey Plywood Ltd does not recommend Shadowclad® be left uncoated when used as an exterior cladding.

17.12 The use of dark colours with an LRV of less than 50% and failure to adequately maintain the coating increases the risk of aesthetic related issues such as face checking. For this reason Carter Holt Harvey Plywood Ltd does not support the use of dark colours on Shadowclad® exterior cladding.

17.13 Coatings should be applied by brush to ensure adequate coating film build is achieved. Application via roller or spray is not recommended.

Inspection

17.14 The Technical Literature must be referred to during the inspection of Shadowclad® Ventilated Cavity installations.

Health and Safety

18.1 Cutting of Shadowclad® sheets must be carried out in well ventilated areas and eye and hearing protection must be worn.

18.2 Safe use and handling procedures for the components that make up Shadowclad® Ventilated Cavity are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

19.1 The following testing has been completed by BRANZ:

- BRANZ expert opinion on NZBC E2 code compliance for Shadowclad® Ventilated Cavity was based on testing and evaluation of all details within the scope and as stated within this Appraisal. Shadowclad® Ventilated Cavity details were tested to NZBC Verification Method E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, vertical and horizontal Shadowclad® joints, internal and external corners. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of NZBC Acceptable Solution E2/AS1 for cavity-based plywood claddings.
- Wind face load and fastener slip testing for Shadowclad® Ventilated Cavity. BRANZ determined design wind suction pressures, and by comparing these pressures with the NZS 3604 design wind speeds and AS/NZS 1170 pressure coefficients, the fixing requirements given in the Technical Literature were confirmed as suitable for timber framed walls.

Other Investigations

20.1 Structural and durability opinions have been provided by BRANZ technical experts.

20.2 The performance and testing of plywood wall cladding products in New Zealand and Australia has been considered, including the structural and weathertightness performance, durability and non-hazardous nature.

20.3 Site inspections have been carried out by BRANZ to examine the practicability of installation.

20.4 The Technical Literature for Shadowclad® Ventilated Cavity has been examined by BRANZ and found to be satisfactory.

Quality

21.1 The manufacture of Shadowclad® has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

21.2 The quality of materials, components and accessories supplied by Carter Holt Harvey Plywood Ltd is the responsibility of Carter Holt Harvey Plywood Ltd. The quality control system for the manufacture of Shadowclad® has been assessed and registered as meeting the requirements of AS/NZS 2269 by the Engineered Wood Products Association of Australasia, and ISO 9001 by Telarc SAI.

21.3 The treatment of Shadowclad® to H3.1 and 3.2 has been independently assessed and certified as meeting the requirements of AS/NZS 1604.3.

21.4 Quality of installation on-site of components and accessories supplied by Carter Holt Harvey Plywood Ltd and the building contractor is the responsibility of the installer.

21.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing solutions and joinery, wall underlays, flashing tapes, cavity battens, air seals and Shadowclad® sheets in accordance with the instructions of Carter Holt Harvey Plywood Ltd.

21.6 Building owners are responsible for the maintenance of Shadowclad® Ventilated Cavity in accordance with the instructions of Carter Holt Harvey Plywood Ltd.

Sources of Information

- AS 3730:2006 Guide to the properties of paints for buildings.
- AS/NZS 1170:2002 Structural design actions.
- AS/NZS 1604.3:2012 Specification for preservative treatment - Part 3: Plywood.
- AS/NZS 2269:2012 Plywood - Structural.
- AS/NZS 4680:2006 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles.
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3603:1993 Timber Structures Standard.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4211:2008 Specification for performance of windows.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

BRANZ

In the opinion of BRANZ, Shadowclad® Ventilated Cavity Cladding System is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Carter Holt Harvey Plywood Limited, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. Carter Holt Harvey Plywood Limited:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by Carter Holt Harvey Plywood Limited.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Carter Holt Harvey Plywood Limited or any third party.

For BRANZ

Claire Falck
Chief Executive

Date of Issue:
29 November 2023

shadowclad®

shadowclad® Natural GROOVE | shadowclad® Natural TEXTURE | shadowclad® Ultra GROOVE | shadowclad® Ultra TEXTURE | shadowclad® FLASHINGS

SHADOWCLAD® SPECIFICATION & INSTALLATION GUIDE

FOR CAVITY CONSTRUCTION

FEBRUARY 2024

CHH PLY

Information contained within is specific to Shadowclad® structural plywood products and must not be used with any other plywood products, no matter how similar they may appear.

shadowclad®

CAVITY CONSTRUCTION

Contents

CHH PLY

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.

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.

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 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 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. It is available H3.1 LOSP treated for residential and commercial applications or H3.2 CCA if required. H3.2 CCA treatment is only available on a made to order basis in the Ultra finish and is not available with Natural finish products.

For H3.2 CCA contact CHH Plywood for further information and availability.

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
Finish	Natural or Ultra	Natural or Ultra
Sheet Length	2440 and 2745mm	2440 and 2745mm
Width (Overall)	1216mm	1216mm
Width (Effective)	1200mm	1200mm
Cover/Width Tolerance	+/– 1mm	+/– 1mm
Nominal Thickness	12mm	12mm
Weight (kg/m²)	6.6	6.6
R-value (m².C/W)	0.104	0.104
Groove Profile	N/A	9mm wide, 5mm deep at 150mm centres
Edge Profile	Ship lap with weather groove	Ship lap with weather groove
Treatment Available	• H3.1 LOSP (Azole) • H3.2 CCA (Ultra finish only) Made to order only. Contact CHH Plywood for availability.	• H3.1 LOSP (Azole) • H3.2 CCA (Ultra finish only) Made to order only. Contact CHH Plywood for availability.

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
Shadowclad Natural/Ultra	H3.1 LOSP	Zones B and C	Aluminium Anodised, or Stainless Steel
		Zone D (Sea spray)	Stainless Steel*
Shadowclad Ultra	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

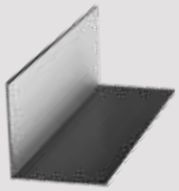
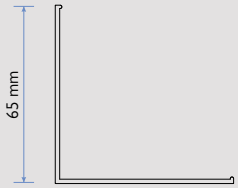
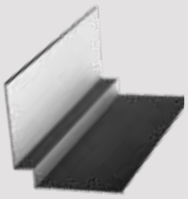
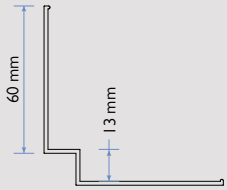
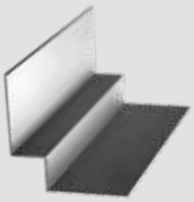
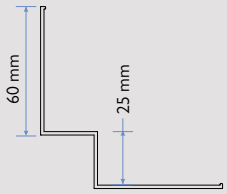
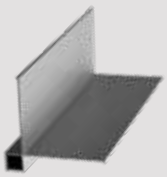
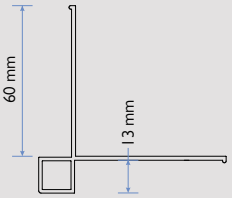
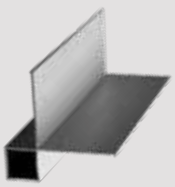
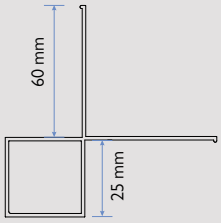
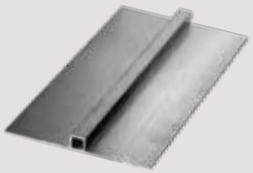
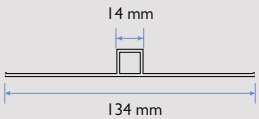
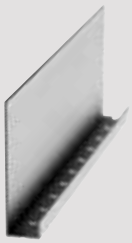
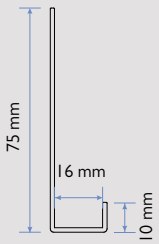
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Internal 90° Angle			Back flashing for internal corners	Natural Anodised	3000 or 6000
Internal 'W' Angle			'W' back flashing for internal corners providing a flush finish with panels (13mm x 13mm)	Natural Anodised or Mill	3000 or 6000
Large Internal 'W' Angle			'W' back flashing for internal corners (25mm x 25mm) **Design Tip:** 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) **Design Tip:** 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**

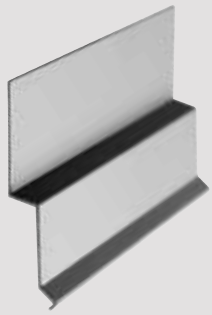
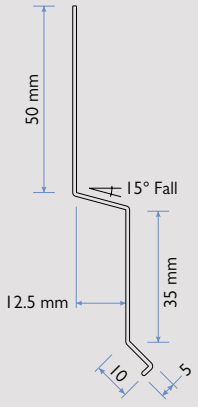
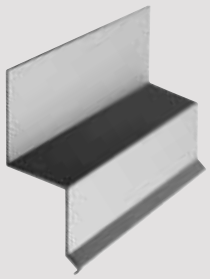
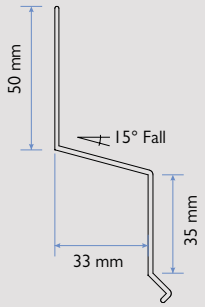
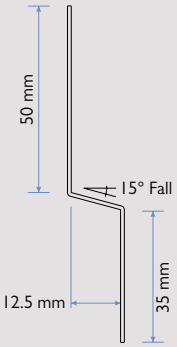
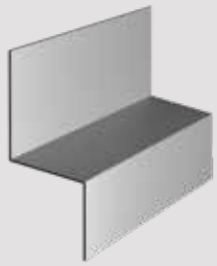
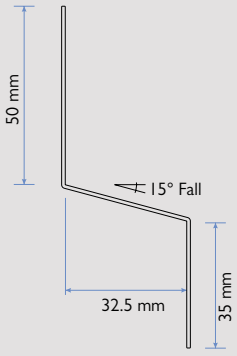
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Horizontal 'Z' Flashing	 	Horizontal 'Z' flashing for horizontal joints between panels	Natural Anodised or Mill	3600
Inter-Storey 'Z' Flashing	 	Horizontal 'Z' flashing for horizontal joints between panels when limiting continuous cavities 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

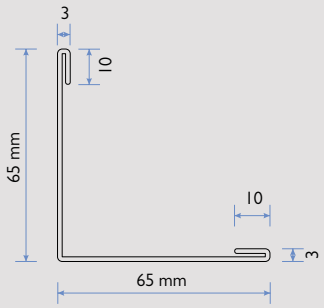
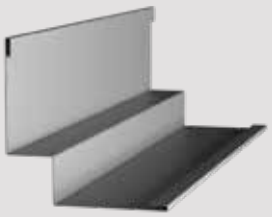
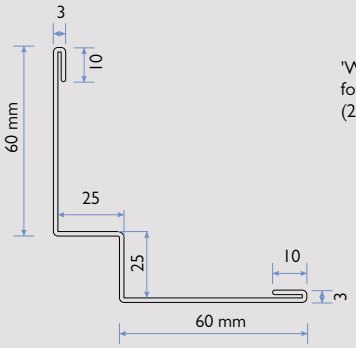
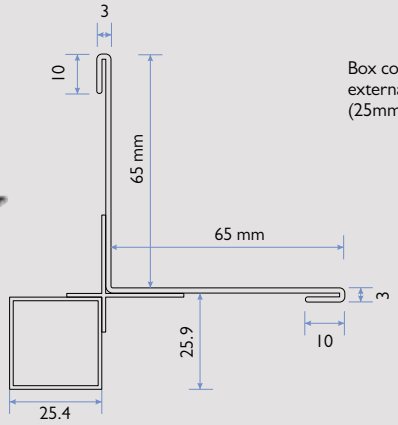
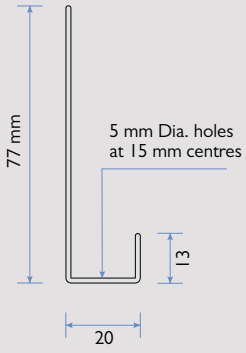
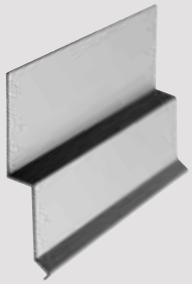
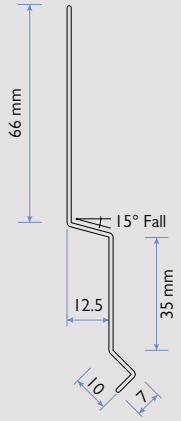
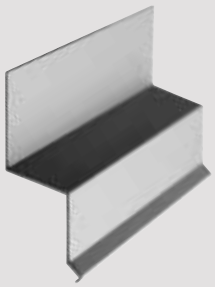
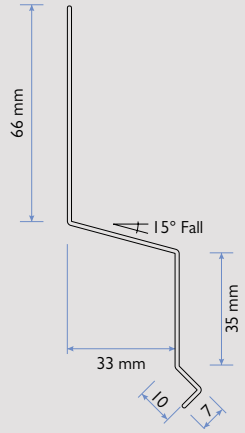
Flashing	Line Drawing	Description	Finish Available	Length (mm)
Internal 90° Angle	 	Back flashing for internal corners	Stainless Steel	3000
Large Internal 'W' Angle	 	'W' back flashing for internal corners (25mm x 25mm)	Stainless Steel	3000
Large External Box Angle	 	Box corner for external corners (25mm 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
Frame Flashing Tape[1]	For a secure and permanent seal of all Ecoply Barrier openings (Use in conjunction with Sill Tape)	-	150mm/200mm x 30m
Sealing Tape[1]	For a secure and permanent seal of all Ecoply Barrier vertical joints	-	60mm x 30m
Sill Tape[1]	One piece stretchable sill tape for window and door sills. 2 rolls per box	-	150mm/200mm x 20m
Ecoply® Barrier[1]	Rigid Air Barrier System	H3.2 CCA	2440mm/2745mm x 1200mm
Cavity Batten	45 x 20mm (nominal)	H3.1 LOSP	Random
Flashings	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 available for Shadowclad Ultra panels on a made to order basis. Contact CHH Plywood wood for further information and availability.

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.

H3.2 CCA treated Shadowclad is only available made to order, lead times may apply.

Table 7: Preservative Treatment Options

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

EWPAA 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

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 (EWPAA) brand and mill number: e.g. 911 (Tokoroa mill).

SHADOWCLAD STRUCTURAL A BOND EO 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
911

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.

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.

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

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.

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.

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.

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.

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.

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.

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.

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:

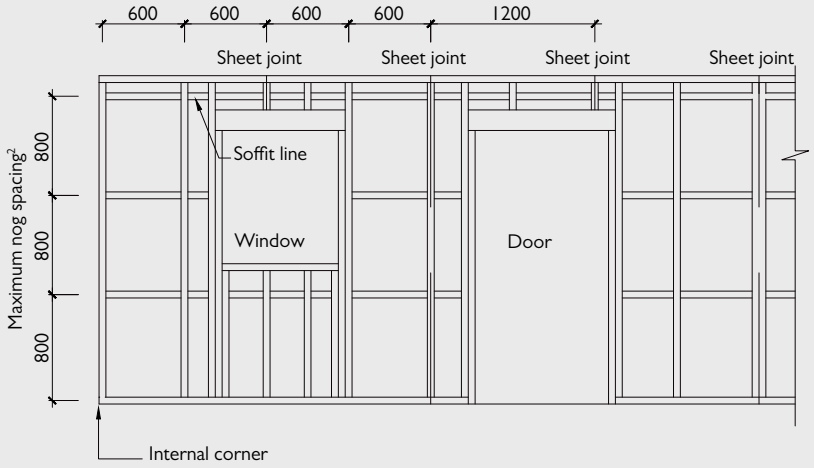
- Battens must be fixed vertically at 300mm centres (i.e. a batten on studs and one in between the two studs fixed to top and bottom plates and nogs).
- Battens fixed to studs are to support Shadowclad and restrain building underlay and insulation from bulging into the cavity.
- The Shadowclad must not 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.

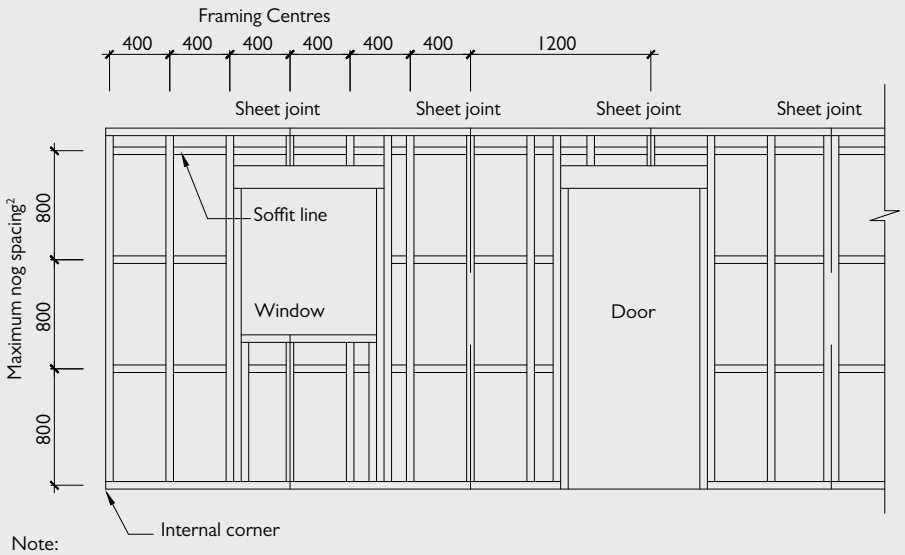
Cavity spacers (i.e. short pieces of cavity batten) may be used to support the bottom sheet edge (or provide intermediate support where required e.g. above window openings) but must allow water drainage to the outside. The cavity spacers must be fixed at a 5° minimum slope with a 50mm minimum air gap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

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



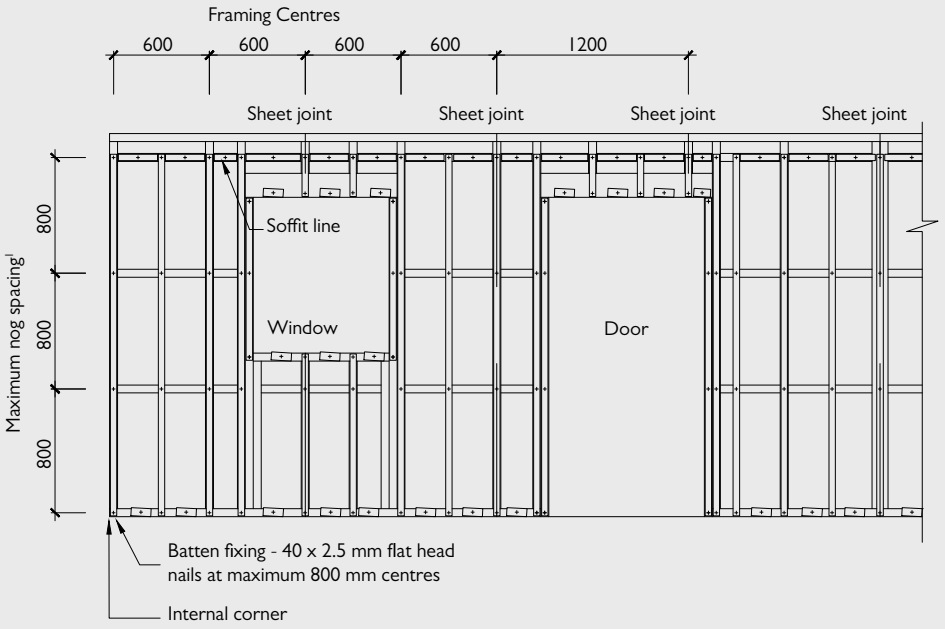
Note:
1. Single spans of Shadowclad® must not exceed 600 mm (e.g. below windows or on balustrades)
2. When using vertical cover battens, nogs at maximum 600 centres

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



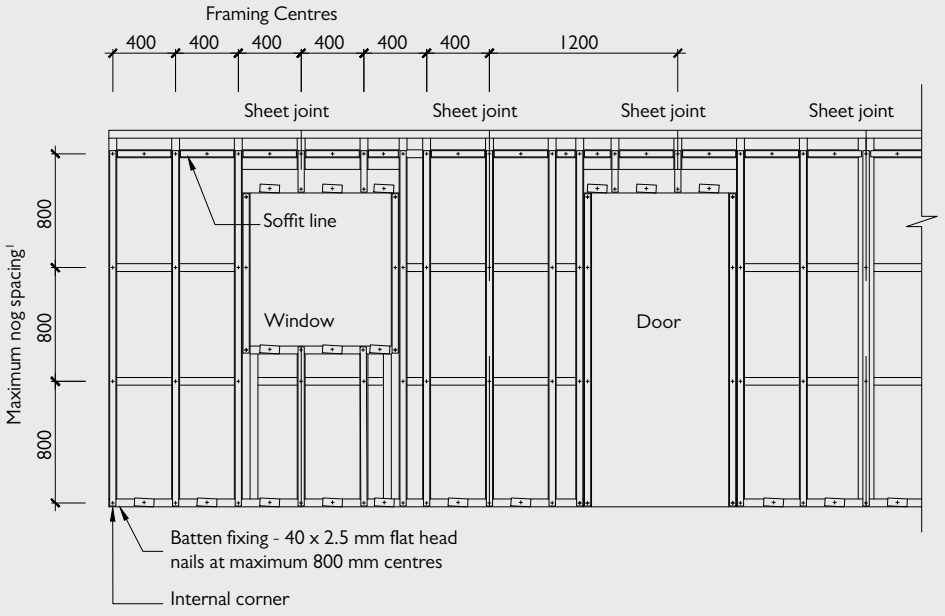
Note:
1. Single spans of Shadowclad must not exceed 600 mm (e.g. below windows or on balustrades)
2. When using vertical cover battens, nogs at maximum 600 centres

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.

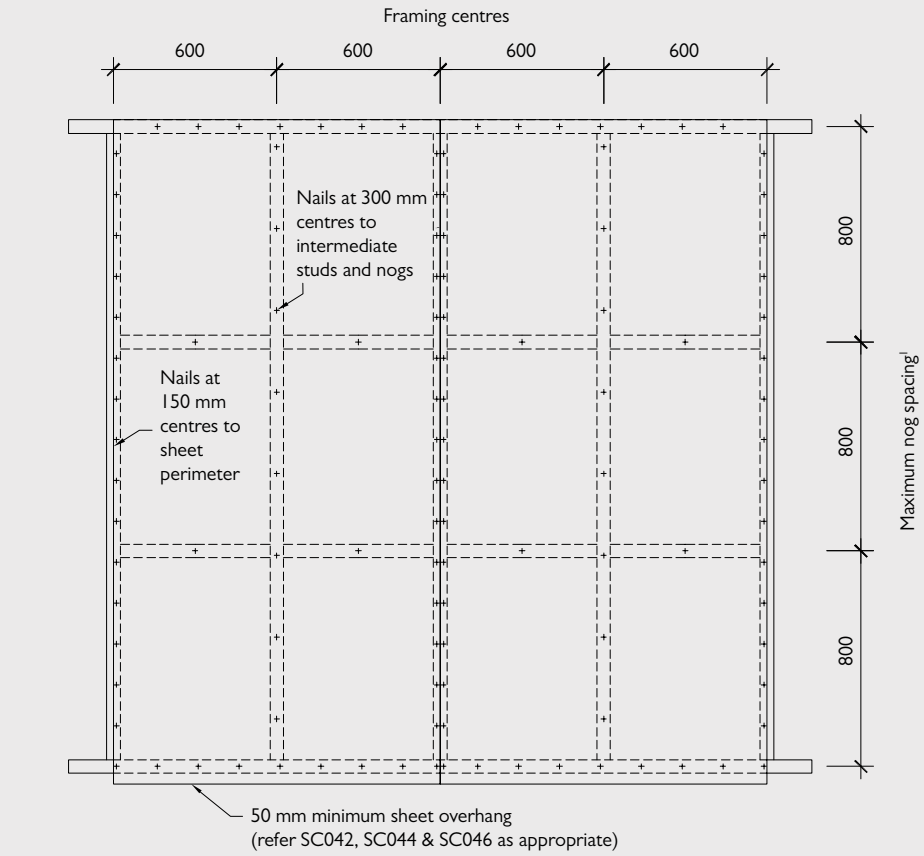
Power Driven Fastening

- 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 or by calling 0800 326 759.

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.

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.

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 no detract from the requirements to read and understand this literature as a whole.

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

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

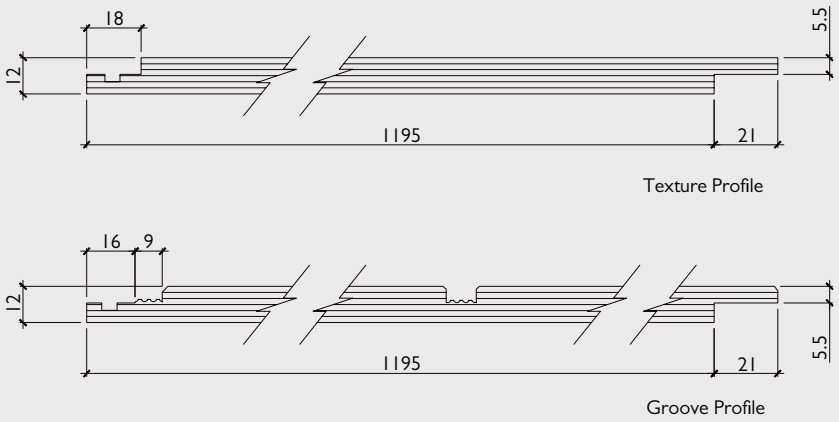
4.10 VERTICAL SHEET JOINTS

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

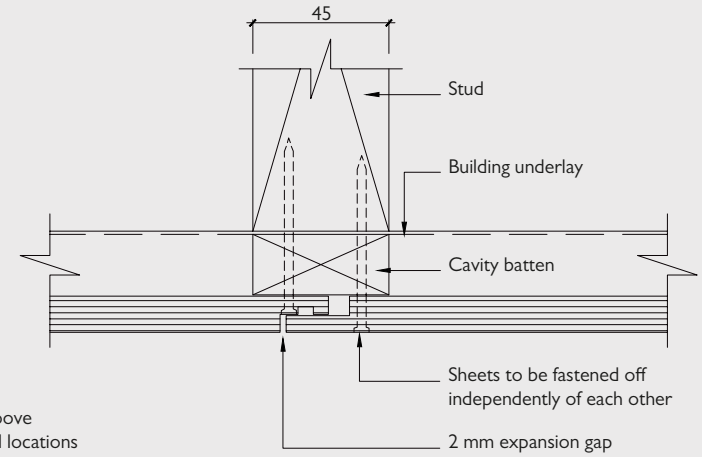
When installing Shadowclad Groove profile sheets, use a 9mm temporary spacer in the groove alongside Ship lap joint to establish correct expansion gap.

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

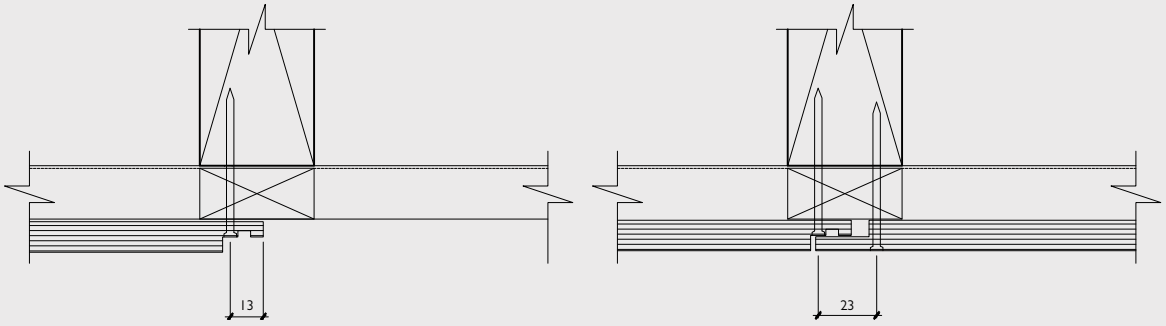


SC006: Shadowclad Texture Vertical Joint (Cavity)

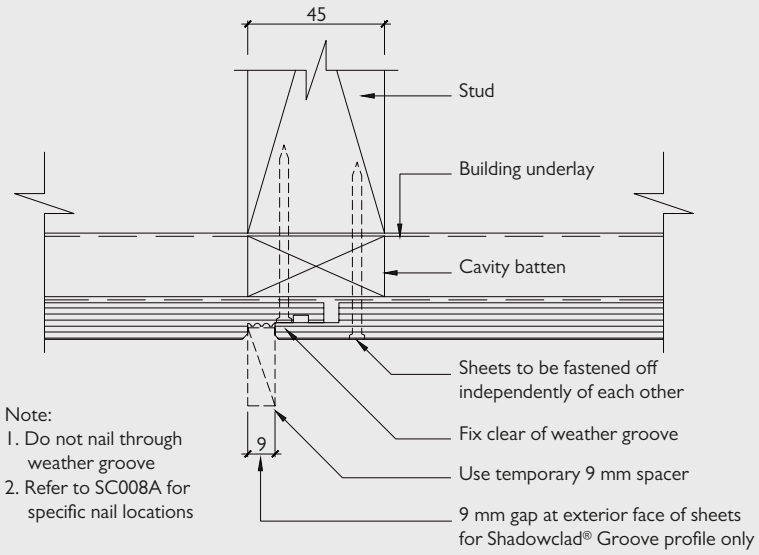


Note:
1. Do not nail through weather groove
2. Refer to SC006A for specific nail locations

SC006A: Shadowclad Texture Vertical Joint Fastener Locations (Cavity)

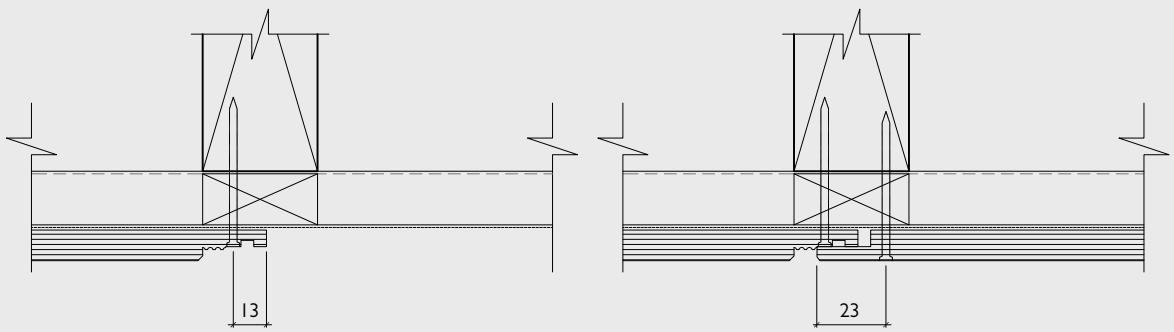


SC008: Shadowclad Groove Vertical Joint (Cavity)

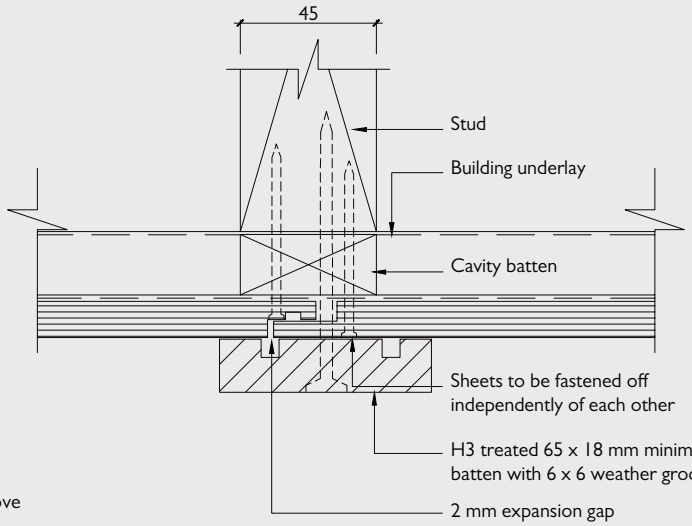


Note:
1. Do not nail through weather groove
2. Refer to SC008A for specific nail locations

SC008A: Shadowclad Groove Vertical Joint Fastener Locations (Cavity)

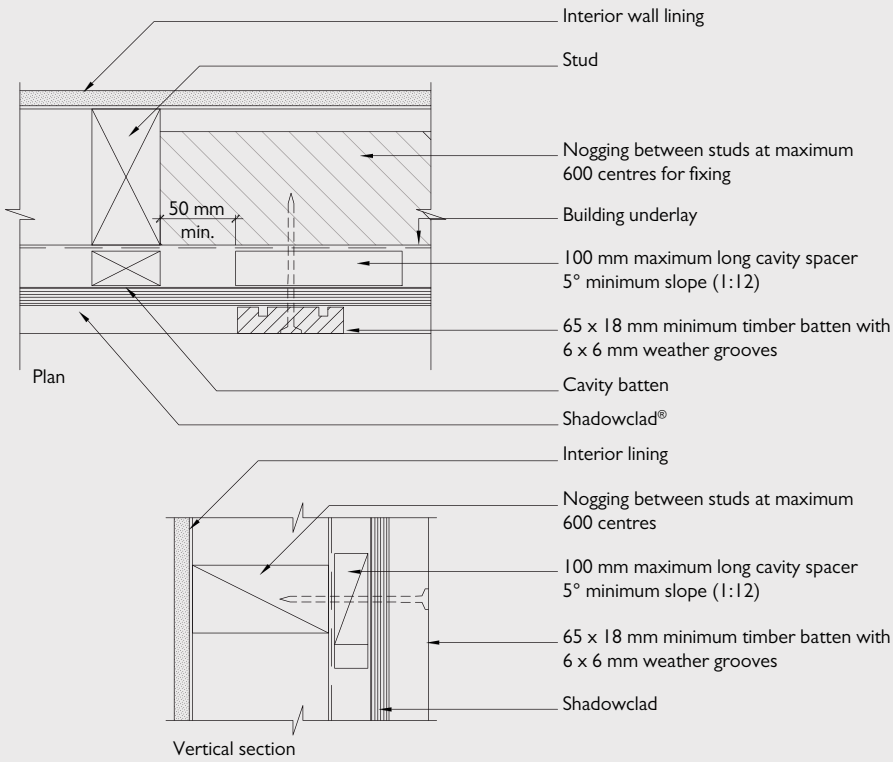


SC010: Shadowclad Vertical Joint with Optional Cover Batten (Cavity)

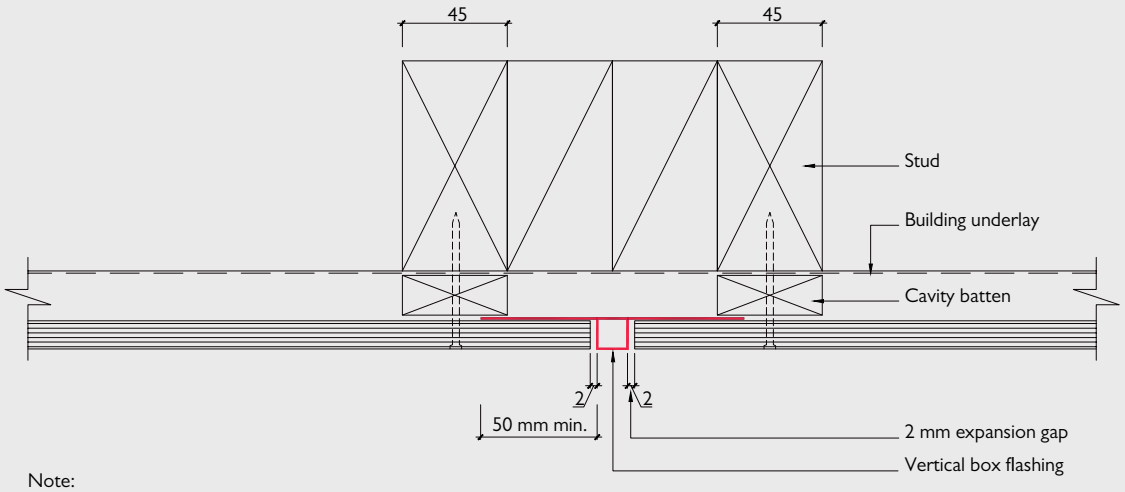


Note:
1. Do not nail through weather groove

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



SC014: Shadowclad Vertical Joint with Top Hat Flashing (Cavity)



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

4.11 HORIZONTAL SHEET JOINTS

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

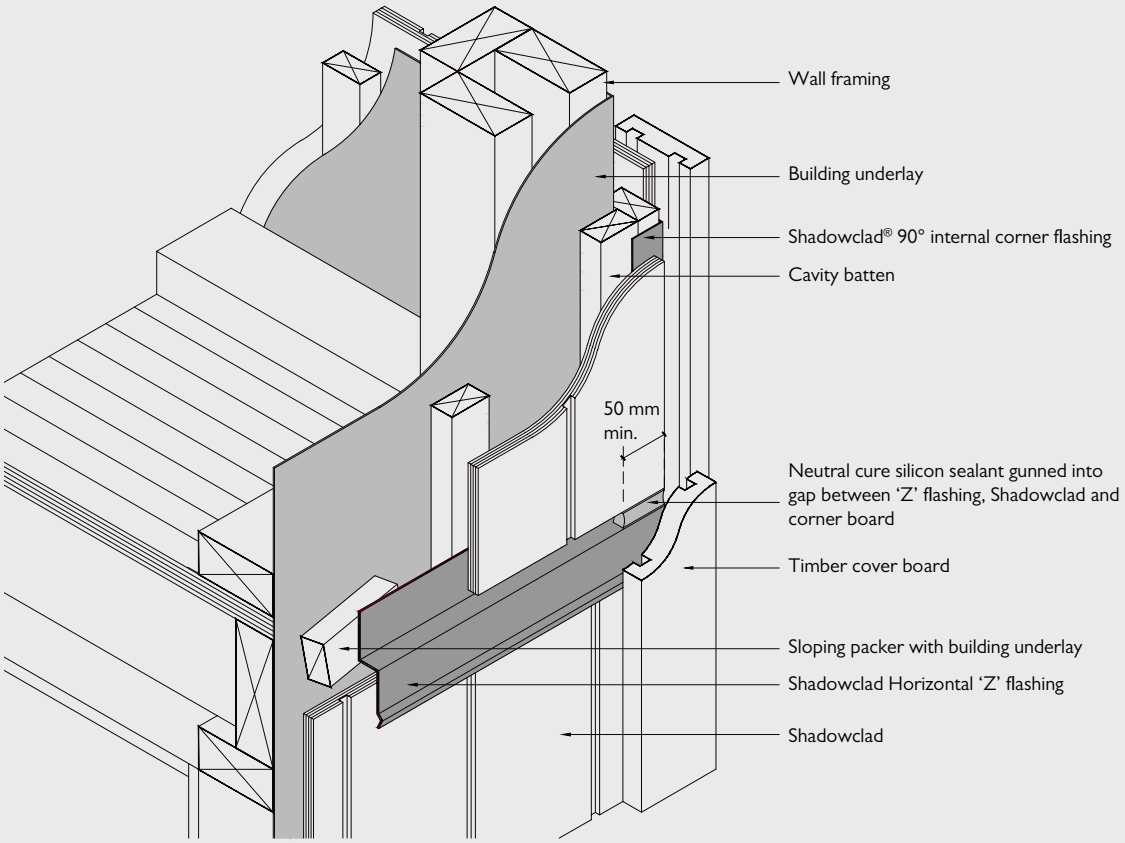
A Shadowclad Horizontal 'Z' flashing should be used for horizontal sheet joints.

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

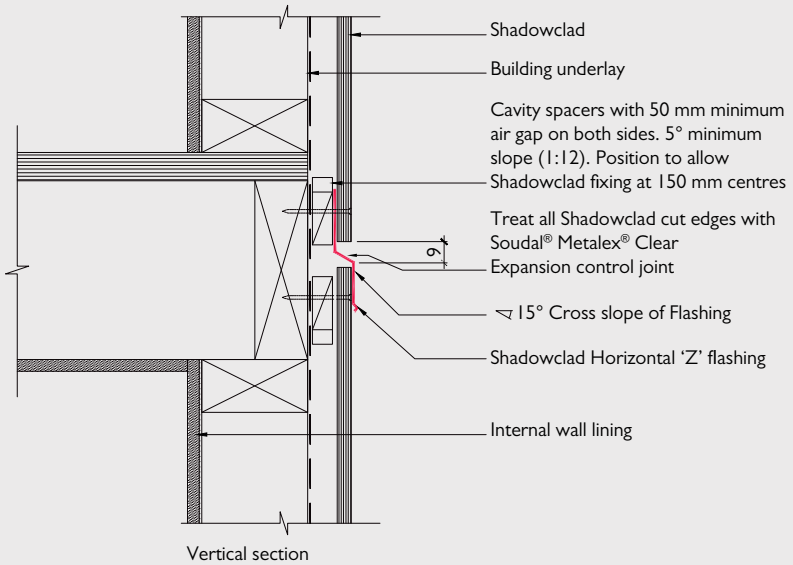
If aluminium 'Z' flashings are being used, all butt joints must include proprietary back flashings. Stainless steel flashings should be lapped by a minimum 150mm at joins.

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)

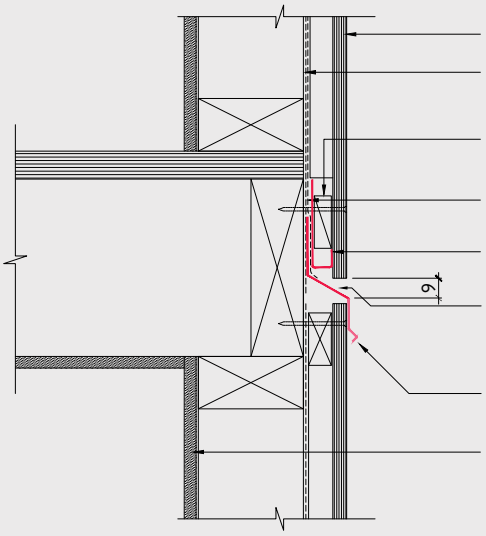


Vertical section

Notes:

1. 50 mm strip of neutral cure silicon sealant must be provided at the termination point of all 'Z' flashings at windows, corner boxes, etc (refer to SC0100)
2. Detail is only suitable for drained cavities up to two storeys or 7 m in height. For drained cavities over two storeys or 7 m in height refer to detail SC018 Horizontal Joint - Non Continuous (Cavity)
3. Back flashings or 150 mm overlap required at all horizontal flashing butt joints (refer to SC0102 and SC0104)
4. Treat all Shadowclad cut edges with Soudal® Metalex® Clear

SC018: Shadowclad Mid Floor Horizontal Joint – Non Continuous (Cavity)

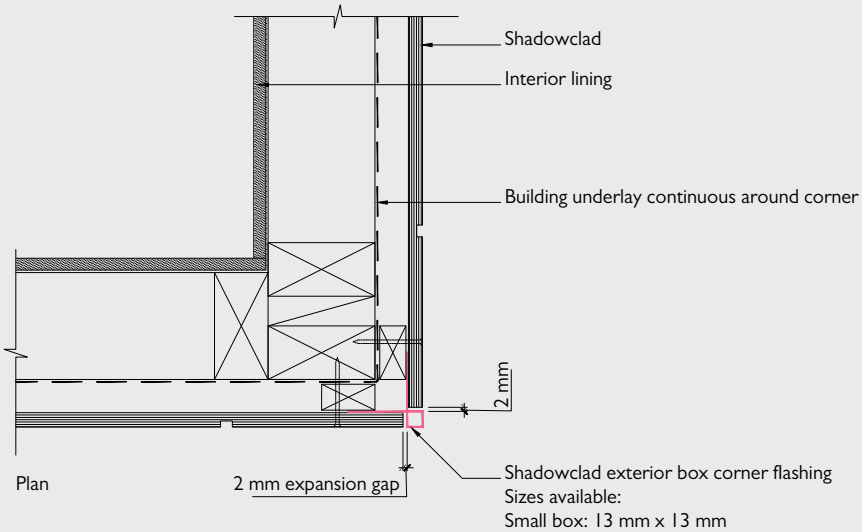


Vertical section

Notes:
1. Stop ends must be provided at the termination point of all inter-storey 'Z' flashings
2. Detail SC016 Mid Floor Horizontal Joint (Cavity) may be used for continuous cavity up to two storey or 7 m in height
3. Back flashings or 150 mm overlap required at all horizontal flashing butt joints (refer to SC0102 and SC0104)
4. Treat all Shadowclad cut edges with Soudal® Metalex® Clear

4.12 EXTERNAL CORNERS

SC020: Shadowclad External Corner with External Box Flashing (Cavity)

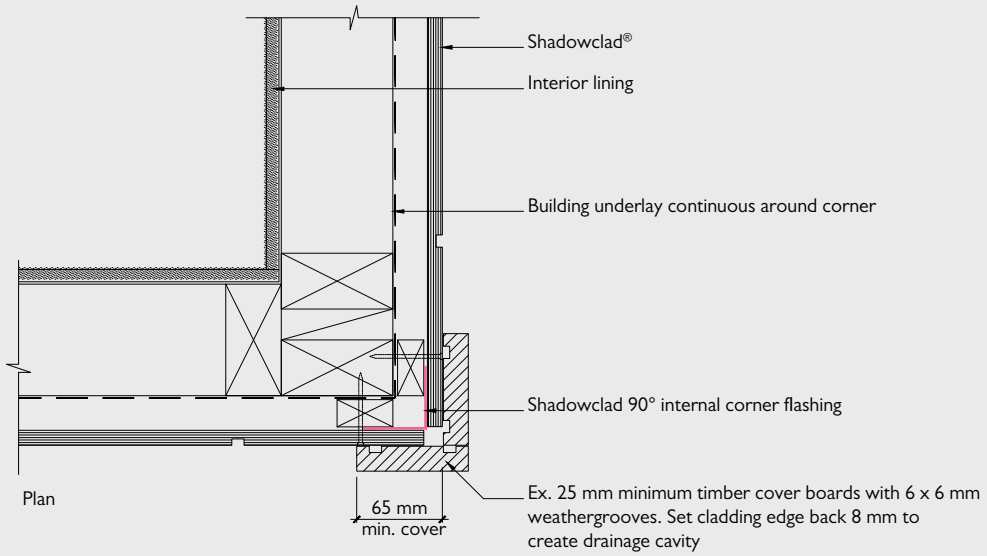


Plan

2 mm expansion gap

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

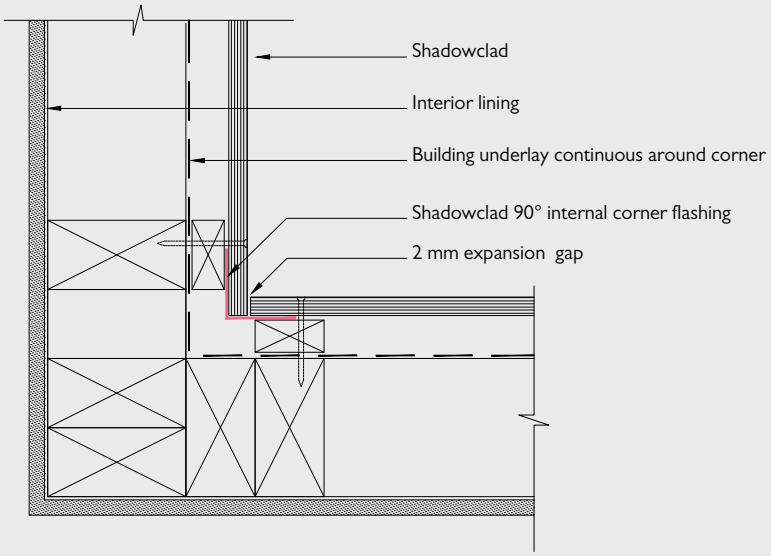
SC022: Shadowclad External Corner with Cover Boards (Cavity)



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

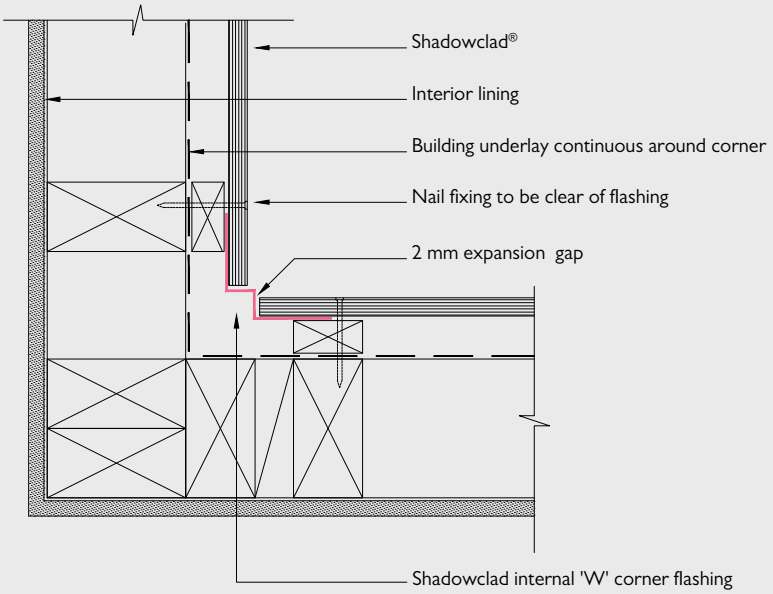
SC024: Shadowclad Internal Corner with 90° Flashing (Cavity)



Plan

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

SC026: Shadowclad Internal Corner with 'W' Flashing (Cavity)



Plan

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

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).

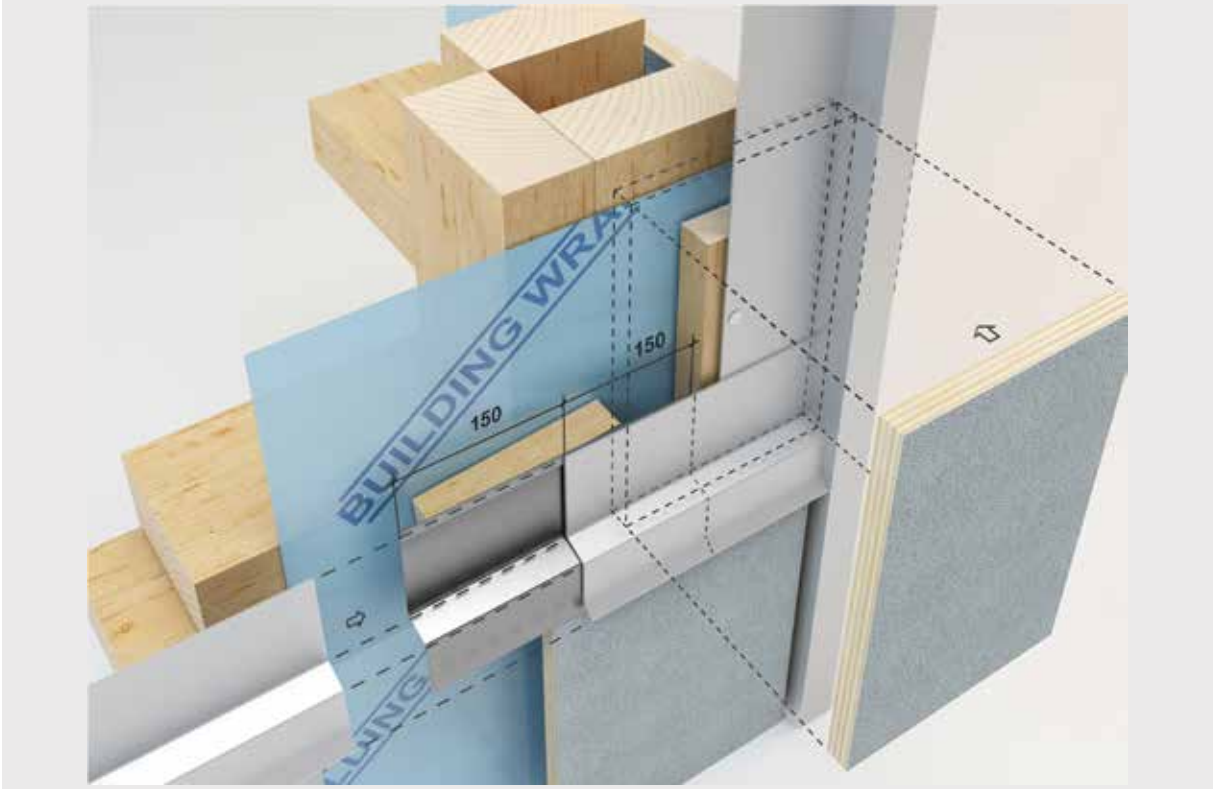
Stainless steel back flashings should overlap by a minimum of 150mm at joins to create weathertight joints where horizontal flashings meet (refer to SC0104).

'Z' Flashings Terminations

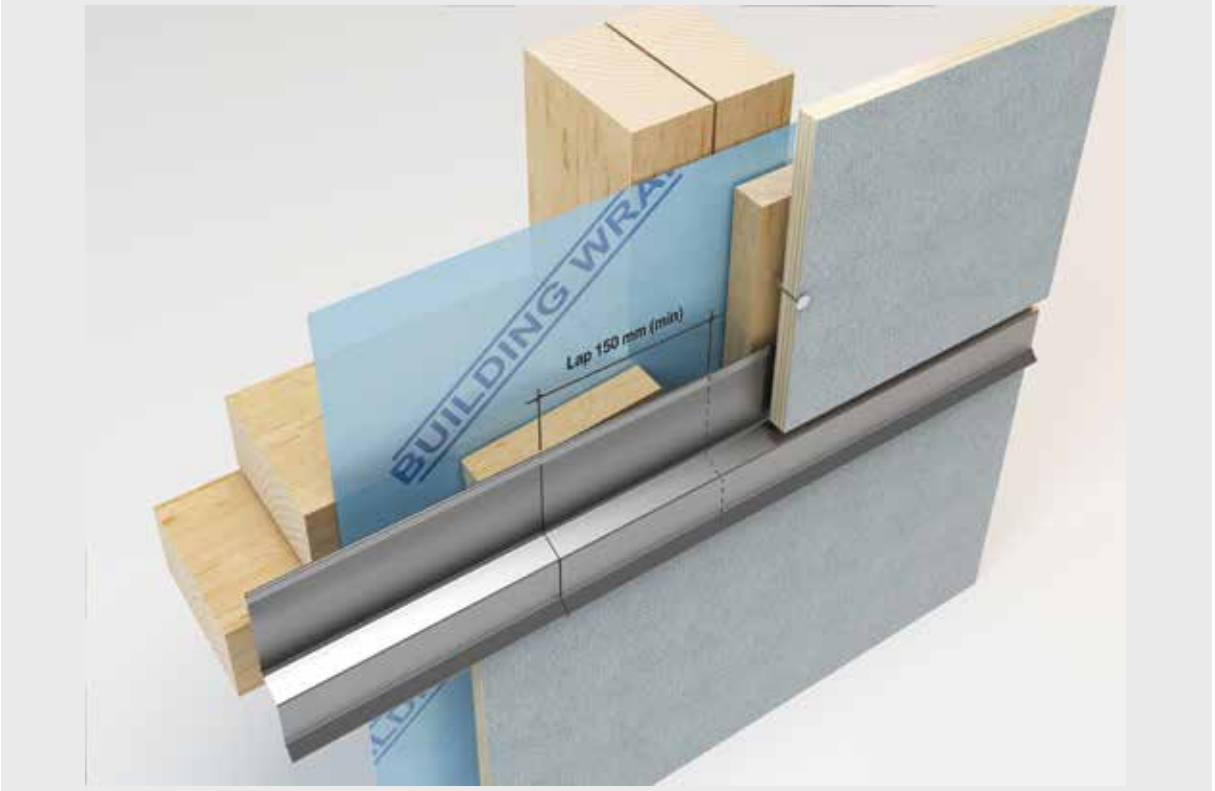
Where inter-storey 'Z' flashings terminate stop ends must be installed.

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)



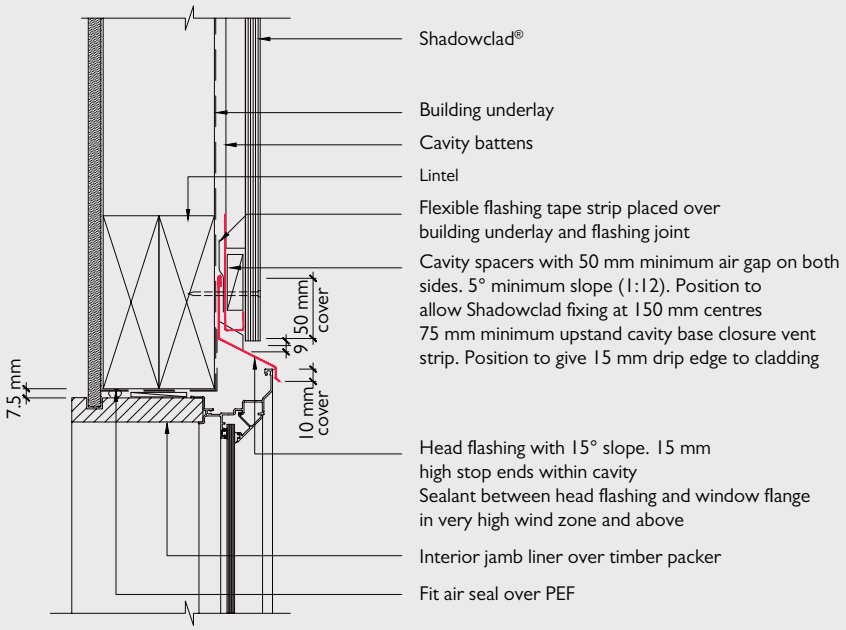
SC0104: Shadowclad Stainless Steel 'Z' Flashing Joins (Cavity)



4.15 WINDOW PENETRATIONS

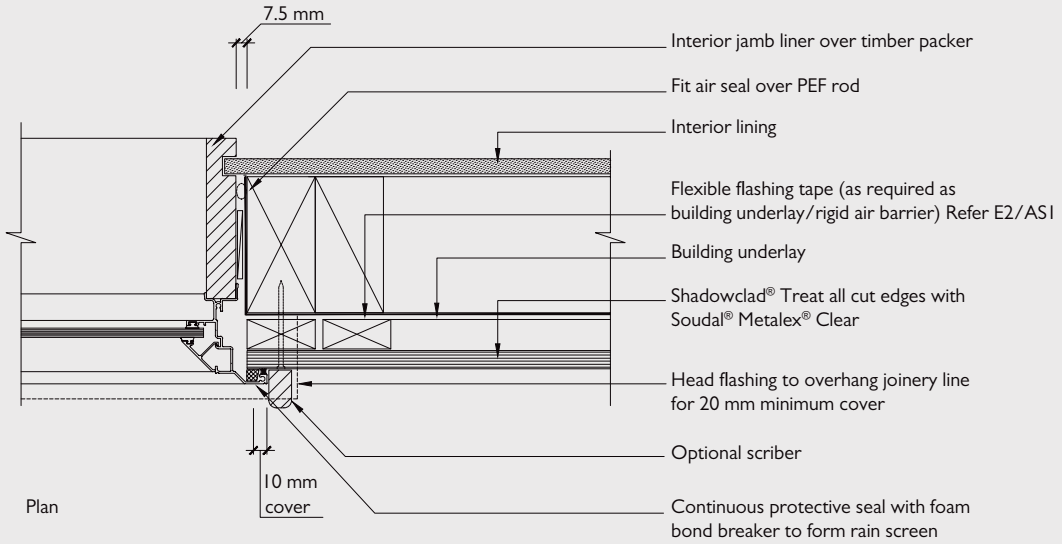
Window joinery flashings (i.e. head and sill flashings) should be sourced from the joinery fabricator to meet the requirements of Acceptable Solution E2/ASI or an Alternative Solution such as the Window Association of New Zealand Window Installation System (WANZ WIS) which can be downloaded at www.wanz.org.nz.

SC028: Shadowclad Window Head Detail (Cavity)



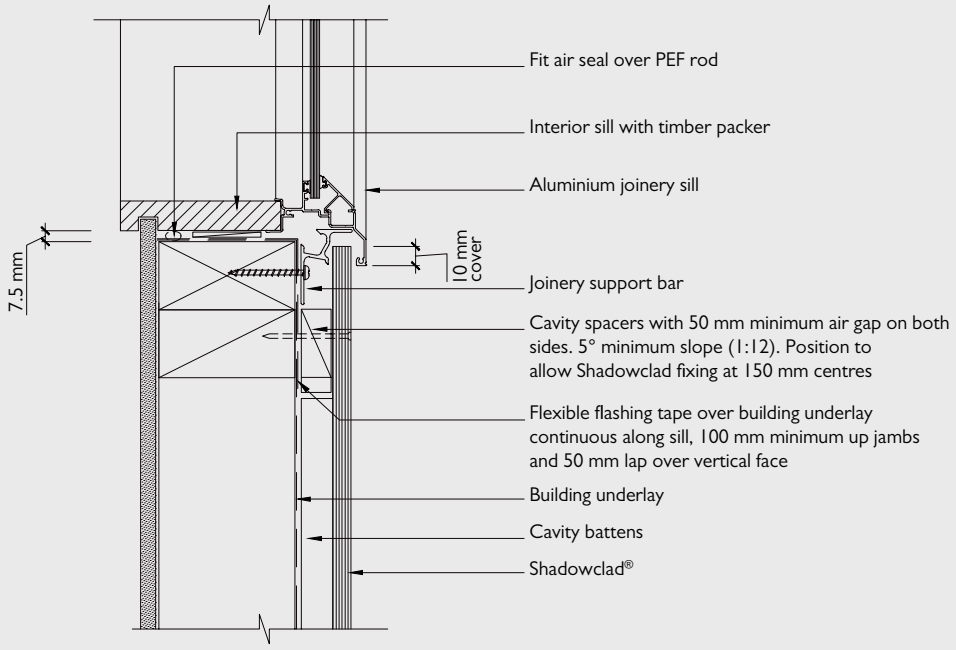
Note:
1. Treat all cut edges with Soudal® Metalex® Clear
2. Stop ends to head flashing terminations

SC030: Shadowclad Jamb Detail (Cavity)



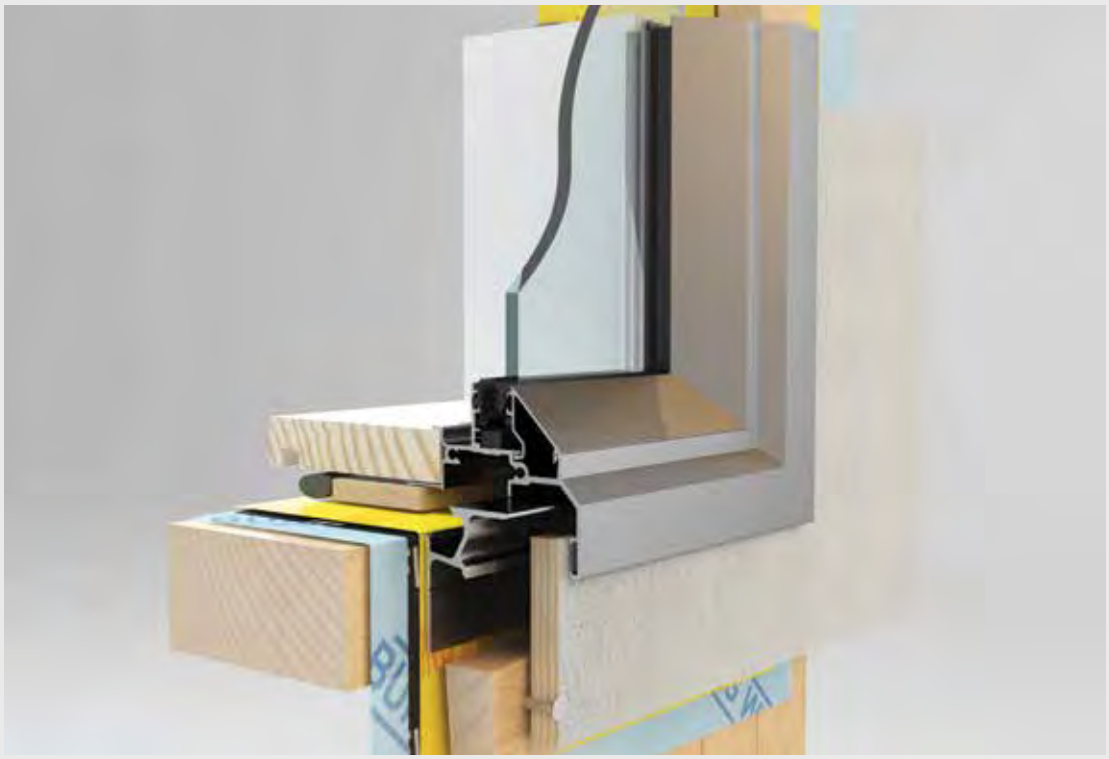
Note:
1. Treat all Shadowclad cut edges with Soudal® Metalex® Clear
2. 50 mm strip of sealant must be provided at the termination point of all 'Z' flashings at windows, corner boxes, etc

SC032: Shadowclad Window Sill Detail (Cavity)



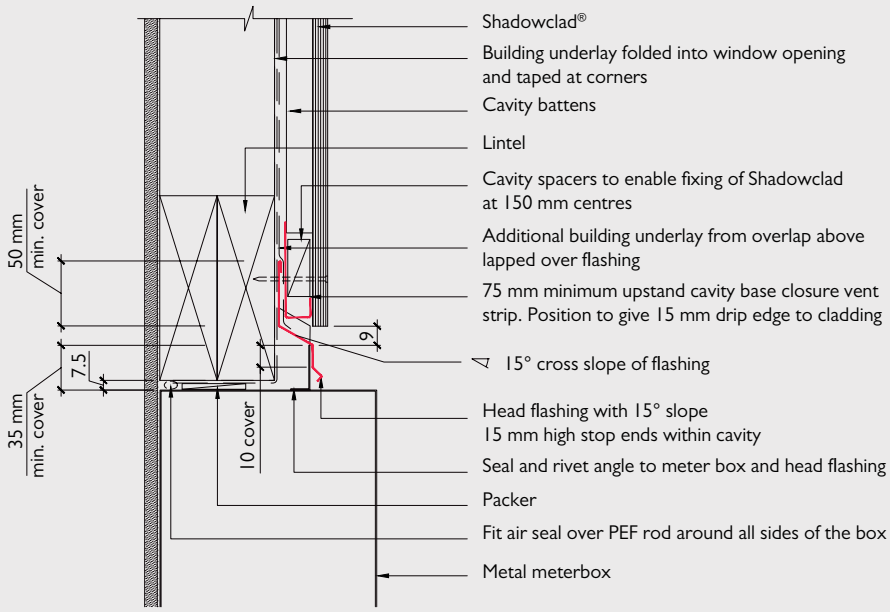
Vertical section

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



4.16 WALL PENETRATIONS

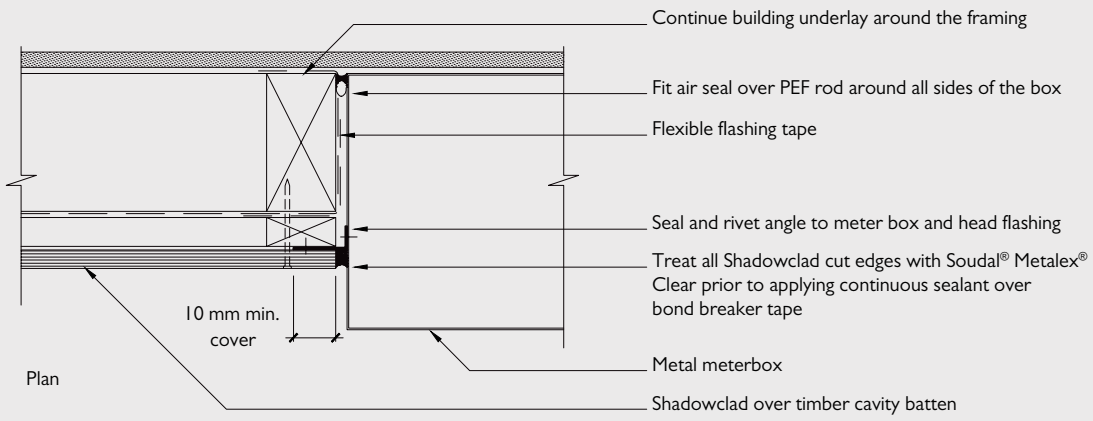
SC034A: Shadowclad Meterbox Vertical Cross Section (Cavity)



Vertical section

Note:
1. Treat all cut edges with Soudal® Metalex® Clear
2. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

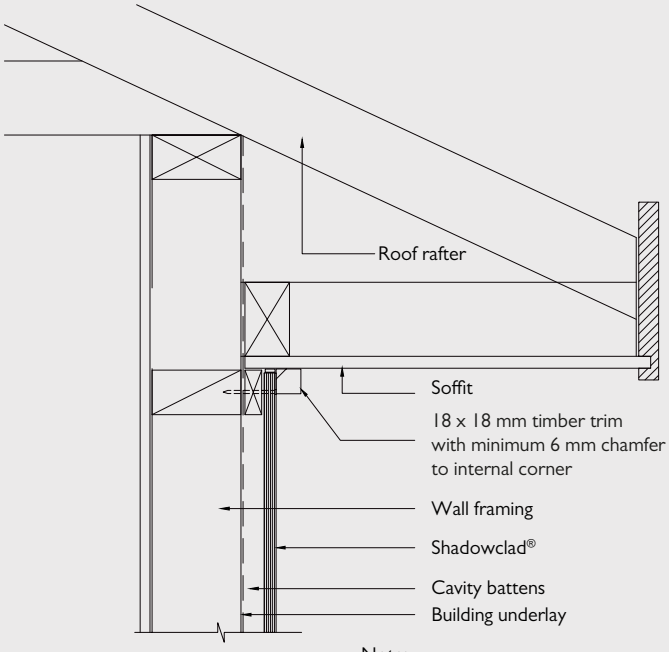
SC034B: Shadowclad Meterbox Horizontal Cross Section (Cavity)



Plan

Note:
1. Treat all cut edges with Soudal® Metalex® Clear
2. 50 mm strip of neutral cure silicon sealant must be provided at termination points of all 'Z' flashings at meter boxes

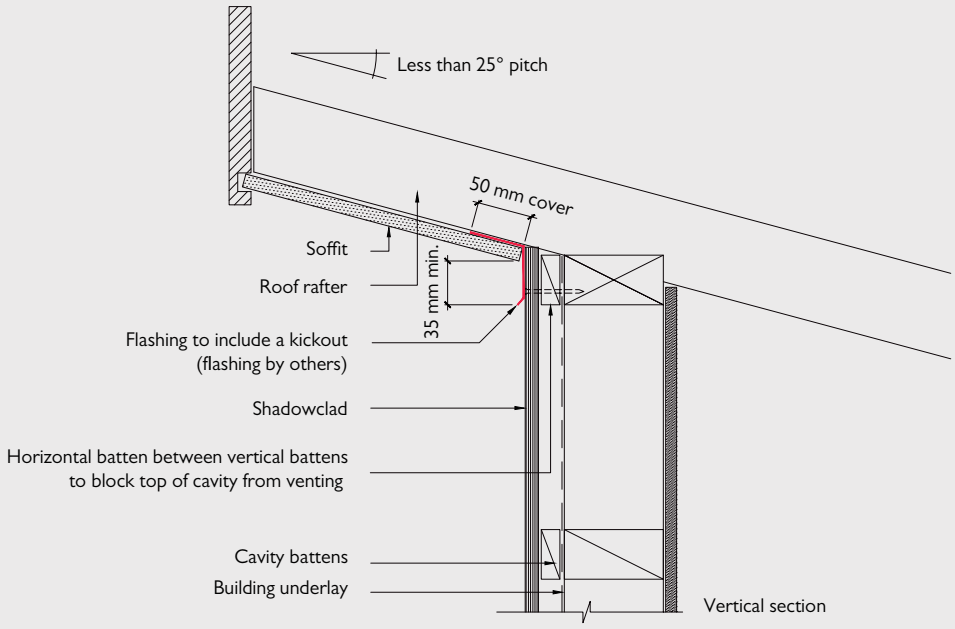
SC036: Shadowclad Soffit Detail (Cavity)



Vertical section

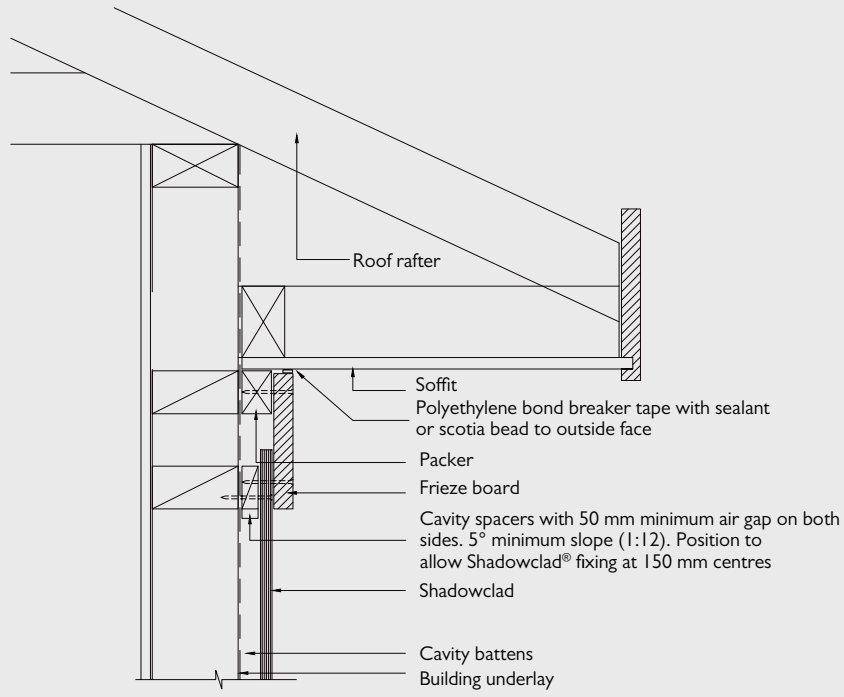
Note:
1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear

SC036A: Shadowclad Alternative Soffit Detail (Cavity)



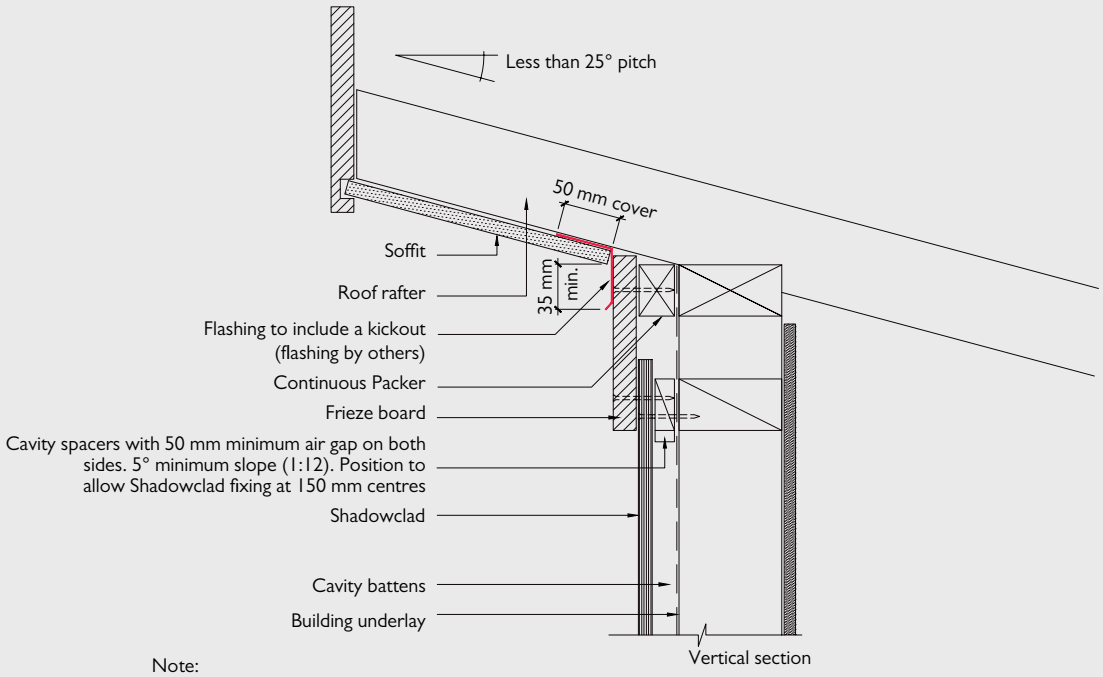
Note:
1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear

SC038: Shadowclad Soffit Alternative Detail (Cavity)



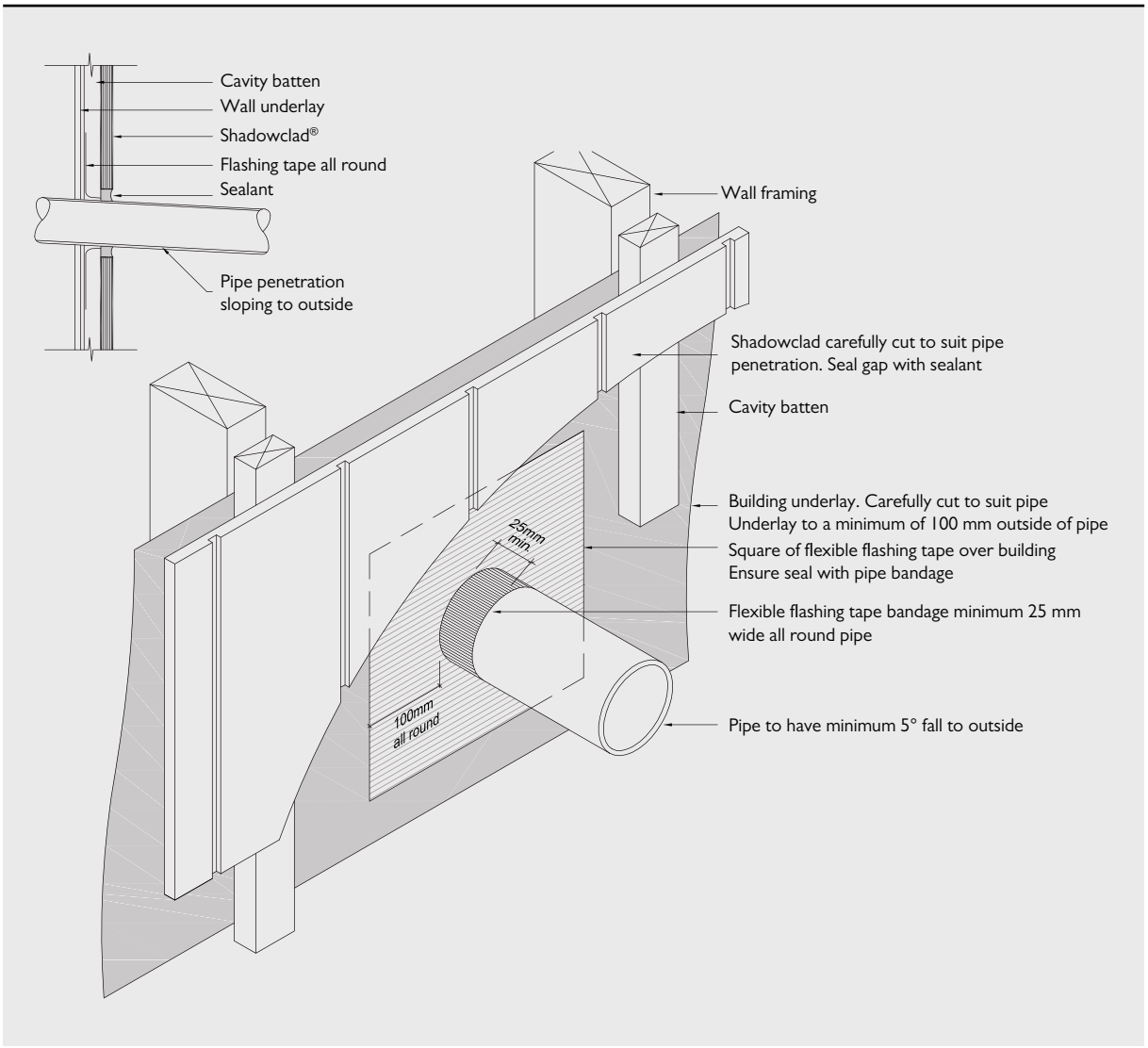
Note:
1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear

SC038A: 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

SC040: Shadowclad Pipe Penetration (Cavity)



4.17 SHEET CLEARANCES

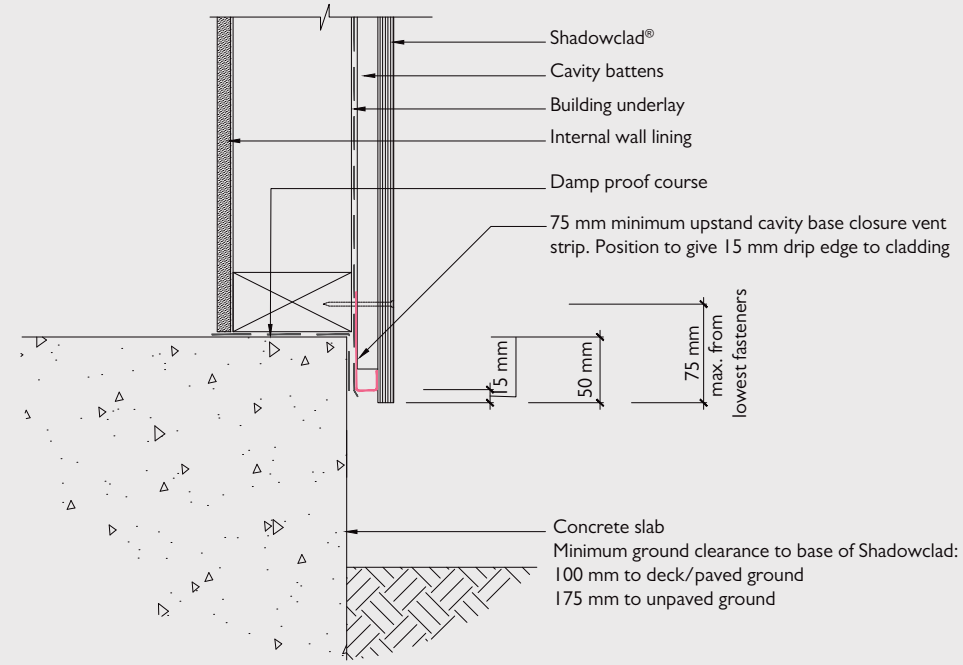
Ground Clearances

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.

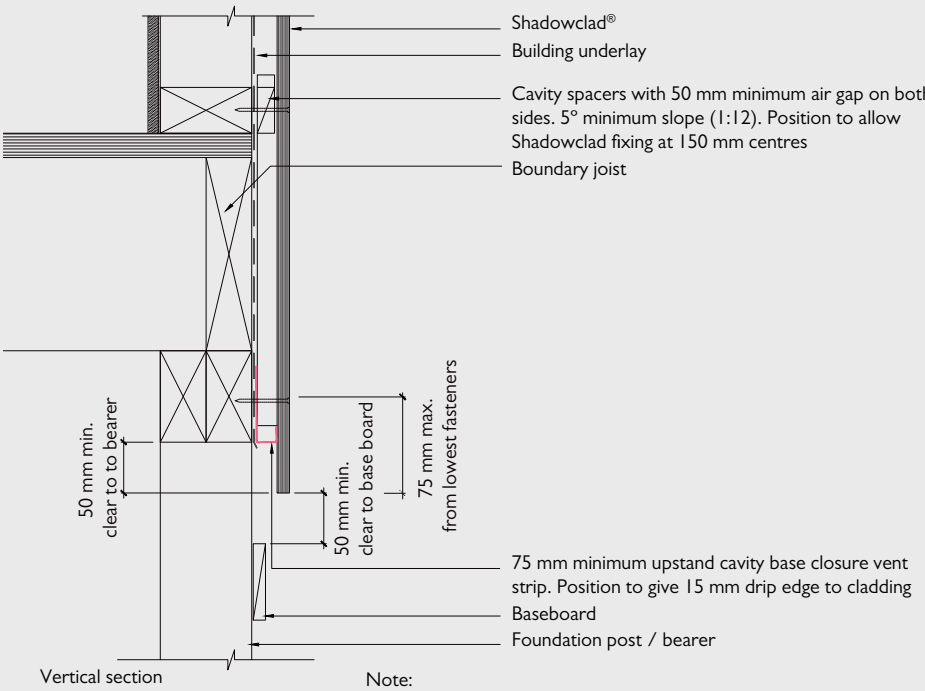
SC042: Shadowclad Overhangs and Ground Clearances (Cavity)



Vertical section

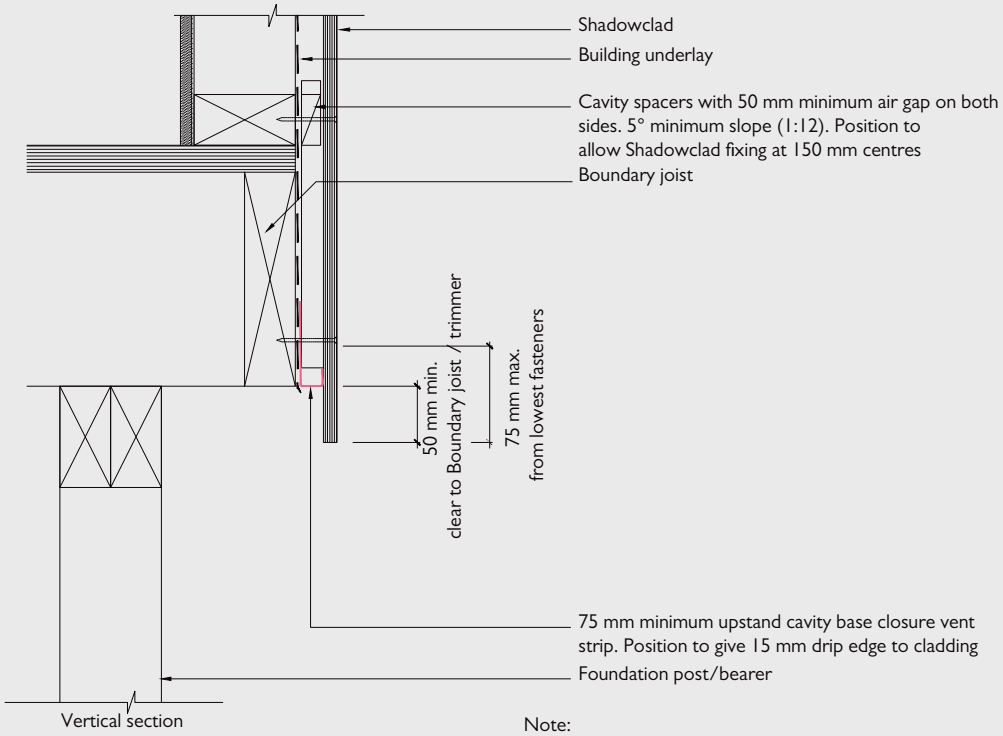
Note:
1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

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



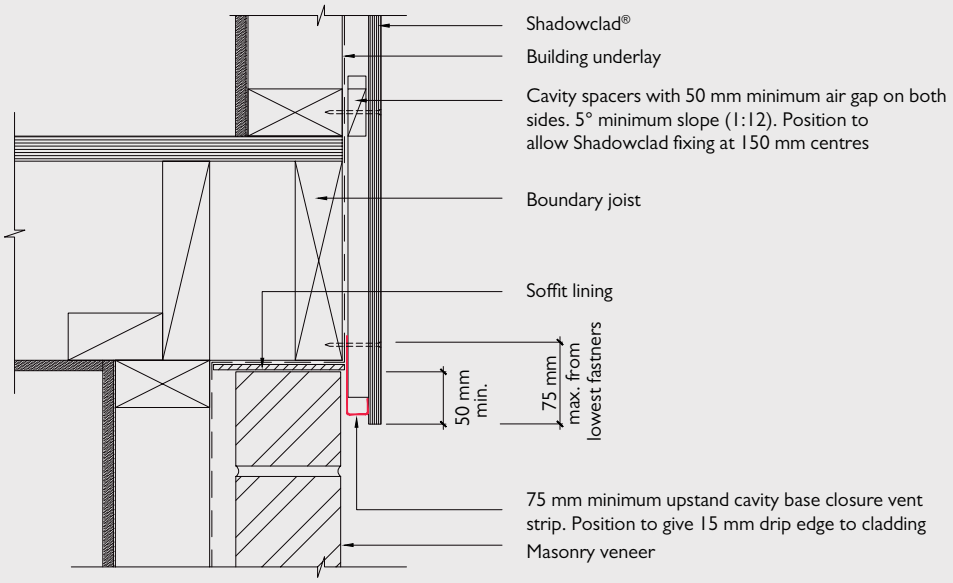
Note:
1. Cut edges should be placed at the top of the sheet to avoid rain drips soaking into cut end grains
2. Treat all cut edges with Soudal® Metalex® Clear
3. Priming the bottom edge and back (rear) of the sheets to a height 150 mm is required

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)

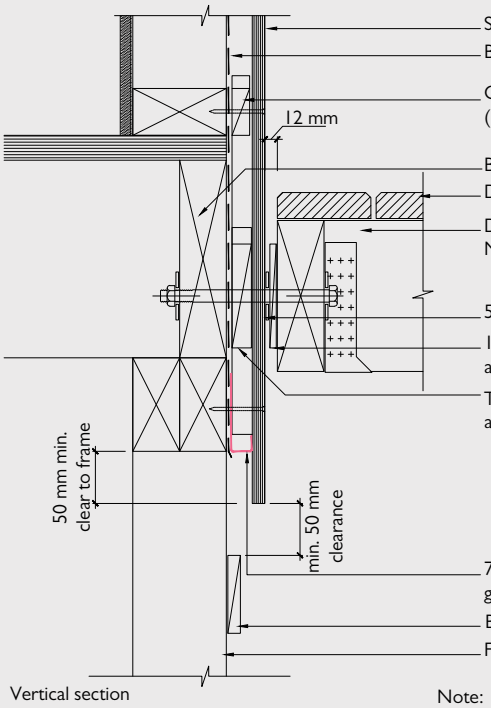


Vertical section

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

4.18 OTHER DETAILS

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

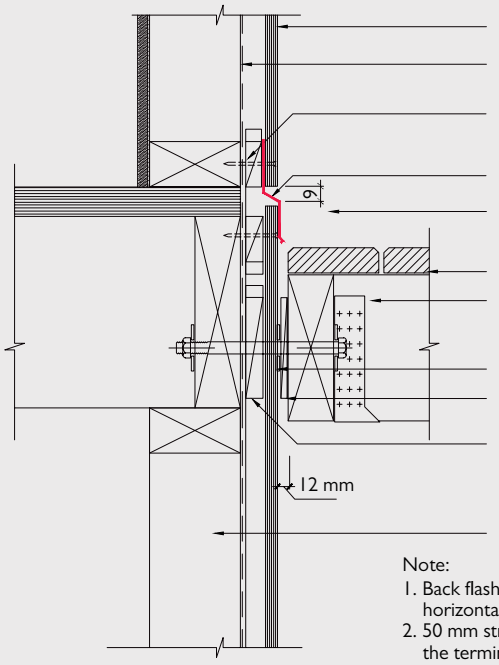


Vertical section

Shadowclad®
Building underlay
Cavity spacers with 50 mm minimum air gap on both sides. 5° minimum slope (1:12). Position to allow Shadowclad fixing at 150 mm centres
Boundary joist
Decking
Deck joists attached to stringer with joist hangers Refer NZS3604 for fixing details Shadowclad sealed prior to fixing packer
50 x 3 mm thick EPDM washer
12 mm thick by 150 mm long H3.2 CCA treated solid timber packer at fixings
Timber packer behind Shaowclad with 5° slope to top of packer as per cavity battens
75 mm minimum upstand cavity base closure vent strip. Position to give 15 mm drip edge to cladding
Baseboard
Foundation post/bearer

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)

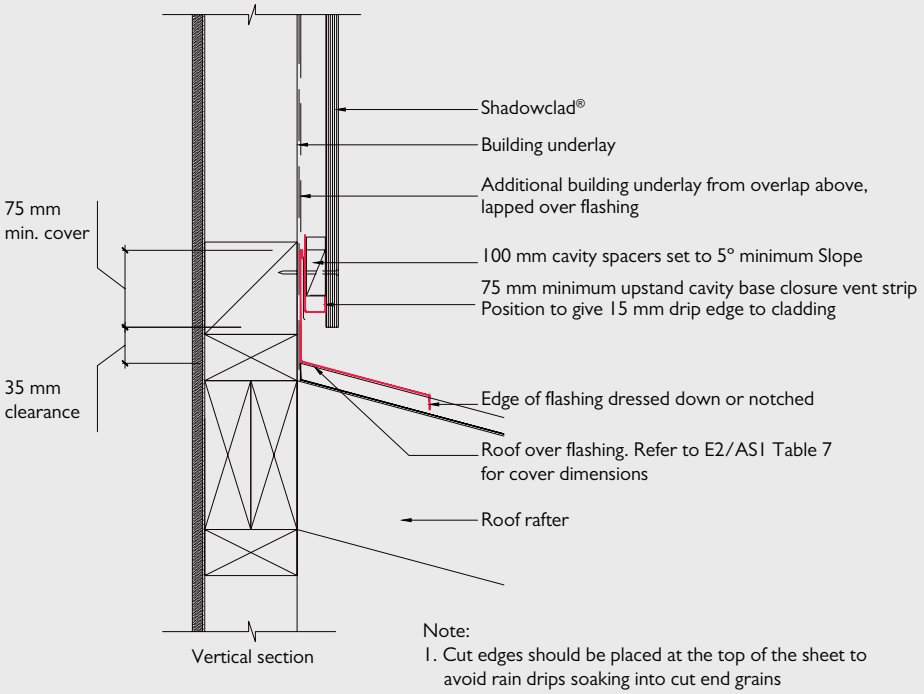


Vertical section

Shadowclad
Building underlay
Cavity spacers with 50 mm minimum air gap on both sides. 5° minimum slope (1:12). Position to allow Shadowclad fixing at 150 mm centres
15° cross slope of flashing
Shadowclad Horizontal 'Z' head flashing
Decking
Deck joists attached to stringer with joist hangers. Refer NZS3604 for fixing details Shadowclad sealed prior to fixing packer
50 x 3 mm thick EPDM washer
12 mm thick by 150 mm long H3.2 CCA treated solid timber packer at fixings
Timber packer behind Shaowclad with 5° slope to top of packer as per cavity battens
Foundation / wall detail

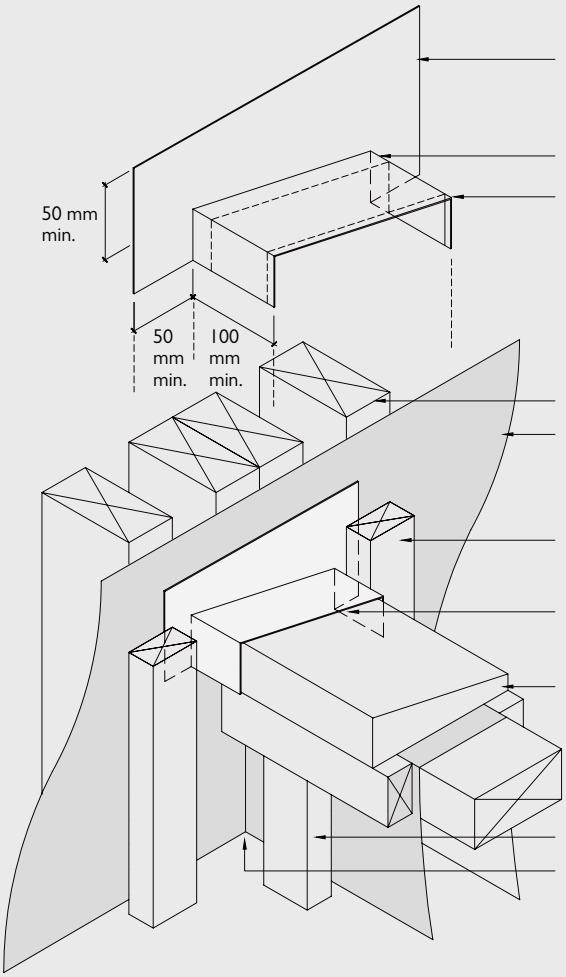
Note:
1. Back flashing or 150 mm overlap required at all horizontal flashing butt joints
2. 50 mm strip of neutral cure silicon sealantmust be provided at the termination point of all 'Z' flashings at windows, corner boxes, etc
3. Treat all cut edges with Soudal® Metalex® Clear

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)



Metal saddle flashing installed behind the cladding line

Continuous lines of sealant

Continuous lines of sealant

Wall framing

Building underlay

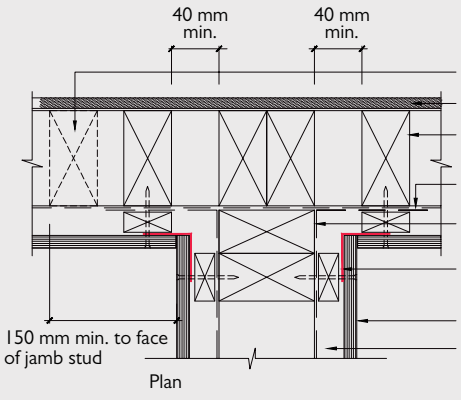
Position cavity batten to form clear channel between sloped timber capping and batten

Flexible flashing tape dressed up and securely adhered to wall underlay at rear of cavity
Dress 50 mm minimum down vertical face of battens

Sloping packer to extend across cavity with 5° minimum fall to interior side

Cavity batten

Drain channel formed in corner



Plan

Window trimming stud

Wall lining

Wall framing

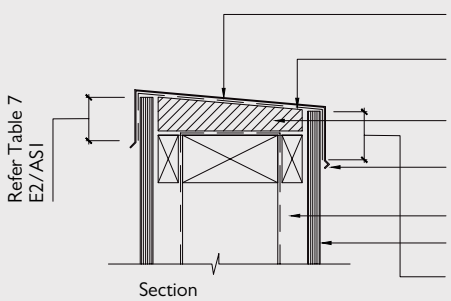
Building underlay

Parapet underlay continuous around corner

Shadowclad 90° internal corner flashing

Shadowclad®

Cavity batten



Section

Metal saddle capping flashing.
5° minimum slope (1:12) to interior line

Building underlay to provide separationpan between capping and timber

Sloping timber packer extends across cavity both sides

Bird's beak edge where used as ballustrade capping

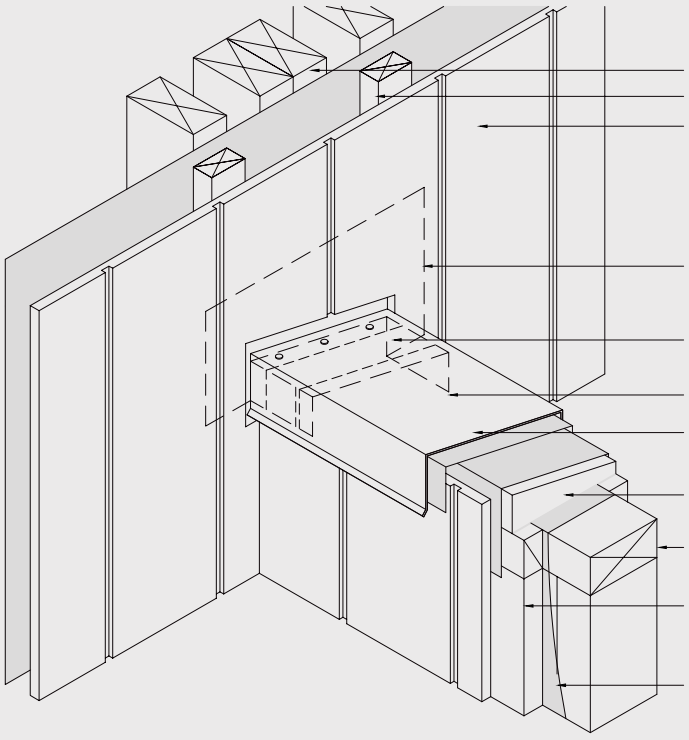
Cavity batten

Shadowclad

Refer Table 7 E2/AS1

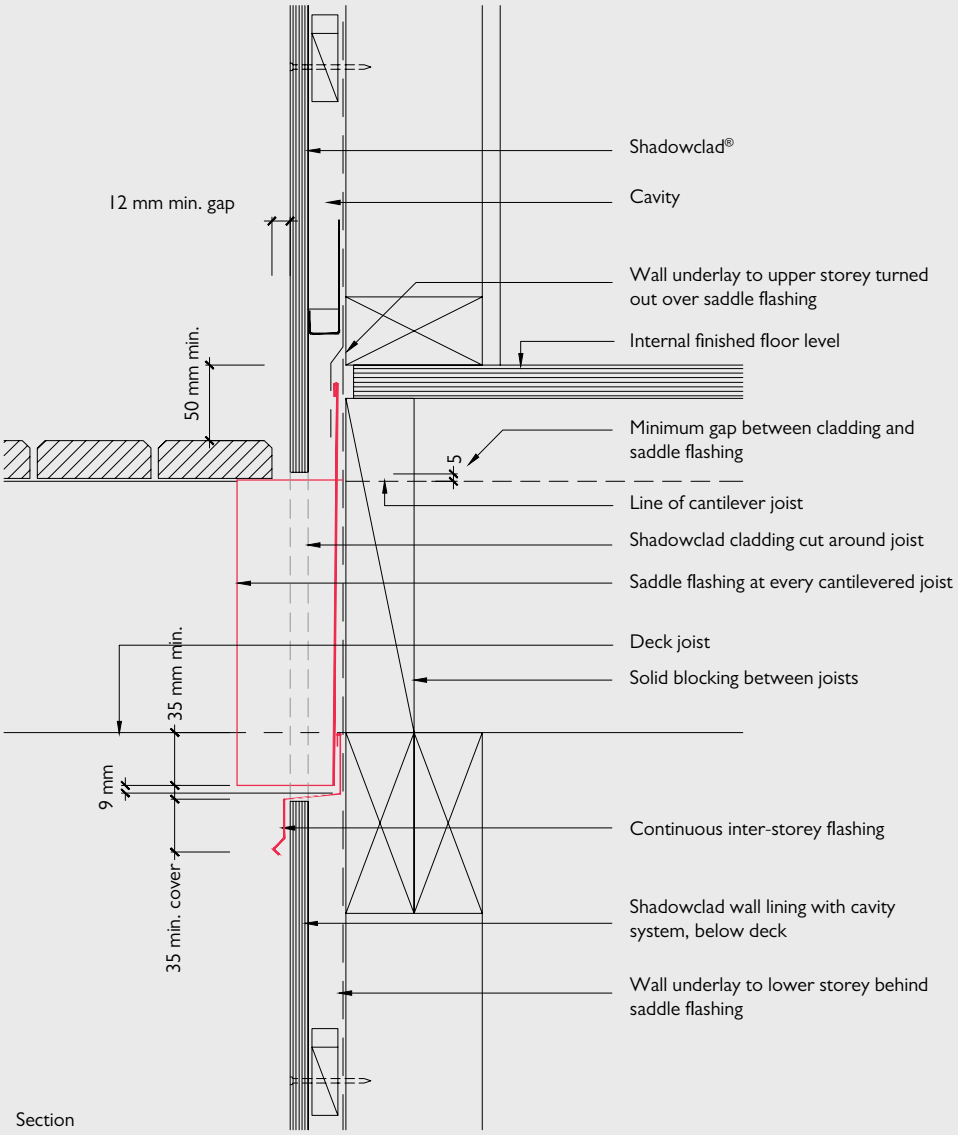
Note:
1. Treat all cut edges with Soudal® Metalex® Clear

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)



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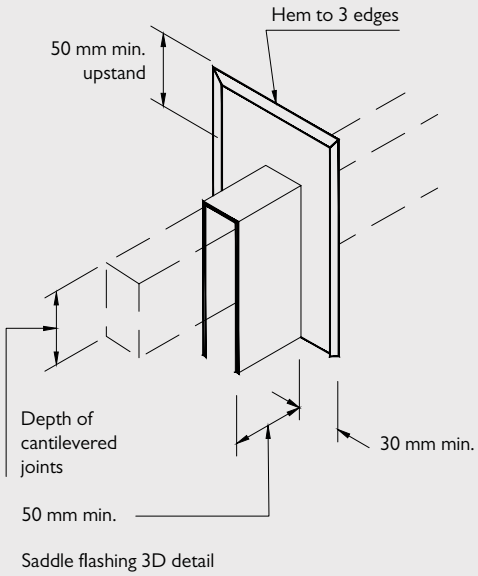
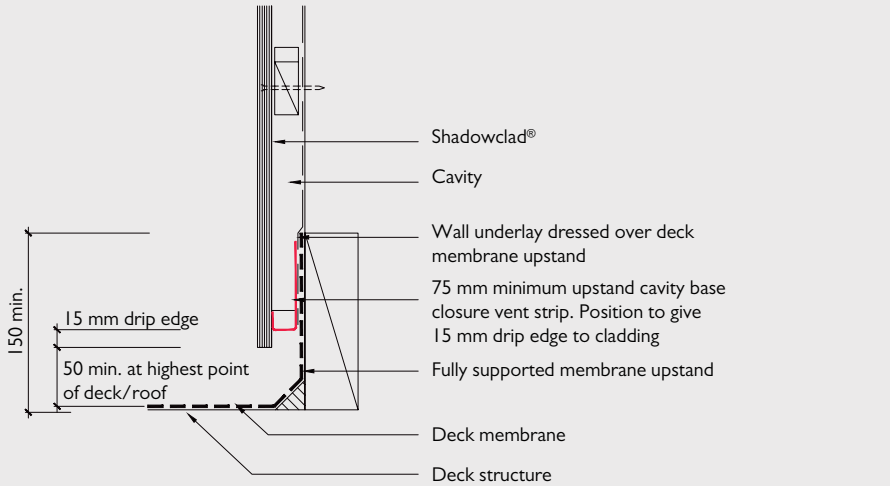


Saddle flashing 3D detail

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

Within 3 Months of Erection	**Ensure the panel is clean and dry prior to top coating. Top coat with two coats of premium 100% acrylic exterior house paint.**
OR	
Within 3 to 6 Months of Erection	**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.**

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 sITe App?

A: The Shadowclad sITe App can be downloaded from 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 sITe 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/.
- 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).
- APA (www.buildabetterhome.org).
- EWPAA (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.

Building Code Compliance Documents can be downloaded free of charge at www.building.govt.nz/building-code-compliance/.

Line drawings within this literature can be downloaded from 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 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.

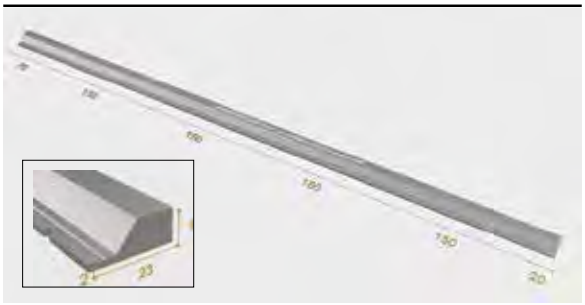
The Shadowclad Stick does not replace the need to follow good building practice and the requirement to read and understand the Shadowclad Specification & Installation Guides and the NZBC.

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.

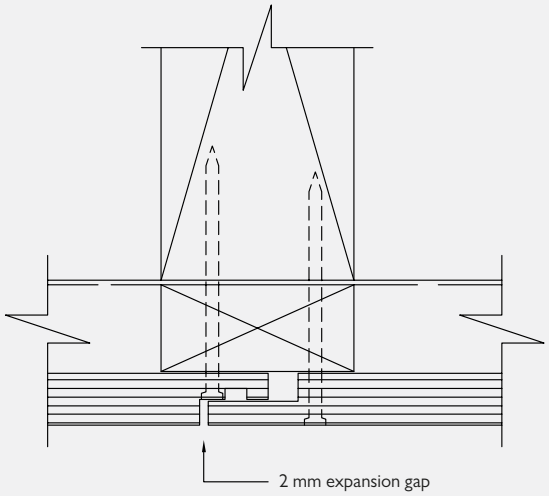
Figure 1: The Shadowclad Stick



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

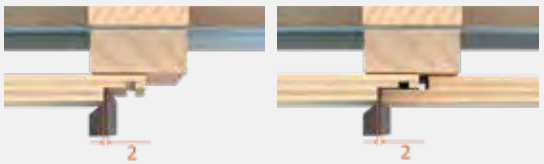
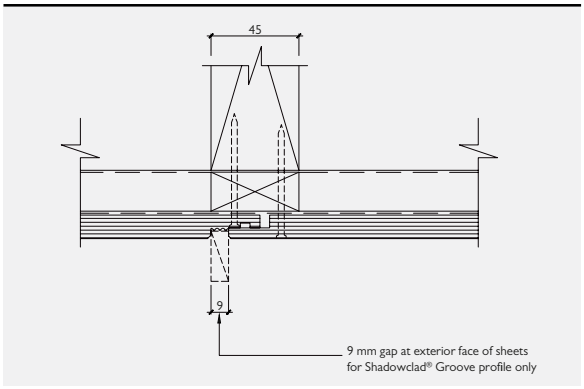
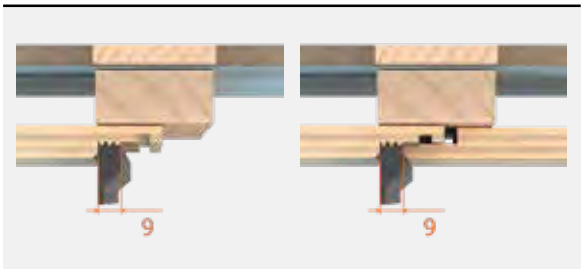


Figure 3: Shadowclad Groove - 9 mm Vertical Expansion Gap

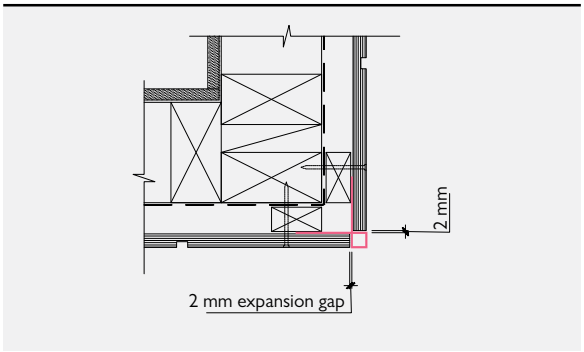


Refer to SC008 for the installation detail

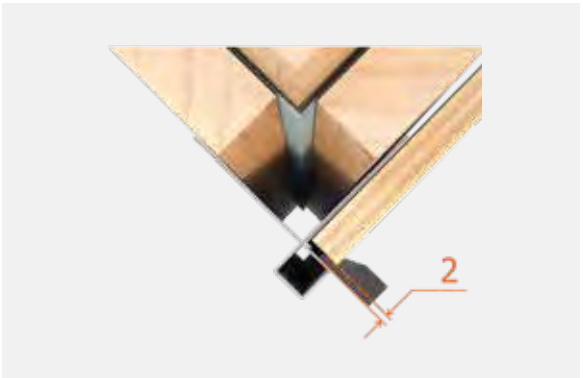


The 2 mm thick edge of the Shadowclad Stick can also be used to measure the 2 mm expansion gap required between vertical flashings and Shadowclad as detailed in Figure 4 (Vertical Top Hat Flashing and 'W' Flashing similar).

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



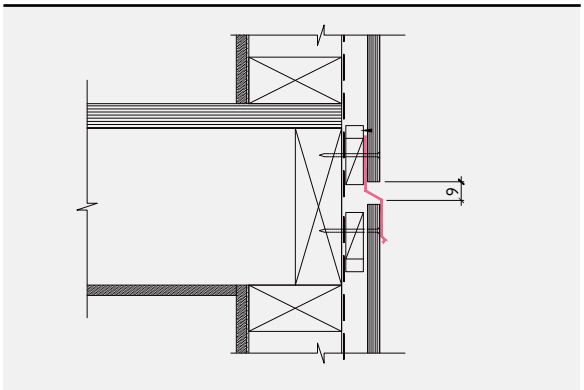
Refer to SC020 for the installation detail



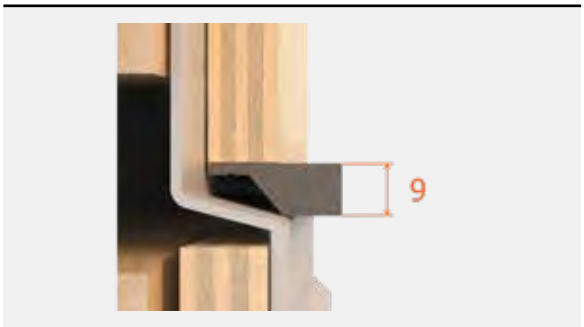
11.3 HORIZONTAL JOINTS

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

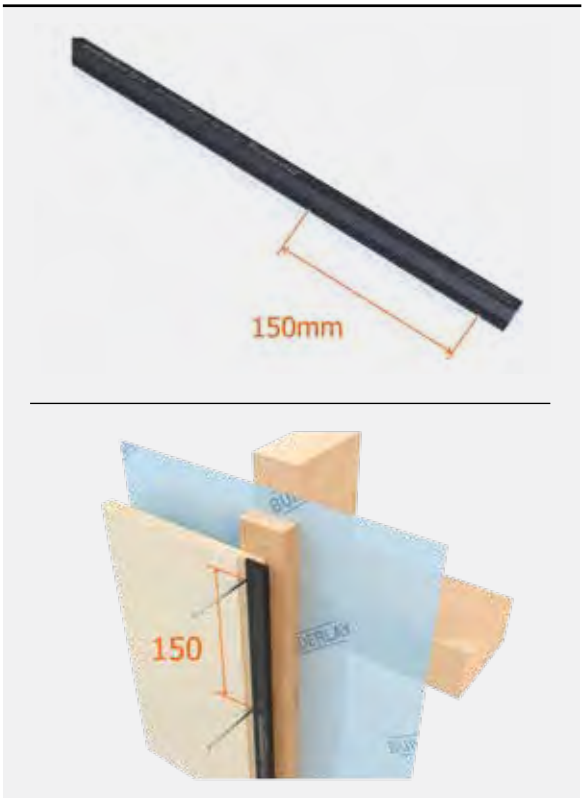


Figure 7: Sheet fastening within the panel at 300 mm

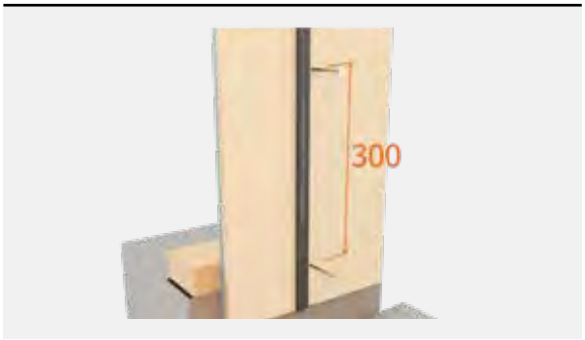
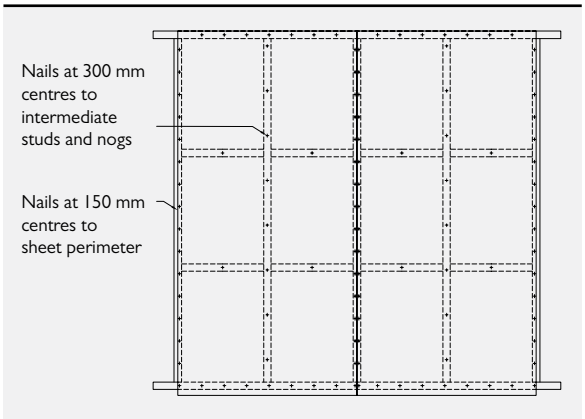


Figure 8: Pictorial representation of nail spacings for sheet edges and intermediate supports



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

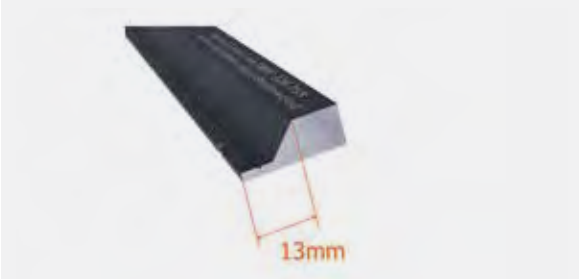
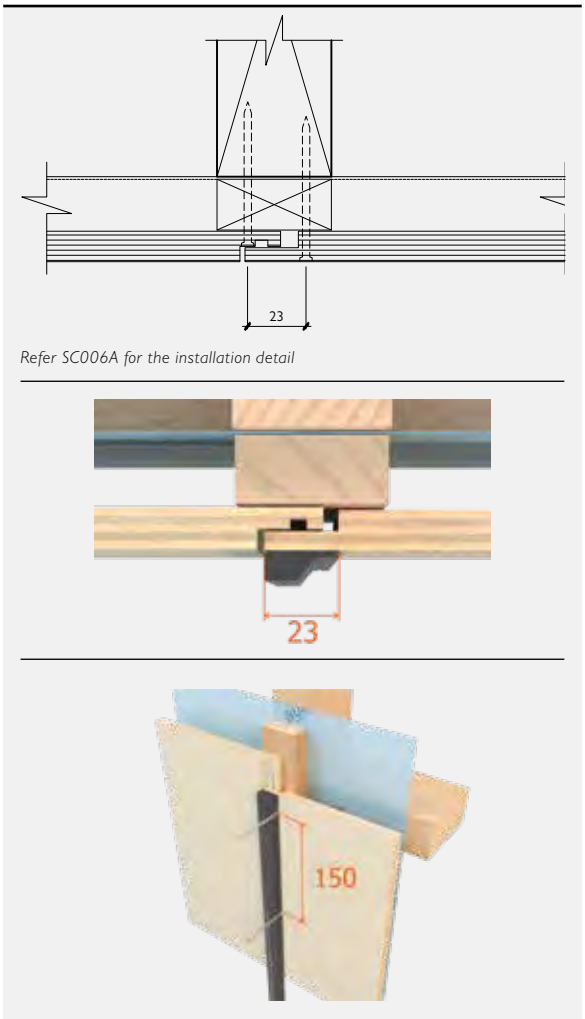


Figure 11: Shadowclad Stick 23 mm dimension

Figure 12: Shadowclad Stick and ship lap nailing



Refer SC006A for the installation detail

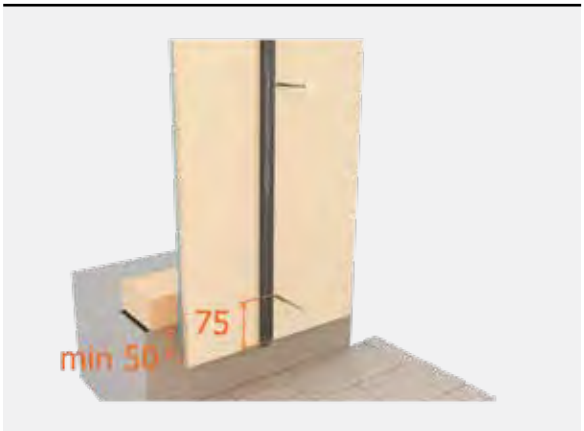
11.7 END DISTANCE FASTENER LOCATIONS

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.

SHADOWCLAD KEY INSTALLATION & DESIGN POINTS

EXTERIOR CLADDING APPLICATIONS

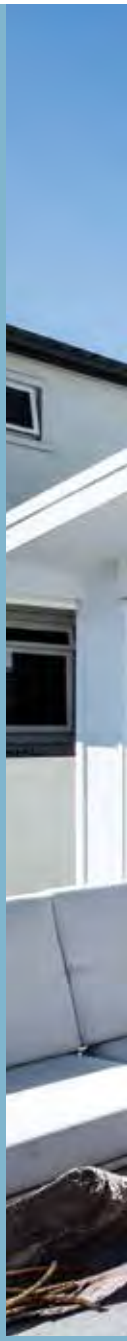
The following tasks are provided to installers to point out key installation and design factors when used as an exterior cladding. These do no detract from the requirements to read and understand this literature as a whole.

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

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

shadowclad®

BRANZ Appraised
Appraisal No.784 [2017]



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February 2024
SHADOWCLAD_V1.28.0224

JAS-ANZ

PRODUCT CERTIFIED paa ENGINEERED WOOD

ewpaa

NEW ZEALAND MANUFACTURED

Product Technical Statement
March 2021

Shadowclad® for Cavity Construction

Product Description

Shadowclad structural plywood panels are manufactured from New Zealand pine wood veneers. The Shadowclad range includes machined plywood panels, available un-treated (for internal use only) or treated to either a H3.1 or H3.2 level. It also includes a range of flashing solutions. The Shadowclad system has been tested to the requirements of E2/VM1 for use as a cladding solution installed on a cavity system complying with the New Zealand Building Code (NZBC).

Shadowclad panels are available in either grooved or textured profiles and in either Natural or Ultra (Pre-Primed) finishes

This Product Technical Statement relates specifically to Shadowclad used in cavity construction.

Scope of Use

Shadowclad panels are suitable for use as a cladding material for cavity construction when used as an external wall cladding for buildings within the following scope:

- The scope limitations of Acceptable Solution AS1 of E2, External Moisture
- With a risk score less than or equal to 20 when calculated in accordance with Table 2, E2/AS1
- Specific design for ultimate limit states (ULS) wind pressures not exceeding 2.5 kPa

The durability of Shadowclad used in residential applications is subject to the requirements of NZS 3602 Timber and Wood Based Products for use in building (NZS 3602), in accordance with NZBC Clause B2 Durability.

Limitations / Disclaimer

Shadowclad for cavity construction must not be used in:

- Direct fix applications
- With a risk score exceeding 20, when calculated in accordance with Table 2, E2/AS1
- Specific design for ultimate limit states (ULS) wind pressures exceeding 2.5 kPa

The site on which the building is situated must comply with the Acceptable Solution E1/AS1 of the Approved Document for the NZBC Clause E1 "Surface Water".

Please refer to the current Shadowclad literature for information, limitations, and cautions regarding the storage, handling, installation, usage, and maintenance of Shadowclad.

Compliance with the New Zealand Building Code

Shadowclad, if employed in accordance with the Shadowclad Specification and Installation Guide for cavity construction, will assist in the building meeting the following provisions of the NZBC, provided it is correctly installed as part of an otherwise compliant exterior wall assembly.

Clause B1 Structure: Performance B1.3.1, B1.3.2, B1.3.3 (a, c, h, j, q), B1.3.4(d)

Shadowclad is Product Certified by the Engineered Wood Products Association of Australasia (EWPAA) as being manufactured in accordance with the joint New Zealand / Australian Standard AS/NZS 2269, Structural Plywood, and then bandsawn and grooved as required. The EWPAA is accredited for product

certification by the Joint Accreditation System of Australia and New Zealand (JAS -ANZ).
The Shadowclad flashing range has been tested in accordance with Verification Method E2/VM1 and Australian/ New Zealand Standard 4284 Testing of Building Facades (AS/NZS 4284) for compliance with NZBC requirements.

Clause B2 Durability: Performance B2.3.1(b), when used and treated to the requirements of NZS 3602

Shadowclad is manufactured to meet the requirements of the NZBC Clause B2 Durability. When treated to the required treatment levels prescribed in NZS 3602, it will form part of an Acceptable Solution complying with the requirements of the NZBC (Acceptable Solution B2/AS1, 3.2.1).

NZBC Clause B2 requires claddings which do not form part of bracing to achieve a minimum structural durability level of 15 years.

The Shadowclad Exterior Flashing Range is manufactured from extruded aluminium or folded from stainless steel (as applicable). The Shadowclad flashings range is purpose designed to complement Shadowclad panels used in exterior applications.
Independently tested for weather tightness and compliant with Table 20 of E2/AS1, Shadowclad flashings achieve a minimum of 15 years durability in all NZS 3604 exposure zones including Zone D.

Clause E2 External Moisture: E2.3.2, E2.3.3, E2.3.5

Shadowclad, together with the Shadowclad Flashing range, have been tested in accordance with Verification Method E2/VM1 and AS/NZS 4284 "Testing of Building Facades" for compliance with NZBC requirements.

Clause F2 Hazardous Building Materials: F2.3.1

Shadowclad meets this requirement and will not present a health hazard to people.

Clause H1 Energy Efficiency H1.3.1

External walls clad with Shadowclad, which has an R-value of 0.104 m2.C/W, and together with internal linings and bulk insulation meet the requirements of Acceptable Solution H1/AS1.

Quality Assurance

Carter Holt Harvey Plywood Limited (CHH Plywood) has strict quality assurance processes in place to monitor that Shadowclad is manufactured in a manner that meets both the structural and visual requirements of the specific product.

Shadowclad is independently third party audited by the EWPAA. The EWPAA certifies Shadowclad manufactured by CHH Plywood at its Tokoroa mill.

Participation and compliance with the requirements of the EWPAA's process-based quality control scheme includes product testing and monitoring of properties. It provides the basis for the EWPAA's Product Certification of Shadowclad as conforming to the requirements of AS/NZS 2269.

The EWPAA's product certification scheme is accredited under JAS-ANZ.

Sustainability

Shadowclad is manufactured from plantation pine grown in New Zealand. It is grown on tree farms which are tended and harvested to provide wood for plywood manufacture and other applications. The crop is

managed on a sustainable basis to yield millable trees. New Zealand plantations are managed in compliance with the New Zealand Forest Accord, a voluntary agreement signed in 1991 between New Zealand forest managers and environmental non-government organisations.

Shadowclad is manufactured in New Zealand, at the CHH Plywood Tokoroa Plywood Mill. Shadowclad is available Forestry Stewardship Council (FSC) Certified on request (FSC-C012019).

Installation Requirements

Shadowclad must be installed in accordance with good building practice, sound design principles, and the requirements of the Shadowclad Specification and Installation Guide for cavity construction. The specifications and details are available at CHH Plywood web site www.shadowclad.co.nz or ask CHH Plywood by calling 0800 326 759 for information.

Service Life

Shadowclad will continue to satisfy the performance requirements of the NZBC for 15 years, provided that all of the requirements set out in this Product Technical Statement and the current Shadowclad Specification and Installation Guide for Cavity Construction are followed.

Maintenance Requirements

All cladding materials, including Shadowclad, require careful and regular product maintenance by the building owner throughout the cladding's normal service life to ensure durability and to maintain visual aesthetics. It is important that you refer to, and follow, the requirements of the Shadowclad Specification and Installation Guide for Cavity Construction.

Product Support

CHH Plywood provides extensive product support for our full range of wood-based building products. By visiting www.Shadowclad.co.nz you can access all the latest information regarding our products including Product Guides, Specification and Installation Guides, Technical Notes, Information Bulletins, CAD Drawings, Design Software and other useful information.

In addition to this CHH Plywood have a team of Technical Experts available to assist with any product enquiries. You can contact the team by calling 0800 326 759 or by emailing info@shadowclad.co.nz.