



PRODUCT &  
INSTALLATION  
GUIDE

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VERSION JULY 2021

## espan® AUTHORISED INSTALLER

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Metalcraft Roofing has appointed espan® Authorised Installers, to companies that have undertaken espan® product and installation training and have satisfied the requirements of Metalcraft Roofing to be recognised as an espan® Authorised Installer. An Authorised Installer is awarded to a roofing company and it remains the sole responsibility of the roofing company to ensure espan® installation is done under the supervision of an espan® Authorised Installer. All espan projects must be installed by a company recognised as an espan® Authorised Installers and a directory of those companies can be found on:

[metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)



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# CHECK LIST

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All steps should be discussed and checked off with the builder before installation.

Please ensure all steps are checked off the below check list:

- Check genuine espan® product in COLORSTEEL®
- Check espan 470® suitability and swage requirements with espan product selector.
- Check moisture content 18% maximum
- String line
- Substrate - clean plane from apex to gutter line, substrate must be straight and square.
- Roof design - check set out and how to lay
- Set out grab flashings to ridge line (needs to have tolerance)
- Check correct sheet overhang into gutter, refer installation details.
- Laying of clips
- Paper is tight (check chalk line / make sure its square)
- Square off the gable
- Clipping ( Caution: timber cavity batten is preferred)
- Turn the sheets/ Stop ends to the pitch of the roof ( does not have to be 90 degrees)
- Laying of sheets
- Flashings
- Check purlin centres ( roofing: spacing for end spans less than intermediate spans.)
- Check clip centres with maximum span requirements, guidance notes and design load parameters.
- Castellated timber battens preferred. Plastic battens require extra care to avoid crushing. For some buildings depending on design requirements, steel structural battens might be a requirement of building design.
- Noggings to all cavity lines
- Windows final fitting (tacked only)
- Synthetic paper is recommended.
- DPC to exposed timber ( where metal touches timber)
- Check all sheets are hemmed, gutter eaves grab flashings always required.
- espan® 470 is available in aluminium.
- espan® prickles recommended from: All Steel fabrication - Christchurch 0800 255 78335.



## espan® PRODUCT SELECTOR GUIDE

WIND ZONE  NZS 3604 (ULS) Design Load	espan® 340				espan® 470				
	SWAGES IN PAN		FLAT PAN		SWAGES IN PAN		FLAT PAN		
	VERTICAL CLADDING	ROOFING	VERTICAL CLADDING	ROOFING	VERTICAL CLADDING	ROOFING	VERTICAL CLADDING	*SOLAR LAMINATE ROOFING ONLY	ROOFING
LOW 0.98kPa	YES	YES	YES	YES	YES	YES	YES	YES	APPROVAL REQUIRED
Maximum span (mm)	VERTICAL CLADDING - 1200mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.								
MEDIUM 1.32kPa	YES	YES	YES	YES	YES	YES	YES	YES	APPROVAL REQUIRED
Maximum span (mm)	VERTICAL CLADDING - 1200mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				VERTICAL CLADDING - 1000mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				
HIGH 1.88kPa	YES	YES	YES	YES	YES	YES	YES	YES	NOT SUITABLE
Maximum span (mm)	VERTICAL CLADDING - 900mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				VERTICAL CLADDING - 800mm centres. ROOFING - 800mm intermediate spans & 520mm end spans.				
VERY HIGH 2.44kPa	YES	YES	YES	YES	YES	YES	YES	YES	NOT SUITABLE
Maximum span (mm)	VERTICAL CLADDING - 800mm centres. ROOFING - 800mm intermediate spans & 550mm end spans.				VERTICAL CLADDING - 700mm centres. ROOFING - 700mm intermediate spans & 450mm end spans.				
EXTRA HIGH 2.96kPa	YES	YES	YES	YES	YES	YES	YES	YES	NOT SUITABLE
Maximum span (mm)	VERTICAL CLADDING - 700mm centres. ROOFING - 700mm intermediate spans & 450mm end spans.				VERTICAL CLADDING - 600mm centres. ROOFING - 600mm intermediate spans & 390mm end spans.				
** (SED)	APPROVAL REQUIRED				APPROVAL REQUIRED				NOT SUITABLE

\* espan® 470 FLAT PAN IS ONLY ALLOWED FOR ROOFING IF SOLAR LAMINATES ARE INSTALLED AT SAME TIME WITH THE ROOFING INSTALL.

\*\* (SED) FOR SPECIFIC ENGINEERING DESIGN PROJECTS, THE ENGINEER MUST PREPARE A ROOF MAP SHOWING PURLIN SPANS AND LOCAL PRESSURE FACTORS FOR EACH SECTION OF THE ROOFING AND CLADDING. DESIGN LOADS NEED TO BE FULLY FACTORISED AND INCLUDE LOCAL PRESSURE FACTOR + INTERNAL AND EXTERNAL PRESSURE CO-EFFICIENTS.

## GUIDANCE NOTES

If an architect or engineer is designing a building in full accordance with E2/AS1 then it is necessary for the design spans and fixings to comply with those of E2/AS1.

If the architect or designer wishes to use the spans and Fastener patterns as provided by Metalcraft Roofing then they must consider the load on a purlin and a purlin/rafter connection is determined by the wind load and the area of roof the load is acting upon. Roof fasteners transfer wind uplift-loads to the purlins, which in turn transfer them to the primary structure.

Fastening to every second purlin may be within the roof's load/ span range, but will double the load acting on the fastened purlins.

All purlins must be fastened to unless alternate purlins are specifically designed to take the additional loads.

For espan® cladding the nogs and cavity battens are laid horizontally.

## DESIGN LOAD PARAMETERS:

espan® must resist a Uniformly Distributed Load (UDL) strength load. For roofing end spans have been calculated by multiplying the Intermediate span by 0.66. Spans are based on unrestricted access and allow for a concentrated load of 1.32kN.

In all wind zones, up to Extra High as defined in Table 5.4 NZS3604:2011, the Ultimate kPa loads for Low, Medium, High, Very High, Extra High have been derived from:

Pressure coefficients  $C_{pe} + C_{pi} = 1.1$   
Local pressure factor  $kl = 1.5$   
Ultimate load factor = 1.0

Projects that are specific engineered design (SED) will use different factors than above and these should be calculated by the project engineer. For SED projects use the graph to AS/NZS 1170 to determine maximum spans and fastener requirements.

Classification of Wind Zones in NZS 3604 are specific to the site. Because the buildings covered by this standard are limited in size, design tables (but not design wind speed) include a local pressure factor of 1.5 kPa over the entire structure, rather than varying factors according to the position on the roof as required by AS/NZS 1170.



# ABOUT US

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# WHO WE ARE

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## METALCRAFT ROOFING

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We have been operating since the 1950's and originated in the lovely town of Palmerston North. With more than 60 years experience in the industry, we have established a reputation for both manufacturing high quality roll formed products and for providing an unrivalled level of service.

We consider ourselves to be New Zealand's largest privately owned roofing company and experts at manufacturing. We manufacture a wide range of products using locally sourced steel from New Zealand Steel. Solid material warranties backed by New Zealand Steel will give you an assurance of quality and peace of mind.

We also operate two structural manufacturing plants which share production sites with the Metalcraft Roofing branches at Auckland and Christchurch. These branches manufacture and supply a wide selection of purlins, girts and tophats to the construction markets throughout New Zealand.

We are members of:  
The Roofing Association, New Zealand.  
New Zealand Metal Roofing Manufacturers Incorporated.



### BRANCHES

We have 12 branches servicing New Zealand wide. They are geographically positioned from Cromwell to Whangarei allowing us to service local regions from Cape Reinga to Bluff.

### BRANCH LOCATIONS

Whangarei  
Auckland, Hobsonville  
Auckland, East Tamaki  
Hamilton  
Tauranga  
Rotorua  
Hastings  
New Plymouth  
Palmerston North  
Wellington  
Christchurch  
Cromwell

## METALCRAFT INSULATED PANELS

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Metalcraft Insulated Panels, our sister company specialises in the manufacture and supply of insulated panels.

All products are backed by solid warranties and the range of insulated panels, supplied by Metalcraft Insulated Panels is used in a variety of applications from Industrial and commercial coolstore to agricultural and architectural buildings. Some interest has developed within the residential sector for clients wishing for a warm roof solution.

### BRANCH LOCATIONS

Auckland  
Hamilton

## UNITED INDUSTRIES LIMITED

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Both ourselves and Metalcraft Insulated Panels are part of United Industries Limited. United Industries is heavily involved in providing materials and services to the New Zealand construction market through its group companies.

For more information visit: [unitedindustries.co.nz](http://unitedindustries.co.nz)





espan® 470 in COLORSTEEL®Thunder Grey



# WARRANTY AND MAINTENANCE

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## COLORSTEEL® MATERIAL WARRANTY GUIDELINES

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The COLORSTEEL® Environmental Guide gives a guide to the classification of the environmental categories and the associated warranties that the various material finishes are given. Download the COLORSTEEL® Environmental Guide from:

[colorsteel.co.nz](http://colorsteel.co.nz)  
[metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)

## MAINTENANCE RECOMMENDATIONS

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All roofing and cladding products are subject to the cumulative effects of weather, dust and other deposits. Normal rain washing will remove most accumulated atmospheric contaminants from roofs.

For wall cladding, manual washing every 3 to 12 months, depending on the paint system, is recommended in moderate to very severe environments to prevent accumulation of dirt, debris or other material not removed by rain washing.

For areas that do not receive adequate rain washing (i.e. unwashed areas) such as soffits, wall cladding under eaves, underside of gutters, fascias, sheltered areas of garage doors and unwashed roof areas, more extensive manual washing is required.

Similarly, other high risk areas, around flues, under television aerials or overhanging trees and sites prone to mould, lichen, bird droppings or debris, need to have regular manual washing.

For specific maintenance recommendations download the COLORSTEEL® Environmental Guide from:

[colorsteel.co.nz](http://colorsteel.co.nz)  
[metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)





espan® 340 in COLRSTEEL® TuiTuft™.

# ENVIRONMENTAL

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## ENVIRONMENTAL POLICY

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We look to advance waste minimisation in our manufacturing processes wherever possible, and promote recycling of ancillary non-steel waste by sorting to maximise our ability to recycle it. Transportation efficiency is another critical area for evaluation and improvement in order to minimise the adverse environmental effects from inefficient logistical movements, and to simultaneously generate cost efficiencies for the Group and its customers.

As an established provider of Solar Photovoltaic services, we appreciate the value of investment in renewable energy generation, from both a sustainability and a cost saving point of view and we seek to standardise renewable energy generation across our locations nation-wide. The current sites with PV generate around 25% of our energy requirements, but it is our long-term intention to scale this up to generate 100% of our energy requirements from on-site PV Solar generation.

To complement this initiative, the auditing and optimising energy consumption in our manufacturing operations is a key point of focus. Energy efficiency measures are already being implemented in our older locations, and remains front of mind when designing new facilities and procuring new equipment. Furthermore, on-site water harvesting is another sustainability feature of note that is being integrated into our new facilities as they are constructed.

## ENVIRONMENTAL CHOICE

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New Zealand Steel pre-painted and resin coated products are third party certified to the Environmental Choice ECNZ -57-16 standard.

ECNZ licence No: 5717145 is New Zealand Steel's licence number and Metalcraft Roofing is an extension of New Zealand Steel's licence.

The products covered by this licence are those formed with feed from COLORSTEEL®, ZINCALUME® and GALVSTEEL® as made by New Zealand Steel Ltd.

Metalcraft Roofing has products that have been assessed by The New Zealand Eco Labelling Trust which have been found to comply with the requirements of the Environmental Choice Specification.

All Metalcraft Roofing branches have completed the ECNZ licence No: 5717145 audit and have been all awarded Environmental Choice certificates.



*Pre-painted and Resin  
Coated Steel Products*  
Licence No. 5717145





PV Solar Modules.

# SOLAR PV MODULES

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## INSTALLATION

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We are pleased to be offering a supply and installation service for our broad range of solar power solutions.

This is a natural addition to our comprehensive range of roofing products and related services, enabling us to offer you the unique service of installing a roof, and a solar power package at the same time.

We are also able to advise and quote on commercial scale projects or 'off-grid' systems to suit your specific requirements and install the solar panels on insulated panel roofing systems as well.

## BEST PRACTICE

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We are Corporate members of the Sustainable Electricity Association of NZ (SEANZ) and adhere to their strict quality assurance principles. SEANZ is an independent organisation representing organisations who research, manufacture, distribute, design, sell, finance and build Renewable Technologies and Projects in New Zealand and the Pacific.

### THEIR MISSION:

Drive the growth of on-site renewable electricity generation in New Zealand by developing capacity and capability of the industry.

### SEANZ MEMBERS MUST:

Meet the SEANZ entry criteria whereby company principals and directors past history is identified and taken into consideration.

Continue business operations with honesty and integrity.

Ensure only appropriately validated and verified, certified technology. That their skills and knowledge are applied ethically in the interest of their clients.



**Sustainable Energy**  
Association New Zealand

## SOLAR PV MODULES

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### OUR PREFERRED SUPPLIER - TRINA SOLAR

Trina Solar which is Tier 1, and among the largest Solar manufacturers in the industry with a proven track record and a culture of continual technological improvement.

330W modules are the current panel size available and are what we specify in most cases, but in a commercial setting the larger 440W modules may also be more appropriate. However, the technology and efficiency of the modules is ever increasing so the panel kWp rating increases frequently, so the module sizes may increase depending on latest release technology available.

## FINISH OPTIONS

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As well as improving performance efficiency, manufacturers have recognised that consumers want a panel that not only performs well, but also looks good on the roof. Initially most panels had bare aluminium frames and white backing sheets, and were quite a stark feature on a roof space.

However, most manufacturers are now producing completely black panels, with black aluminium frames, and black backing sheets that blend in with the dark solar cells themselves – these are now our standard panel type.

To complement this, we also use black clamps and mounting rails to present a more visually integrated solar array overall that will blend into the roof aspect – particularly on a dark coloured roof.

For more information on PV Solar Modules refer to: [metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)





Solaflex Laminates installed on espan® 470.



# SOLAFLEX LAMINATES

## SOLAFLEX LAMINATES

This is an alternative form of energy generation technology to Photovoltaic (PV) which is most common among conventional Solar modules.

Instead Solaflex Laminates use CIGS (Copper indium gallium selenide). Solar cells made of this material are deposited as a very thin layer on the flexible backing strip which then has a coating of adhesive applied. Because the material has a high absorption coefficient and strongly absorbs sunlight, a much thinner film is required than of other semiconductor materials.

The efficiency of Solaflex Laminates is between 16-17% (depending on the product), whereas conventional panels are around 18-20%. However, CIGS technology is known to be more effective in flat pitch conditions, and in vertical application such as wall cladding.

For more information on Solaflex Laminates refer to [metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)

## COMPATIBILITY

Of the range of Metalcraft Roofing roof profiles, these strips are compatible with espan® 470. However, they can also be fitted to alternative roof profiles of similar dimensions. For best adhesion, we highly recommend a flat surface, rather than one with swages. There is some variability in the dimensions of similar profiles from other manufacturers, so bearing in mind the strip width is 348mm, the wider the sheet width, the better to minimise the impact of shading in morning and afternoons.

As well as metal roofing substrates, it is also possible to apply these strips to a membrane roof surface. They are commonly applied to smooth surfaced roofs overseas, and we have worked with our partners in this roofing segment to develop solutions for compatibility with textured finish membrane roofing also.

For more information on different types of mounting brackets, batteries and inverter options. Please visit: [metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)

## PRODUCT OPTIONS

We carry the recently released Third Generation of this product range, which includes a 290Watt module, and a 125Watt module. Both options are 348mm in width, however there is variation in the length.

### LENGTHS:

The 290Watt option is 5910mm in length, but requires 100mm clearance from eave line, so 6000mm roof sheet length is the minimum required to be suitable for this product.

The alternative option is 2,585mm in length, and 125Watts per strip. Although it is a lesser wattage, homes with shorter roof sheet lengths that are becoming increasingly more common are now also suitable for this Solar solution.

We can also offer a larger product best suited for commercial scale application. These are 500Watts each and are physically larger than our standard range, being 2583 x 1292mm (L x W). This product is typically used on a flat smooth membrane surface, however this does not suit every situation, so they can alternatively be adhered to a customised aluminium plate mounted to the roof.





espan® 340 in COLRSTEEL® Ironsand.

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# PRODUCT INFORMATION

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## DEFINITION

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espan® is a premium roll-formed tray profile, manufactured in New Zealand using 0.55BMT G300 steel from New Zealand Steel and is available in COLORSTEEL® ENDURA® and COLORSTEEL® MAXX®.

MANUFACTURER OF COLORSTEEL®:

New Zealand Steel Ltd, 131 Mission Bush Rd, Glenbrook 2681, [www.nzsteel.co.nz](http://www.nzsteel.co.nz)



## PURPOSE

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espan® is available nationwide from all 12 Metalcraft Roofing branches and has been designed specifically for use as a roofing profile and as a vertically laid wall cladding profile.

## APPLICATION

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espan® is suitable for residential and commercial buildings within the scope of NZS 3604:2011 and is suitable to withstand design loads up to and including Extra High as specified in NZS 3604:2011.

For Specific Engineered Designed projects outside the scope of NZS 3604: 2011, the architect, designer and engineer will need to evaluate the suitability of espan® on a project specific basis.

Scope and limitations of the suitability of espan® can be found in the published Product Technical Statement available online: [metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)

espan® in COLORSTEEL® ENDURA® and COLORSTEEL® MAXX®. complies with the requirements of Table 20 of E2/AS1 for Zinc/Aluminium coated steel.

Depending on the geographical locations and exposure zone requirements outside the exposure zone limitations of COLORSTEEL® ENDURA® and COLORSTEEL® MAXX®, the designer may consider espan® 470 in Aluminium.

## FEATURES & BENEFITS

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espan® has been designed for style and performance in mind.

Feature and Benefits of espan® include:

- Secret fixed for superior weather performance
- Innovative clip allows espan® to be installed without a supportive substrate. The clip requires fixing into structure.
- High ribs provide strength and rigidity and allow for bold strong shadow lines.

## AVAILABILITY

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espan® is available for purchase from all Metalcraft Roofing branch locations and all espan® Authorised Installers as published on: [metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)

## STAY UPDATED

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When specifying and installing espan® please ensure you have all the current documentation, available to download from: [metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)

## MINIMUM PITCHES

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The minimum pitch is determined by the ability of the roof cladding to discharge maximum rainfall without water penetration through the side laps, end laps or flashings. The minimum pitch is 3° for sheet lengths of up to 40m. For sheet lengths exceeding 40m but less than 60m then the minimum pitch is 4°

The above minimum requirement has been calculated assuming peak rainfall to be less or equal to 100mm/hr.

Please note the minimum pitch relates to the pitch of the laid espan®.

## MINIMUM SHEET LENGTHS

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The minimum manufactured sheet length is 1m. For projects where smaller sheet lengths are required, please check with your local Metalcraft Roofing branch.

## OIL CANNING

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Oil canning is an inherent characteristic of cold formed metal products, particularly products with broad flat areas like espan®. It is seen as waviness or distortion in the flat surfaces. Oil canning does not affect the products strength or performance.

The architect, builder and homeowner needs to be aware that oil canning may affect the overall aesthetic outcome. Oil canning may occur during the roll-forming process and or during installation and where thermal expansion occurs.

A degree of oil canning is unavoidable. Please refer to NZMRM Metal Roof and Wall Cladding Code Of Practice: [metalroofing.org.nz](http://metalroofing.org.nz)

The end result of the profile is dependent upon the quality of the timber sub-structure that supports it, so it is critical that the roof purlins be square and flush for optimum results.

## THERMAL EXPANSION

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All metal cladding and flashings are subject to expansion and contraction caused by changes in temperature and the amount of expansion depends on colour and the material. espan® is a secret fixed profile and when installed as per Metalcraft Roofing's Installation Guidelines the espan® profile® can freely expand and contract.

Darker colours will thermally expand more than lighter colours and may result in more roof noise.

## ROOF NOISE

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The homeowner should be aware that temperatures of dark colours are higher than those of lighter colours. Darker colours will thermally expand more. Thermal expansion of metal roofs is covered in the NZMRM Code of Practice.

The MBIE document on roof cladding advises that noise from thermal expansion is normal and should be expected. Refer to MBIE -Guide to tolerances, materials and workmanship in new residential construction 2015.

The risk of wind driven roof noise associated with wider pan profiles like espan® can be reduced by incorporating swages into the pan, these swages are discreet and also assist with reducing oil canning.

## VENTILATION

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Depending on the design and ventilation requirements of the building, roof ventilation may be required within the roof space. Please refer to the NZMRM Metal Roof and Wall Cladding Code Of Practice: [metalroofing.org.nz](http://metalroofing.org.nz)

## GLARE

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Glare off light coloured roofs can sometimes be an annoyance to neighbours and if this is to be considered, refer to the COLORSTEEL® Glare Bulletin.



# COMPLIANCE

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## COMPLIANCE WITH NZBC

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If designed, installed and maintained in accordance with all Metalcraft Roofing requirements, the espan® 340 and espan® 470 Roofing and External Cladding system will comply with or contribute to compliance with the following provisions of the New Zealand Building Code.

### B1-STRUCTURE

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When installed according to the purlin and fastener spacings stipulated in espan® loadspan tables this product will resist the design loads calculated from AS 1170:2002 and NZS 3604 2011.

### B2-DURABILITY

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espan® will comply with the NZBC - Clause B2 when used in accordance with E2/AS1 table 20: and COLORSTEEL® Environmental Categories, Warranty & Product Maintenance Recommendations.

For special environments outside the scope of these documents please refer to Metalcraft Roofing. These include fertiliser stores, galvanising plants, areas of intense animal husbandry, swimming pools, cement works or any other areas creating a highly acidic or alkaline environment.

Contact or run off with other materials need to be in accordance with the NZMRM Code of Practice: [metalroofing.org.nz](http://metalroofing.org.nz)

## ALUMINIUM

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Product Technical Statements are available online for espan® in COLORSTEEL® and for espan® 470 in Aluminium. espan® 340 is not available in aluminium. [metalcraftgroup.co.nz](http://metalcraftgroup.co.nz)

## C3-PROTECTION FROM FIRE

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COLORSTEEL® is non combustibile and will contribute to compliance of NZBC - Clause C3.

Fire Testing of coated steel products:

COLORSTEEL® ENDURA® is rated as a Group 1-S material and has an average specific extinction area of 132.2 m<sup>2</sup>/kg, a peak heat release rate of 16.0 kW/m<sup>2</sup> and total heat released of 0.54 MJ/m<sup>2</sup> when tested in accordance with ISO 5660:2002 Part 1 and Part 2.

COLORSTEEL® MAXX® is rated as a Group 1-S material and has an average specific extinction area of 107.0m<sup>2</sup>/kg, a peak heat release rate of 15.3 kW/m<sup>2</sup> and total heat released of 0.44 MJ/m<sup>2</sup> when tested in accordance with ISO 5660:2002 Part 1 and Part 2.

For buildings above 10m in height and closer than 1m to the relevant boundary, the espan® clip is available with a core-flute cushioning tape.

## E2-EXTERNAL MOISTURE

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When used in accordance with the details as per NZMRM Code of Practice or Metalcraft Roofing's product technical literature, espan® will meet the performance requirements of the NZBC -Clause E2 in NZ 3604:2011 in all wind zones up to Extra High or SED upto design wind speeds of 60m/s.

## G12-DRINKING WATER

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COLORSTEEL® products have been tested in accordance with AS/NZS 4020:2005 and have passed the requirements for products in contact with drinking water.



## ALTERNATIVE SOLUTION

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espan® has crest centres that exceed the 215mm maximum centres for tray profiles as per the requirement of E2/AS1. Because of this the espan® profile needs to demonstrate compliance to the New Zealand Building Code as an alternative solution. This is done through in service history of standing seam profiles and flashing covers as per NZMRM Code of Practice.

## IN SERVICE HISTORY

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espan® compliance is demonstrated based on in service history of standing seam products performing in New Zealand and supporting evidence on standing seam profiles as per NZMRM Code of Practice.

## INTERNAL MOISTURE

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New Zealand Building Code clauses E3 – Internal Moisture and G4 – Ventilation, focus on air quality and accumulation of moisture in occupied spaces. The acceptable solutions for these clauses do not specifically require ventilation of attic spaces.

While problems with excessive internal moisture in attic spaces are relatively uncommon, they can be severe. A poorly designed ceiling cavity, even above a well-aired room, can give rise to internal moisture problems in the attic space, which can affect the air quality of the occupied space below and may cause health and durability issues.

The NZMRM Code of Practice requires building techniques which encourage trickle ventilation of all spaces in buildings; and requires specific ventilation design for:

- Flat roofs,
- Sarked roofs,
- Skillion roofs, and
- Roofs with ceilings which allow easy passage of moisture vapour.
- Long (over 12m spans), shallow pitched (less than 12°) roofs should also be designed to allow natural ventilation.

Generally, there is no need to make provision for moisture control in industrial and most commercial buildings due to them being either well ventilated or climate controlled. In buildings with valuable or delicate stock, the possibility of dripping condensation needs to be assessed.

Roofs in cold areas where numbers of people may come in wet at the end of the day, such as ski lodges and tramping huts, require specific design.

Buildings designed to accommodate large numbers of people (such as theatres, sports areas and educational buildings) and areas creating particularly high moisture levels (e.g. swimming pools) should have ventilation solutions designed by a specialist engineer.

Please refer to NZMRM Code of Practice for more information on internal moisture: [metalroofing.org.nz](http://metalroofing.org.nz)

# PRODUCT PROPERTIES

## espan® 340

Minimum Pitch:	3 degrees after deflection
Applications:	Commercial and residential.
Orientation:	Roofs and vertical wall cladding.
Material Options:	0.55mm BMT G300 steel, espan® 340 is not available in aluminium.
Solar Compatibility:	espan® 340 can accommodate clip on solar panels.
Swage Requirements:	espan® 340 is available with or without swages.
Swage Considerations:	The swages are discreet and provides for extra rigidity and strength, this is important in reducing the prospect of wind driven roof noise. The swages also assist with reducing oil canning.
Availability:	Nationwide. Sheet length restrictions might apply depending on project location.

### espan® 340 - FLAT



### espan® 340 - SWAGES



Profile dimensions are nominal and may vary depending on material.

Profile dimensions are not set out dimensions. If a specific set out is required please liaise with Metalcraft Roofing.

# espan® 470

Minimum Pitch:	3 degrees after deflection
Applications:	Commercial and residential.
Orientation:	Roofs and vertical wall cladding.
Material Options:	0.55mm BMT G300 steel or 0.9mm BMT aluminium.
Solar Compatibility:	espan® 470 can accommodate clip on solar panels.
PV Laminate Compatibility:	espan® 470 can accommodate PV solar laminates, refer to PV Laminate information for scope and limitations and use.
Swage Requirements:	Roofing: espan® 470 is manufactured standard with 2 swages, in the pan. The swages are discreet and provide for extra rigidity and strength; this is important in reducing the prospect of wind driven roof noise. The swages also assist with making oil canning less evident.  espan® 470 roofing installed with Metalcraft Solaflex Laminates does not require swages. espan® 470 wall cladding does not require swages.
Swage Removal:	Metalcraft Roofing will consider removing swages on espan® 470 roofing on a case by case basis but only in wind zones upto Medium. Please consult with your local Metalcraft Roofing branch.
Availability:	Nationwide. Sheet length restrictions might apply depending on project location.

## espan® 470 - FLAT

LIMITATION TO APPLICATION OF USE, REFER PRODUCT SELECTOR



## espan® 470 - SWAGES

STANDARD SUPPLY



Profile dimensions are nominal and may vary depending on material.  
Profile dimensions are not set out dimensions. If a specific set out is required please liaise with Metalcraft Roofing.

# MAXIMUM SPANS & FASTENER TYPE

## SNOW LOADS

Roof cladding design does not usually have to be altered for snow load, but it may be necessary to increase the strength of the structure to allow for induced snow loads.

The maximum snow load in New Zealand (under NZS 3604) is a UDL of 2 kPa. Collapse under snow load would be a strength failure, since 2 kPa is less than the upwards load in a Very High Wind Zone. However, as it is a downwards load, restraint is linear by the purlins, rather than point restraint by the fasteners, so greater capacity is achieved.

## SHEET OVERHANG

The maximum overhang for espan® is 150mm.

## ROOF TRAFFIC

espan® is secret fixed and has been loadspan tested to resist a 1.32kN point load.

## FASTENER TYPES

Timber purlins generally require a fastener penetration of 30 mm.

Steel purlins require a fastener penetration of three threads through the steel member.

For each project the screw length should be checked for minimum embedment. If another screw length is required then please consult with Metalcraft Roofing.

The use of stainless steel fixings is not recommended by steel manufacturers for use with coated steel in severe marine and industrial environments, as they are considered to cause deterioration.

Please note fixing into plywood is not permitted, when there is a plywood substrate fixing of espan needs to be in timber purlins beneath and have a minimum 30mm embedment. Fixing into structural steel battens are allowed with a recommended minimum 1.2mm thickness. For fixings into thinner steel, please consult Metalcraft Roofing.

FIXING SUBSTRATE	FASTENER TYPE:
Timber	TT10-12X45 CL4 WASQ2GRU - 45mm long
Timber + 20mm cavity	TT10-12X65 CL4 WASQ2GRU - 65mm long or; TT10-12X50CL4 Small HWF Wafer Head Screw - 50mm long
1.2mm Steel	ST10-16X16CL4WASQ2 (Wafer Head Screw) ST10-16X30CL4WASQ2

## espan® PRODUCT SELECTOR GUIDE

WIND ZONE  NZS 3604 (ULS) Design Load	espan® 340				espan® 470				
	SWAGES IN PAN		FLAT PAN		SWAGES IN PAN		FLAT PAN		
	VERTICAL CLADDING	ROOFING	VERTICAL CLADDING	ROOFING	VERTICAL CLADDING	ROOFING	VERTICAL CLADDING	*SOLAR LAMINATE ROOFING ONLY	ROOFING
LOW 0.98kPa	YES	YES	YES	YES	YES	YES	YES	YES	APPROVAL REQUIRED
Maximum span (mm)	VERTICAL CLADDING - 1200mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.								
MEDIUM 1.32kPa	YES	YES	YES	YES	YES	YES	YES	YES	APPROVAL REQUIRED
Maximum span (mm)	VERTICAL CLADDING - 1200mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				VERTICAL CLADDING - 1000mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				
HIGH 1.88kPa	YES	YES	YES	YES	YES	YES	YES	YES	NOT SUITABLE
Maximum span (mm)	VERTICAL CLADDING - 900mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				VERTICAL CLADDING - 800mm centres. ROOFING - 800mm intermediate spans & 520mm end spans.				
VERY HIGH 2.44kPa	YES	YES	YES	YES	YES	YES	YES	YES	NOT SUITABLE
Maximum span (mm)	VERTICAL CLADDING - 800mm centres. ROOFING - 800mm intermediate spans & 550mm end spans.				VERTICAL CLADDING - 700mm centres. ROOFING - 700mm intermediate spans & 450mm end spans.				
EXTRA HIGH 2.96kPa	YES	YES	YES	YES	YES	YES	YES	YES	NOT SUITABLE
Maximum span (mm)	VERTICAL CLADDING - 700mm centres. ROOFING - 700mm intermediate spans & 450mm end spans.				VERTICAL CLADDING - 600mm centres. ROOFING - 600mm intermediate spans & 390mm end spans.				
** (SED)	APPROVAL REQUIRED				APPROVAL REQUIRED				NOT SUITABLE

\* espan® 470 FLAT PAN IS ONLY ALLOWED FOR ROOFING IF SOLAR LAMINATES ARE INSTALLED AT SAME TIME WITH THE ROOFING INSTALL.

\*\* (SED) FOR SPECIFIC ENGINEERING DESIGN PROJECTS, THE ENGINEER MUST PREPARE A ROOF MAP SHOWING PURLIN SPANS AND LOCAL PRESSURE FACTORS FOR EACH SECTION OF THE ROOFING AND CLADDING. DESIGN LOADS NEED TO BE FULLY FACTORISED AND INCLUDE LOCAL PRESSURE FACTOR + INTERNAL AND EXTERNAL PRESSURE CO-EFFICIENTS.

## GUIDANCE NOTES

If an architect or engineer is designing a building in full accordance with E2/AS1 then it is necessary for the design spans and fixings to comply with those of E2/AS1.

If the architect or designer wishes to use the spans and Fastener patterns as provided by Metalcraft Roofing then they must consider the load on a purlin and a purlin/rafter connection is determined by the wind load and the area of roof the load is acting upon. Roof fasteners transfer wind uplift-loads to the purlins, which in turn transfer them to the primary structure.

Fastening to every second purlin may be within the roof's load/ span range, but will double the load acting on the fastened purlins.

All purlins must be fastened to unless alternate purlins are specifically designed to take the additional loads.

For espan® cladding the nogs and cavity battens are laid horizontally.

## DESIGN LOAD PARAMETERS:

espan® must resist a Uniformly Distributed Load (UDL) strength load. For roofing end spans have been calculated by multiplying the Intermediate span by 0.66. Spans are based on unrestricted access and allow for a concentrated load of 1.32kN.

In all wind zones, up to Extra High as defined in Table 5.4 NZS3604:2011, the Ultimate kPa loads for Low, Medium, High, Very High, Extra High have been derived from:

Pressure coefficients  $C_{pe} + C_{pi} = 1.1$   
Local pressure factor  $kl = 1.5$   
Ultimate load factor = 1.0

Projects that are specific engineered design (SED) will use different factors than above and these should be calculated by the project engineer. For SED projects use the graph to AS/NZS 1170 to determine maximum spans and fastener requirements.

Classification of Wind Zones in NZS 3604 are specific to the site. Because the buildings covered by this standard are limited in size, design tables (but not design wind speed) include a local pressure factor of 1.5 kPa over the entire structure, rather than varying factors according to the position on the roof as required by AS/NZS 1170.

## espan® 340 -0.55MM BMT G300 STEEL MAXIMUM SPANS FOR SED (AS/NZS 1170)

### DESIGN LOAD PARAMETERS:

espan® 340 must resist an Uniformly Distributed Load (UDL) strength load.

To calculate end spans please multiply the intermediate span calculated by 0.66.

Spans are based on unrestricted access and tested to resist a 1.32kN point load in accordance with NZMRM Code of Practice testing standards.

### GUIDANCE NOTES

If the architect or designer wishes to use the spans and fastener patterns as provided by Metalcraft Roofing then they must consider the load on a purlin and a purlin/rafter connection is determined by the wind load and the area of roof the load is acting upon. Roof fasteners transfer wind uplift-loads to the purlins, which in turn transfer them to the primary structure.

Fastening to every second purlin may be within the roof's load/span range, but will double the load acting on the fastened purlins. All purlins must be fastened to unless alternate purlins are specifically designed to take the additional loads.

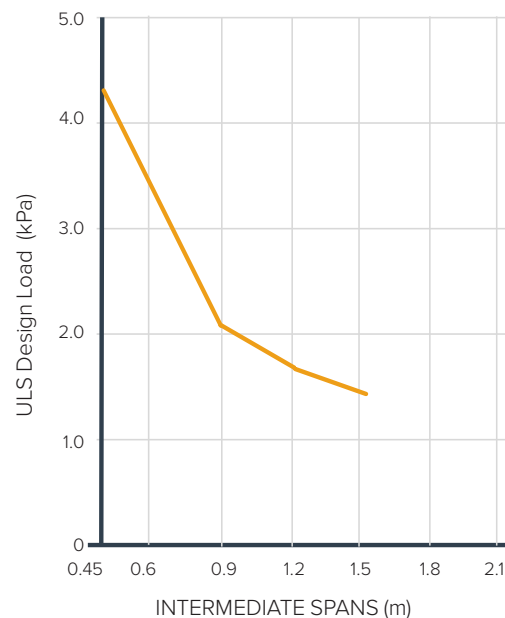
For espan® cladding the nogs and cavity battens are laid horizontally.

Graph may also be used for wall cladding.

### espan® 340

0.55BMT G300 STEEL

TEST RESULTS HAVE BEEN DISCOUNTED BY A  
1.17 VARIABILITY FACTOR



### FASTENER PATTERNS

Fixing patterns -1 clip per purlin / nog.

Timber purlins - 10-12G generally require a fastener penetration of 30 mm.

Steel purlins -10-12G require a fastener penetration of three threads through the steel member.

Refer Fastener Types for recommended fasteners.



## espan® 470 -0.55MM BMT G300 STEEL MAXIMUM SPANS FOR SED (AS/NZS 1170)

### DESIGN LOAD PARAMETERS:

espan® 470 must resist an Uniformly Distributed Load (UDL) strength load.

To calculate end spans please multiply the intermediate span calculated by 0.66.

Spans are based on unrestricted access and tested to resist a 1.32kN point load in accordance with NZMRM Code of Practice testing standards.

### GUIDANCE NOTES

If the architect or designer wishes to use the spans and fastener patterns as provided by Metalcraft Roofing then they must consider the load on a purlin and a purlin/rafter connection is determined by the wind load and the area of roof the load is acting upon. Roof fasteners transfer wind uplift-loads to the purlins, which in turn transfer them to the primary structure.

Fastening to every second purlin may be within the roof's load/span range, but will double the load acting on the fastened purlins. All purlins must be fastened to unless alternate purlins are specifically designed to take the additional loads.

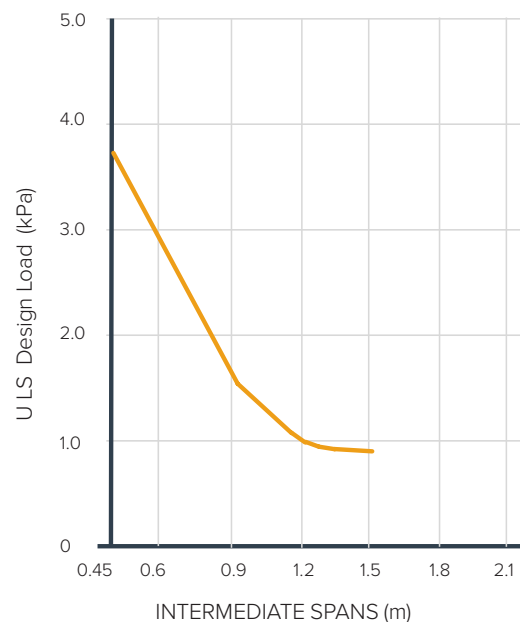
For espan® cladding the nogs and cavity battens are laid horizontally.

Graph may also be used for wall cladding.

### espan® 470

0.55BMT G300 STEEL

TEST RESULTS HAVE BEEN DISCOUNTED BY  
A 1.17 VARIABILITY FACTOR



### FASTENER PATTERNS

Fixing patterns -1 clip per purlin / nog.

Timber purlins - 10-12G generally require a fastener penetration of 30 mm.

Steel purlins -10-12G require a fastener penetration of three threads through the steel member.

Refer Fastener Types for recommended fasteners.

## espan® PRODUCT SELECTOR GUIDE

WIND ZONE  NZS 3604 (ULS) Design Load	espan® 470 0.9mm BMT ALUMINIUM GRADE 5052 H36				
	SWAGES IN PAN		FLAT PAN		
	VERTICAL CLADDING	ROOFING	VERTICAL CLADDING	*SOLAR LAMINATE ROOFING ONLY	ROOFING
<b>LOW</b> <b>0.98kPa</b>  Maximum span (mm)	YES	YES	YES	YES	<b>APPROVAL REQUIRED</b>
	VERTICAL CLADDING - 1200mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				
<b>MEDIUM</b> <b>1.32kPa</b>  Maximum span (mm)	YES	YES	YES	YES	<b>APPROVAL REQUIRED</b>
	VERTICAL CLADDING - 1000mm centres. ROOFING - 900mm intermediate spans & 600mm end spans.				
<b>HIGH</b> <b>1.88kPa</b>  Maximum span (mm)	YES	YES	YES	YES	<b>NOT SUITABLE</b>
	VERTICAL CLADDING - 800mm centres. ROOFING - 800mm intermediate spans & 520mm end spans.				
<b>VERY HIGH</b> <b>2.44kPa</b>  Maximum span (mm)	YES	YES	YES	YES	<b>NOT SUITABLE</b>
	VERTICAL CLADDING - 700mm centres. ROOFING - 700mm intermediate spans & 450mm end spans.				
<b>EXTRA HIGH</b> <b>2.96kPa</b>  Maximum span (mm)	YES	YES	YES	YES	<b>NOT SUITABLE</b>
	VERTICAL CLADDING - 600mm centres. ROOFING - 600mm intermediate spans & 390mm end spans.				
<b>** (SED)</b>	<b>APPROVAL REQUIRED</b>				<b>NOT SUITABLE</b>

\* espan® 470 FLAT PAN IS ONLY ALLOWED FOR ROOFING IF SOLAR LAMINATES ARE INSTALLED AT SAME TIME WITH THE ROOFING INSTALL.

\*\* (SED) FOR SPECIFIC ENGINEERING DESIGN PROJECTS, THE ENGINEER MUST PREPARE A ROOF MAP SHOWING PURLIN SPANS AND LOCAL PRESSURE FACTORS FOR EACH SECTION OF THE ROOFING AND CLADDING. DESIGN LOADS NEED TO BE FULLY FACTORISED AND INCLUDE LOCAL PRESSURE FACTOR + INTERNAL AND EXTERNAL PRESSURE CO-EFFICIENTS.

## GUIDANCE NOTES

If an architect or engineer is designing a building in full accordance with E2/AS1 then it is necessary for the design spans and fixings to comply with those of E2/AS1.

If the architect or designer wishes to use the spans and Fastener patterns as provided by Metalcraft Roofing then they must consider the load on a purlin and a purlin/rafter connection is determined by the wind load and the area of roof the load is acting upon. Roof fasteners transfer wind uplift-loads to the purlins, which in turn transfer them to the primary structure.

Fastening to every second purlin may be within the roof's load/ span range, but will double the load acting on the fastened purlins.

All purlins must be fastened to unless alternate purlins are specifically designed to take the additional loads.

For espan® cladding the nogs and cavity battens are laid horizontally.

## DESIGN LOAD PARAMETERS:

espan® must resist a Uniformly Distributed Load (UDL) strength load. For roofing end spans have been calculated by multiplying the Intermediate span by 0.66. Spans are based on unrestricted access and allow for a concentrated load of 1.32kN.

In all wind zones, up to Extra High as defined in Table 5.4 NZS3604:2011, the Ultimate kPa loads for Low, Medium, High, Very High, Extra High have been derived from:

Pressure coefficients  $C_{pe} + C_{pi} = 1.1$   
Local pressure factor  $k_l = 1.5$   
Ultimate load factor = 1.0

Projects that are specific engineered design (SED) will use different factors than above and these should be calculated by the project engineer. For SED projects use the graph to AS/NZS 1170 to determine maximum spans and fastener requirements.

Classification of Wind Zones in NZS 3604 are specific to the site. Because the buildings covered by this standard are limited in size, design tables (but not design wind speed) include a local pressure factor of 1.5 kPa over the entire structure, rather than varying factors according to the position on the roof as required by AS/NZS 1170.

## espan® 470 -0.90MM BMT ALUMINIUM 5052 H36 MAXIMUM SPANS FOR SED (AS/NZS 1170)

### DESIGN LOAD PARAMETERS:

espan® 470 must resist an Ultimate Limit Design load.  
To calculate end spans please multiply the intermediate span calculated by 0.66.  
Spans are based on unrestricted access and tested to resist a 1.32kN point load in accordance with NZMRM Code of Practice testing standards.

### GUIDANCE NOTES

If the architect or designer wishes to use the spans and fastener patterns as provided by Metalcraft Roofing then they must consider the load on a purlin and a purlin/rafter connection is determined by the wind load and the area of roof the load is acting upon. Roof fasteners transfer wind uplift loads to the purlins, which in turn transfer them to the primary structure.

Fastening to every second purlin may be within the roof's load/ span range, but will double the load acting on the fastened purlins. All purlins must be fastened to unless alternate purlins are specifically designed to take the additional loads.

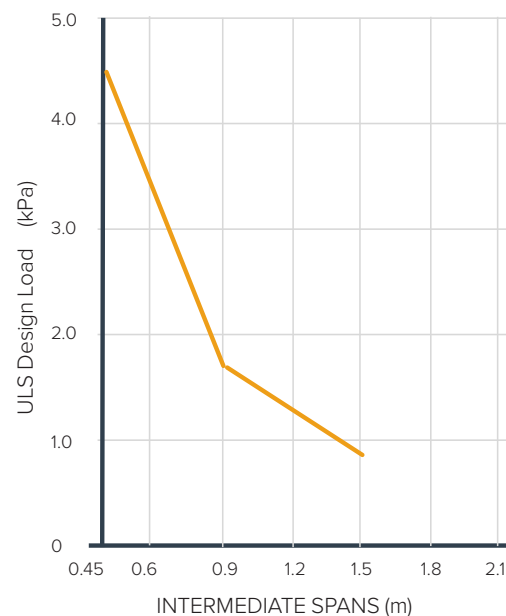
For espan® cladding the nogs are laid horizontally.

Graph may also be used for wall cladding.

### espan® 470

0.90MM BMT ALUMINIUM 5052 H36

TEST RESULTS HAVE BEEN DISCOUNTED BY A 1.17 VARIABILITY FACTOR



### FASTENER PATTERNS

Fixing patterns -1 clip per purlin / nog.

Timber purlins - 10-12G generally require a fastener penetration of 30 mm.

Steel purlins -10-12G require a fastener penetration of three threads through the steel member.

Refer Fastener Types for recommended fasteners.



espan® 340 in COLRSTEEL® Flaxpod

# INSTALLATION GUIDELINES

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# DESIGN CONSIDERATIONS

## CONSIDERATIONS

Metalcraft Roofing's installation details are indicative for the purpose of demonstrating compliance with NZBC - Clause E2. The following design considerations need to be addressed by the architect:

### SET-OUT TOLERANCES:

Set-out tolerances for espan® 340 and espan® 470 vary depending on installation. Architects and designers must allow for upto 4mm tolerance across the installed cover width:

espan® 340 - allow a 344mm set-out.  
espan® 470 - allow a 474mm set-out.

If a specific set out is required please liaise with Metalcraft Roofing.

The thickness and design of the espan® clip pushes the espan® pan off the battens by approximate 10mm.

### espan® CLIP:

espan® clips are manufactured out of zincalume® and fixed directly onto the purlins at recommended spans depending on thickness and wind design loadings.

The purlins must be perpendicular with the espan ribs. When using espan® 340 or espan® 470 in Aluminium espan clips need to be powder coated as a precautionary measure. Clips are available to order from Metalcraft.

For buildings above 10m in height and closer than 1m to the relevant boundary, the espan® clip is available with a core-flute cushioning tape.

For clip centres refer to maximum span and fasteners information.

### HEM:

The espan® hem is required to provide stiffness to the bottom ends of all sheets. All sheets should have a hemmed finish as per below.

#### BOTTOM OF CLADDING:

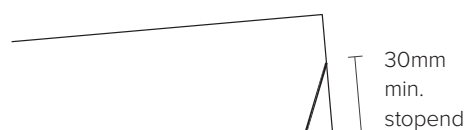
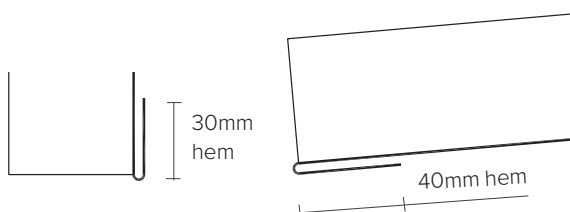
Please ensure the hemming tool is used to provide for a neat edge. Please note when using a hemmed espan® sheet with a grab flashing, a minimum 5mm expansion gap is required, refer to installation details.

#### SHEET END:

Please note when using a hemmed espan® sheet with a grab flashing, a 5mm expansion gap is required, refer to installation details.

### STOPEND:

The espan® stopend tool should be used to achieve a minimum height of 30mm.



## RIGID AIR BARRIERS:

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The supporting structure is indicative and should a rigid air barrier be required then the designer/ architect should check the compatibility with espan® with the NZMRM Code of Practice and provide a suitable separation if required.

## VENTILATION:

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The architect / designer must consider if their building design requires ventilation within the roof space and adjust detailing to suit. Refer to NZMRM Code of Practice.

## THERMAL BREAKS:

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espan® when installed on steel structure in an insulated building requires a thermal break. Timber thermal breaks are recommended. For other thermal breaks please consult with Metalcraft Roofing.

## THERMAL EXPANSION:

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Sheet lengths of espan® are not restricted by expansion but by freight and accessibility to site. The architect / designer should consider if the desired sheet lengths can be transported or whether a step joint would be required. Please consult with Metalcraft Roofing. In some instances it may also be possible to roll-form on site.

## DISCLAIMER:

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All rights reserved. All information, specifications and details are to be used for indicative purposes only and the designer should consult both the NZMRM Code of Practice version 3.0 and all other relevant building codes. It's the responsibility of the designer to determine if roof ventilation is required. Details of the supporting mechanisms are indicative only. Compliance of the supporting mechanisms is the responsibility of the designer. The underlay is detailed as a single line for simplicity and is indicative only. Building paper and type and method of installation should comply with underlay manufacturers recommendations and NZBC regulations.

## FLASHING EXPANSION:

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Most espan® flashings within this guide are drawn as a 2-piece hemmed flashing; the architect designer/ must ensure that there is sufficient clearance to accommodate expansion of the espan sheets within their design.

In some instances direct fixing of one side of the flashings are required and the architect /designer must consider thermal expansion. Lengths of coated steel ridging, cappings, and apron flashings over 12m should have a slip joint as described in NZMRM Code Of Practice.

## CAD DETAILS

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Current and updated installation details available to download in:

DWG - DXF - PDF - RVT

[metalcraftgroup.co.nz](http://metalcraftgroup.co.nz).



# INSTALLATION INFORMATION

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## CLIP SPACINGS:

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Clip spacings and fixings are dependent on design loads as per Metalcraft Roofing's – loadspan tables.

## CLIP INSTALLATION:

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Clips should be laid progressively with sheets. Do not pre-install clips as this will likely result in problems.

## SET OUT BARGE SPACINGS:

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Consider barge spacings for an even finish to barge flashing cover to both sides.

## TAKE CARE:

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Take care when fixing into cavity battens to ensure the fixings are not over tensioned and that the fixing clips are positioned centrally.

Cavity battens should not be crushed and the installers must take care when fixing.

Crushed cavity battens will give rise to and result in increased oil canning and roof noise as it will restrict the free movement of espan® when subjected to thermal expansion and contraction.

## INSTALLATION REQUIREMENT

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Only Metalcraft Roofing's espan® Authorised Installers can Install espan® and installation should be carried out in accordance with the NZMRM Code of Practice. Whomever undertakes installation of espan® must make themselves aware of the requirements of this document.

Any question pertaining to these requirements and also the additional requirements as per Metalcraft Roofing's - espan® installation Guide should be discussed with Metalcraft Roofing prior to installation of espan®.

The NZMRM Code of Practice can be downloaded from [www.metalroofing.org.nz](http://www.metalroofing.org.nz)

## PRE - INSTALLATION

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The roofing contractor or supervisor must inspect a set of consent drawings and specifications before starting to install espan® metal roof or wall cladding. Any decisions departing from it should be agreed on and written confirmation signed before work begins.

Where specific details are not drawn, the roofer and the main contractor should agree on the execution of these details before commencement.

The roofing contractor is required to have safety provisions in place that satisfy the HSW Act 2015 before work is commenced and also be an espan® Authorised Installer.

The supporting structure should be inspected; the purlins and girts should be checked to see they are in a true plane and securely fixed, all trimming completed for penetrations, and any work by other trades is completed.

Where roof and wall cladding intersect with other materials, the sequencing of work and responsibilities for weatherproofing must be agreed with the main contractor prior to installation.

## PRE - INSTALLATION CHECKS:

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espan requires a level substrate and prior to installation of espan®, this is critical and the installer must:

CHECK TIMBER WORK:

Installer must check timber or steel work is level. Any risk of deviation will give rise to and result in increased oil canning and roof noise. Use a string line to check.

Roofing should not be fitted if moisture content exceeds 18% Max. Refer NZMRM Code of Practice.

## STRAIGHT ALIGNMENT:

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Ensure straight alignment of fixing clips and ensure the first espan® sheet is aligned. Particularly important if plastic cavity battens are used as the clips can slip off side of batten. Use a stringline to set position of clips in relation to gutterline for accuracy.

## STOPENDS AND TURN UPS:

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Stopends - Use only approved Metalcraft Roofing stopend tools and Turn Up and Turn Down Tools. A minimum 30mm stopend height is required for espan®.

Stopend tools are available to order from Metalcraft Roofing and a video demonstrating how to create a stopend can be viewed in the video section of espan® 340 and espan® 470 product pages:

[www.metalcraftgroup.co.nz](http://www.metalcraftgroup.co.nz)

## FIXING INTO TIMBER

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The Installer must allow a minimum of 30mm penetration into the purlins when selecting the correct fixing lengths. When non structural cavity battens are used the length needs to increase to ensure the minimum embedment of 30mm is maintained.

## FIXING INTO CONCRETE

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Fixing metal cladding directly into concrete is not permitted due to corrosion and compatibility issues.

The installation of structural timber battens with a minimum depth of 40mm is required. These timber battens are engineered and fixed into the concrete by others.

## FIXING INTO STEEL

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Length of fasteners into steel should allow for 5 - 6mm beyond the drill point with a minimum of 3 threads beyond the drill point.

Please note that steel structure when used in insulated buildings will require a thermal break and the use of EPS thermal break strips are not recommended as they are likely to crush when fixing espan® clips and increase the occurrence of oil canning and or roof noise.

espan® requires a flat substrate – refer to pre-check installation section in this booklet for more information.

## FASTENERS

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Fasteners need to be sourced from Metalcraft Roofing as the selection of the appropriate fastener is essential to the performance of the roof. The durability of the fastener should be, as a minimum requirement, equal to that of the roofing or cladding.

The installer should not deviate from the recommended fasteners without prior consent from Metalcraft Roofing as other fasteners might compromise the product performance and warranty.

The fastener length is dependent on the installation details and will increase if installation is required through a cavity batten into the supporting structure behind.

## espan® CLIPS

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espan® clips are manufactured out of zincalume® and fixed directly onto the purlins at recommended spans depending on thickness and wind loadings. The purlins must be parallel with the espan ribs.

When using espan® 470 in aluminium espan clips need to be powder coated as a precautionary measure.

espan® clips are available to order from Metalcraft.

## CANTERBURY PRICKLES:

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Canterbury prickles can be installed on roofs down to 10 degrees and only in Category A environments as defined by the NZMRM Code of Practice.

# STORAGE AND HANDLING

## STORAGE

Roof and wall cladding must be kept dry, covered and protected from damage while stored on the site. When sheets are to be stored on the ground, they must be stacked horizontally on a firm and level surface on top of cross-stacked untreated timber fillets, inclined slightly for rainwater runoff and be covered with a loose tarpaulin allowing air to circulate.

Sheets should be stacked in sheltered positions preferably near areas of the building where it is to be fixed, and they should be stacked in the order in which they will be used.

The height of such stacks should not exceed 1m, and they should be clear of the ground. If it is necessary to stack sheets in an exposed position, they should be secured against any movement by the wind.

Well ventilated storage is essential as rainwater, or condensation in humid weather can penetrate and damage close-stacked metal cladding by capillary action. Always store metal products under cover in clean, well ventilated buildings.

Once packs are opened and laying of the roof or wall cladding commences, a continual visual check should be made to ensure the surface of the sheets are free of any noticeable defect or damage. This is particularly important with pre-coated materials.

painted steel, the result of wet storage damage could be a bubbling of the paint surface. Damage resulting from such failure invalidates the warranty.

Refer 4.11.7 Crevice Corrosion/Wet Storage Stain of the NZMRM Code of Practice.

## WET STORAGE DAMAGE

Close stacked sheets may deteriorate quickly if water enters the pack. This happens because the metal exposed to moisture without air forms bulky, unstable, and loosely adherent, hygroscopic compounds.

When wet sheets are delivered or they get wet in storage, they must be used immediately or dried. Sheets can be dried by filleting sheets or cross stacking them on a slope to allow water to drain and air to circulate between the sheets.

Only use a dry, well-ventilated environment for long term storage.

Failure to follow these handling and storage precautions could result in spoiling the surface appearance of the products and severely reducing their service life. On galvanised material this will appear as a white corrosion product (white rust); on Aluminium/Zinc steel the corrosion shows up black.

On pre-painted steel, the result of wet storage damage could be a bubbling of the paint surface. Damage resulting from such failure invalidates the warranty.

Refer NZMRM Code of Practice Version 3 - For advice Corrosion/Wet Storage Stain.

The extent and severity of wet storage stain is usually proportional to the length of time the sheeting has been wet. In the case of superficial attack, exposure to the atmosphere and careful cleaning will sufficiently reduce surface imperfections, but heavier deposits can damage the sheets enough that they require replacement.

Where it is likely that the roof or wall cladding will be stored on site for more than one week before installation, the contractor (or person responsible for doing ordering material) should consider including waterproof packaging from the manufacturer in the order.

## STRIPPABLE FILM

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Strippable film is a clear pressure sensitive polyethylene plastic film that is applied to some COLORSTEEL® products in the New Zealand Steel paint line to assist in protecting the COLORSTEEL® surface from damage and scratching during forming, transportation, handling, storage and erection. Strippable film is designed to provide some protection to the COLORSTEEL® product prior to and during installation on the building. It is not designed to protect against corrosion, humidity or chemicals.

### STORAGE:

COLORSTEEL® product with film applied must be stored at temperatures less than 50°C and out of direct sunlight to avoid prolonged UV exposure. The product needs to be kept dry to prevent moisture ingress between the film and the painted surface. In the longer term this may cause issues to the COLORSTEEL® and in the shorter term cause the film adhesive to whiten and breakdown leaving residue on the painted surface when the film is removed.

### USAGE:

Storage requirements for formed products on building sites are as above. The film is intended to protect the painted product up to and during installation, it must be removed directly before or immediately after installation. Failure to do so may result in the film adhesive leaving a residue on the painted surface.

## MARKING AND CUTTING

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Black lead pencils must never be used for marking aluminium/zinc unpainted or pre-painted steel products. The carbon in the pencil promotes corrosion which will etch the surface of the material, leaving a permanent mark. Use a pencil of any colour other than black, a marker pen, or crayon.

Cut pre-painted steel material with care to avoid marring the high-quality finish. Cut by shear only — use nibblers or hand shears. Friction blades and high-speed saw blades must not be used on metal cladding. These blades will damage both the metallic coating and the pre-painted steel surface by creating excessive heat, and generate large amounts of hot swarf which will get embedded into the coating surface

All debris must be swept off the job at the end of each day. Prevention of swarf damage is far easier than its cure.

## SAFETY

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Installing roofs involves many hazards including laceration, electrocution, puncture and falling from height. Prudent PPE and installation practices must be employed, and the guidelines of MBIE “Best Practices for Safe Working at Height” must be strictly adhered to.

## UNLOADING

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Set out flat area and supporting dunnage to ensure sheets will not be damaged by site debris. When unloading by crane, ensure lifting boom has a spreader bar and that tightening strops do not damage sheet laps. If unloading by hand lift each sheet off the stack without sliding over under sheet.





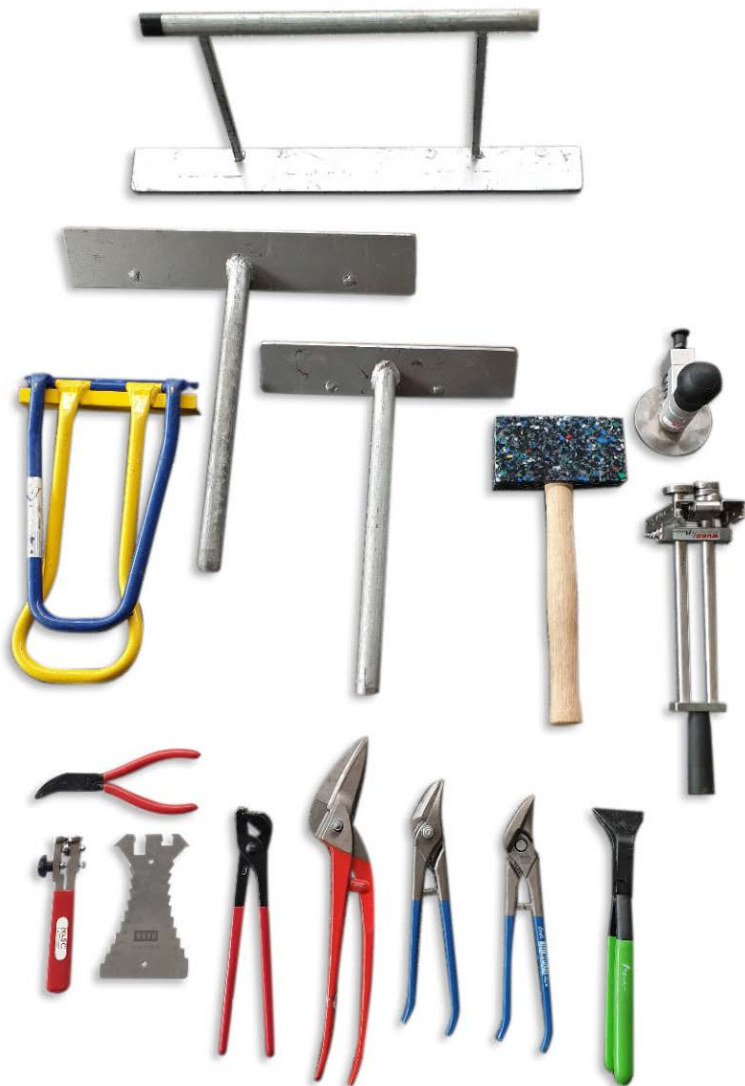
espan® 340 and espan® 470 COLORSTEEL® Grey Friars and Sandstone Grey.

# INSTALLATION TOOLS

## SUGGESTED TOOLS:

Contact your Metalcraft Roofing branch for sourcing of the above tools.

- Hemming tool
- Ridging Clamp
- Stop end
- Needle nose pliers
- Shears
- Wuko
- Disco Bender





espan® 340 in COLORSTEEL® Flaxpod®



# COMPATIBILITY

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## COMPATIBILITY

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When two different metals are in contact and moisture is present, one metal is relatively protected while the other suffers accelerated corrosion. This is known as galvanic or bi-metallic corrosion. A similar problem commonly occurs with water flowing over dissimilar metals.

Contact with other materials must be in accordance with Table 21 (E2/AS1), or compatible with NZMRM Metal Roof and Wall Cladding Code Of Practice: [metalroofing.org.nz](http://metalroofing.org.nz)

## COPPER

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Copper is not compatible with COLORSTEEL® products, especially where the two materials are in contact in the presence of water or where water can flow from copper to the coated product. Every effort must be made to prevent the overflow of water from copper pipes on to the roofing and guttering material.

## LEAD

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Lead is not compatible with Zinalume® products. Corrosion will result from contact between the two products, or from water runoff from lead to COLORSTEEL®.

## STAINLESS STEEL

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Stainless steel must not be in contact with COLORSTEEL® products, but run off from stainless steel onto these products is acceptable.

## GALVANISED STEEL

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Galvanised steel is compatible in contact with COLORSTEEL®, aluminium or zinc but these materials must not discharge onto unpainted galvanised steel, as they are inert. Other inert surfaces include any painted surface, glass, PVC and glazed clay tiles.

## WET TIMBER

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Wet timber is not allowed to be in contact with COLORSTEEL® and the use of a DPC separation layer is required. Run off from wet timber onto COLORSTEEL® or from COLORSTEEL® onto wet timber is allowed.

## CEDAR

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Cedar is not allowed to be in contact with COLORSTEEL® and the use of a DPC separation layer is required. Run off from Cedar onto COLORSTEEL® or from COLORSTEEL® onto Cedar is allowed. Cedar run off may cause staining on the COLORSTEEL®. Use with caution in severe or moist environments. For more information go to: NZMRM Metal Roof and Wall Cladding Code Of Practice: [metalroofing.org.nz](http://metalroofing.org.nz)

## CONCRETE / PLASTER WET

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Concrete/plaster wet is not suitable to use in contact with COLORSTEEL®. Runoff from concrete/plaster wet is also not suitable to use with COLORSTEEL®. Runoff from COLORSTEEL® onto Concrete/plaster wet is allowed.

## CONCRETE / PLASTER DRY

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Concrete/plaster dry is suitable to use in contact with COLORSTEEL®. Runoff from concrete/plaster dry is suitable to use with COLORSTEEL®. Runoff from COLORSTEEL® onto Concrete/plaster dry is also suitable.

## COMPATIBILITY TOOL

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For more information on the compatibility of COLORSTEEL® with other materials, please consult the NZMRM Code Of Practice. The NZMRM has developed an easy to use compatibility tool.

[metalroofing.org.nz](http://metalroofing.org.nz)





# RESIDENTIAL ROOFING DETAILS

## FLASHING COVER DIMENSIONS

The weather-tightness of a flashing is determined by the flashing cover, not the flashing dimension. There are two categories of exposure or pitch that determine the flashing cover width. Extra High Wind Zone can be extended to include wind speeds of up to 60m/s.

Category A: Low, Medium or High Wind Zones, and where the pitch is no less than 10°.

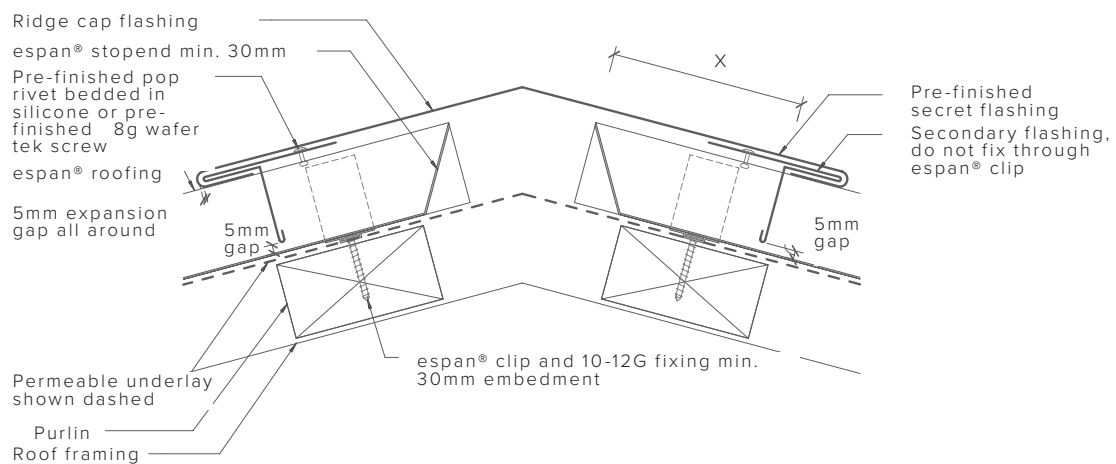
Category B: Very High and Extra High Wind Zones, or where the pitch is less than 10°.

IMPORTANT: Dimensions below are flashing cover dimensions and are not flashing dimensions - Refer installation details.

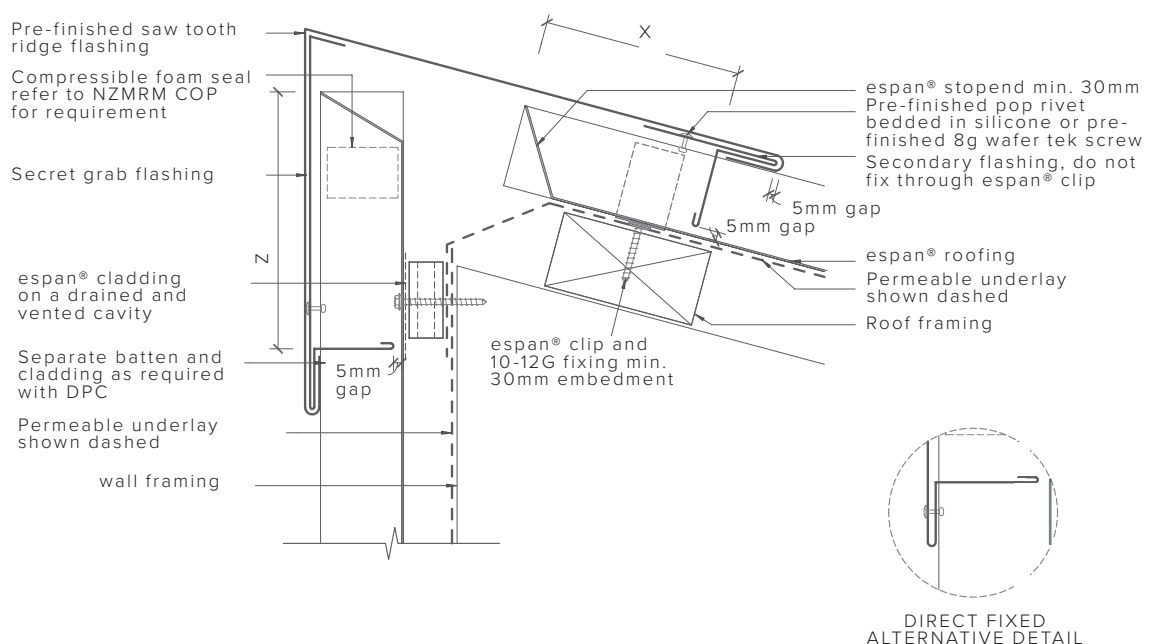
FLASHING TYPE	LEGEND	DIRECTION	CATEGORY A	CATEGORY B
RIDGE	X	Transverse over sheeting	130mm	200mm
SAW TOOTH RIDGE	X	Transverse over sheeting	130mm	200mm
	Z	Vertically down face (smooth)	50mm	75 mm
		Vertically down face (profiled)	75 mm	100 mm
BARGE	Longitudinal		one rib as espan® profile height over 35mm. Where a flashing or folded sheet of espan is folded the turn up must be greater than 35mm.	
	Z	Vertically down face (smooth)	50mm	75mm
	Z	Vertically down face (profiled)	75mm	100mm
APRON	L	Transverse over sheeting	150mm	200mm
	M	Longitudinal	one rib as espan® profile height over 35mm. Where a flashing or folded sheet of espan is folded the turn up must be greater than 35mm.	
	N	Vertically up face (smooth)	50mm with hem 75mm no hem	75 mm with hem or 100 mm no hem
	N	Vertically up face (profiled)	75 mm with hem 100mm no hem	100mm with hem 125mm no hem
	G	End of wall cladding	25mm min. clearance from an apron flashing or another horizontal surface	
PARAPET	Z	Vertically down face (smooth)	50mm	75mm
	Z	Vertically down face (profiled)	75mm	100mm
CHANGE OF PITCH	Transverse over sheet		150mm	200mm
	Transverse under sheet		250mm	250mm

# RESIDENTIAL ROOF DETAILS

## ROOF RIDGE DETAIL



## SAW TOOTH DETAIL

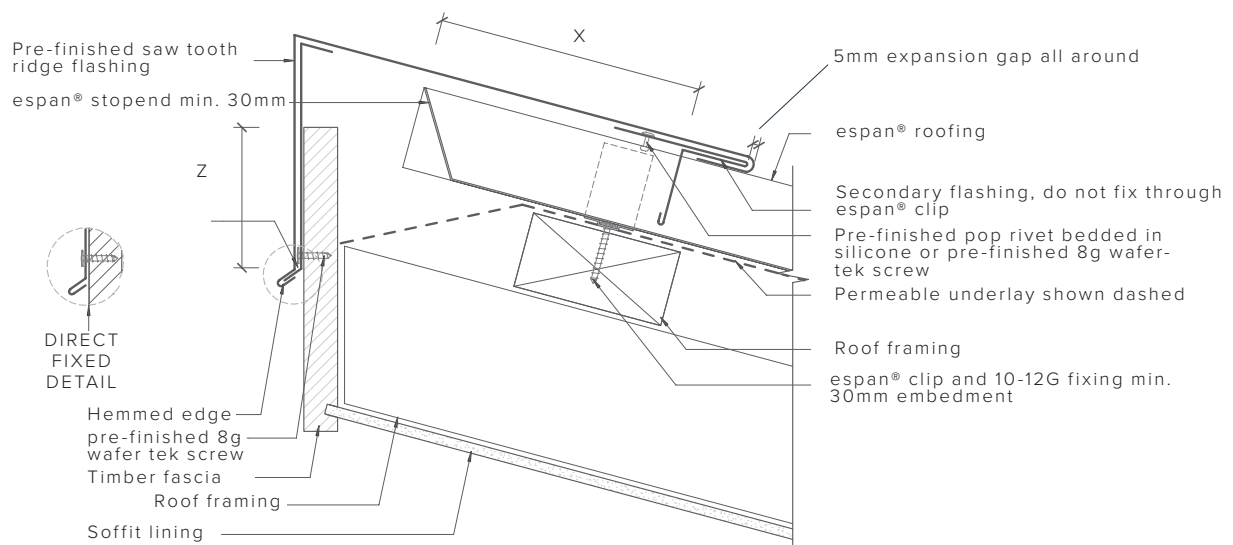


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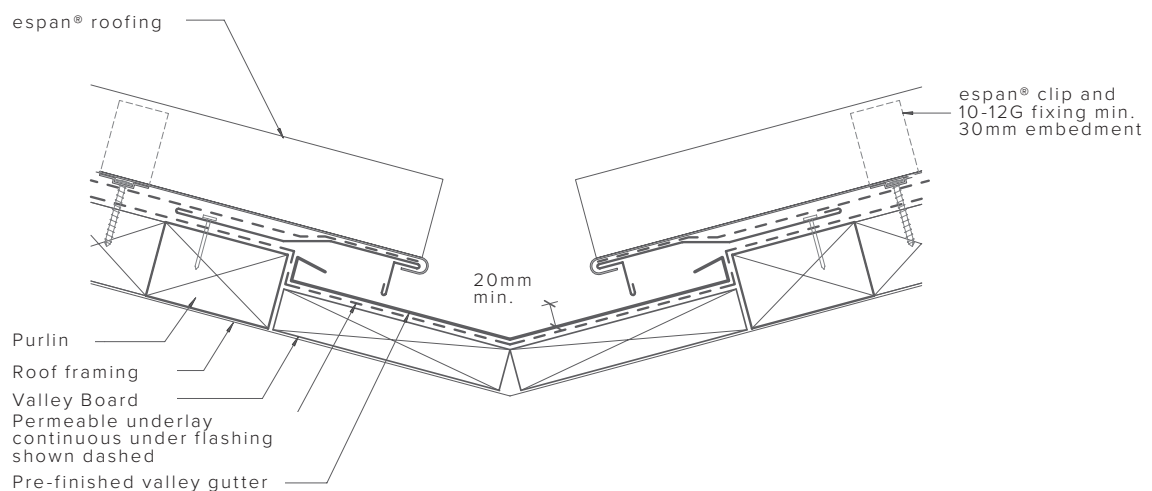


## SAW TOOTH EAVE DETAIL



## SYMMETRICAL VALLEY DETAIL

ROOF PITCH FOR VALLEY GUTTERS AND GUTTER DESIGN AS PER THE NZMRM CODE OF PRACTICE. ASYMMETRICAL VALLEY DETAILS REQUIRE CUSTOM DESIGN REFER TO NZMRM CODE OF PRACTICE.



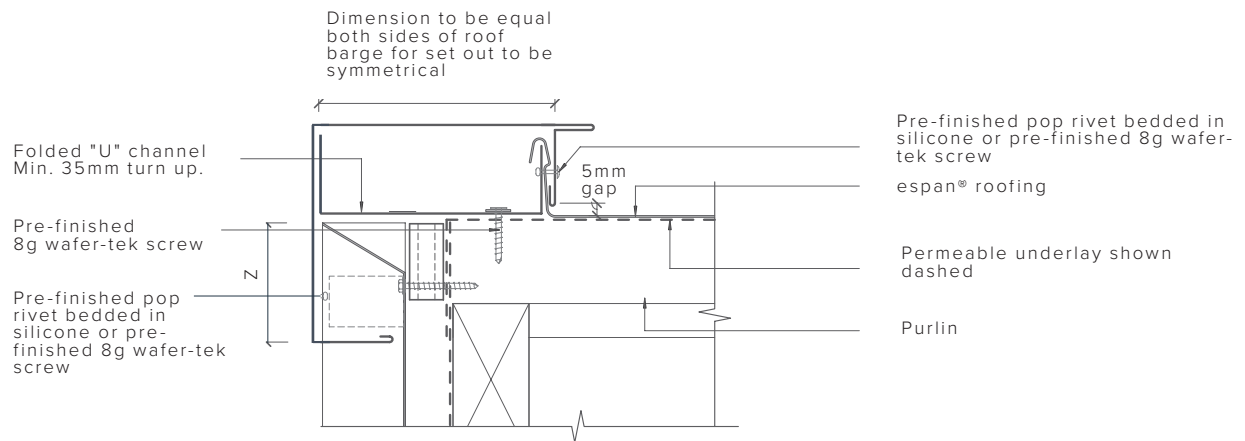
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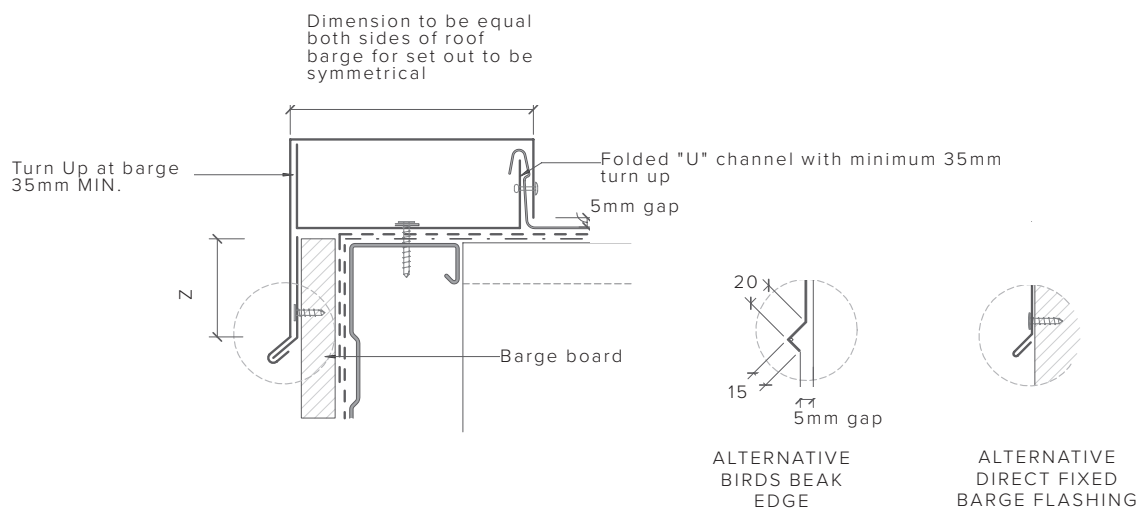




## BARGE DETAIL



## ALTERNATIVE BARGE DETAIL

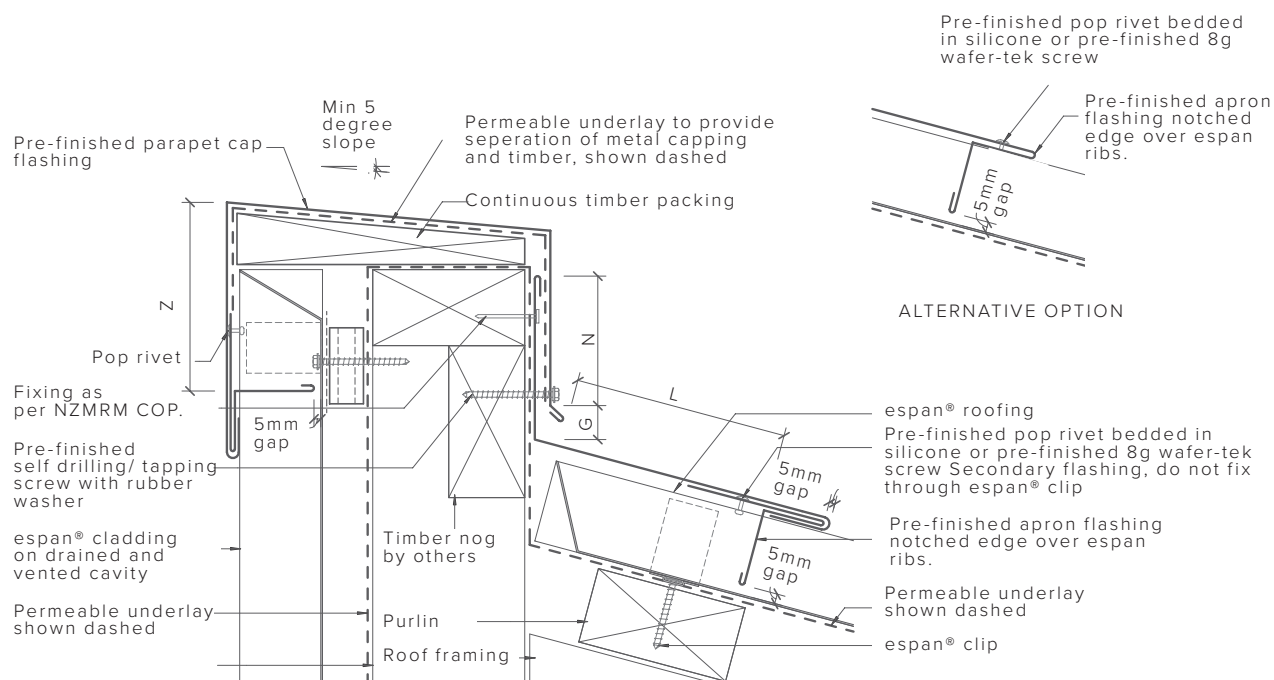


### DISCLAIMER:

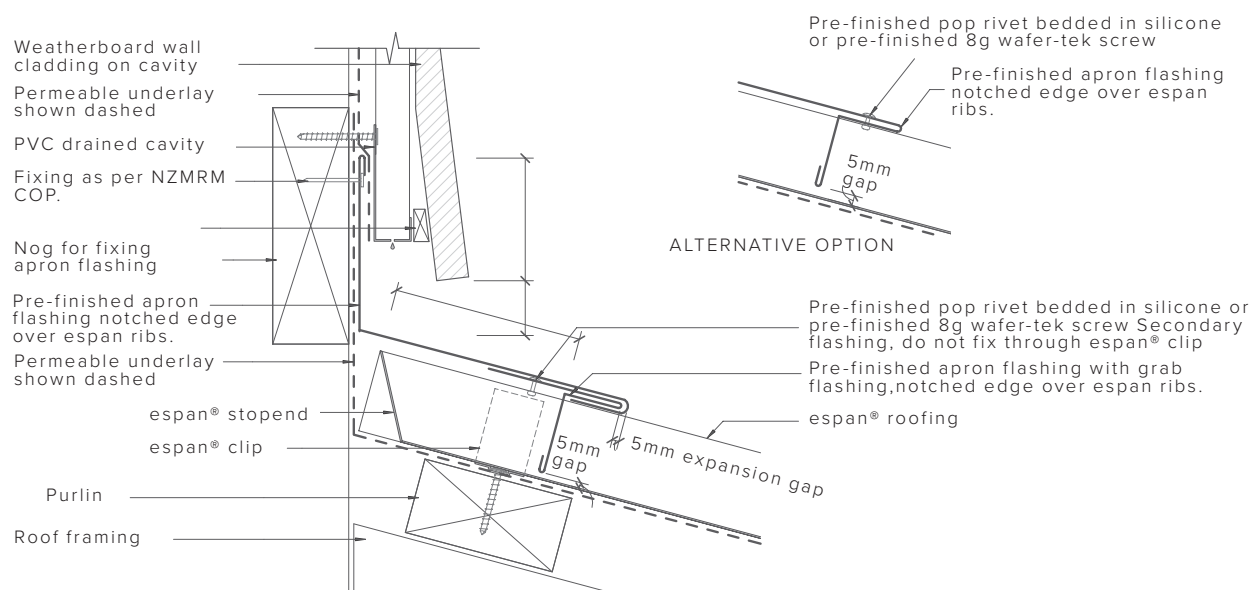
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# RESIDENTIAL ROOF DETAILS

## PARAPET WITH TRANSVERSE APRON DETAIL



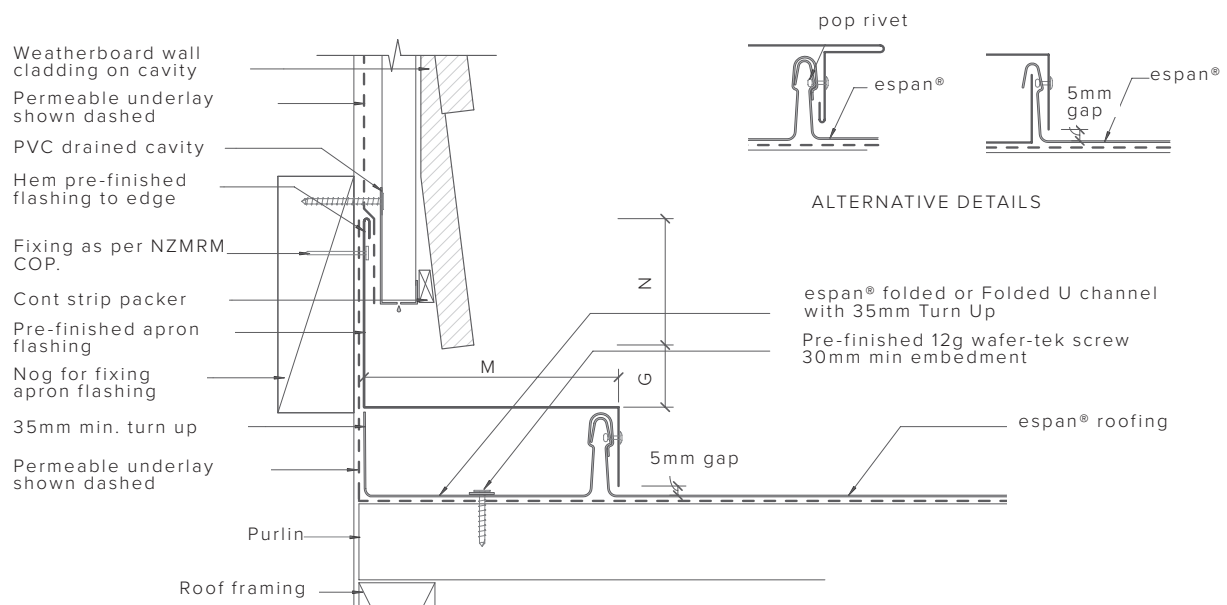
## TRANSVERSE APRON DETAIL



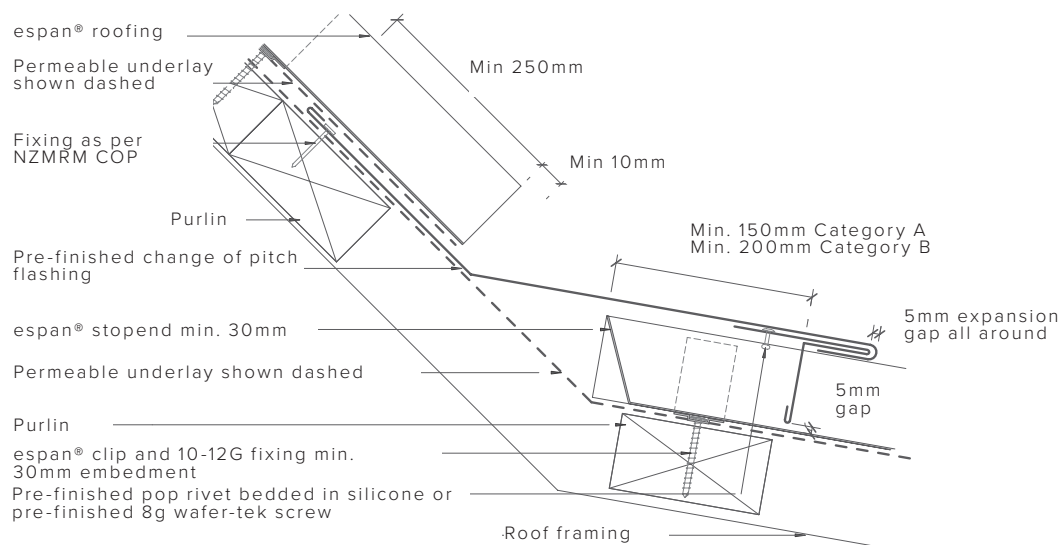
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## PARALLEL APRON DETAIL



## CHANGE OF PITCH DETAIL



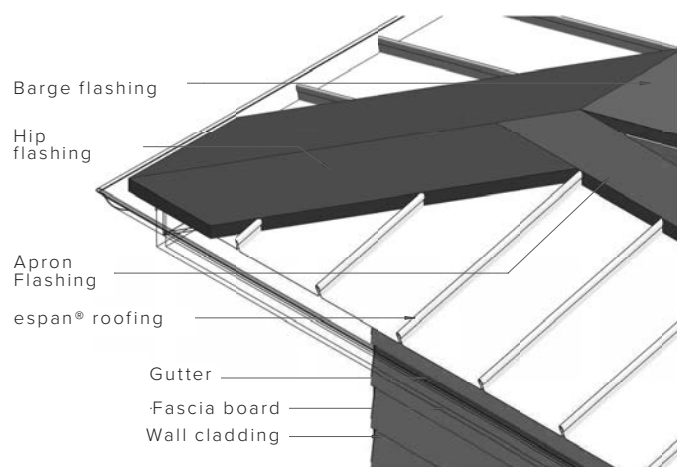
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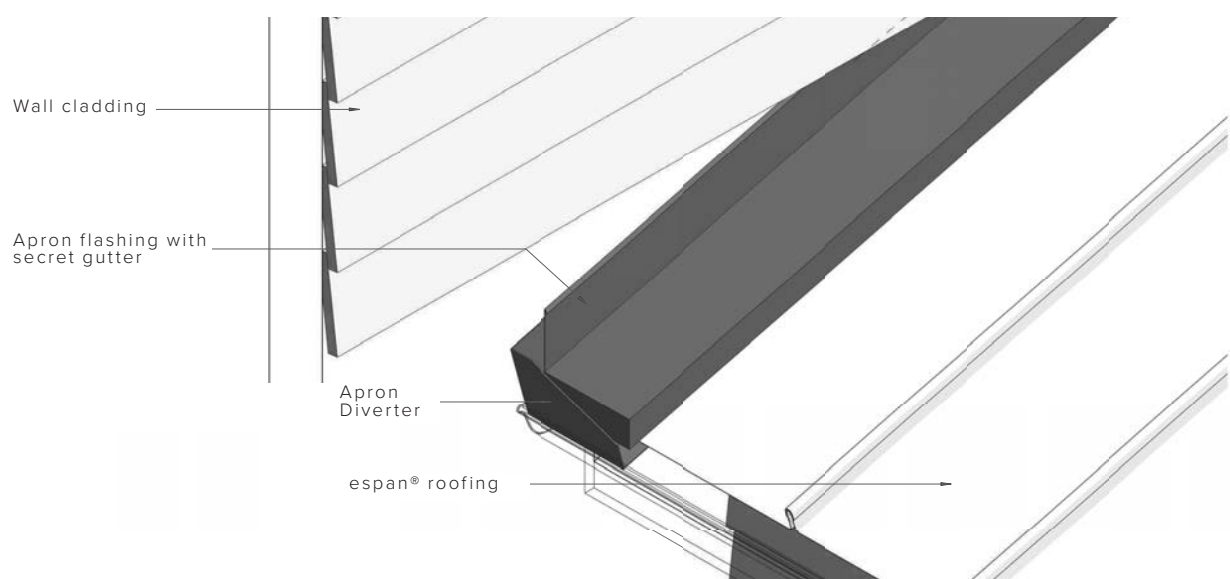


# RESIDENTIAL ROOF DETAILS

## 3D DUTCH GABLE DETAIL



## 3D APRON DETAIL

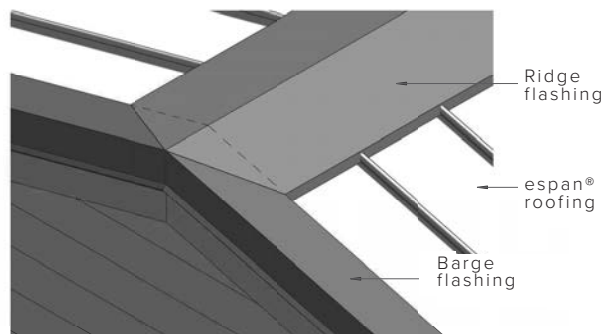


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## 3D RIDGE TO BARGE JUNCTION DETAIL

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espan® 470 in COLORSTEEL® New Denim Blue



# RESIDENTIAL CLADDING DETAILS

## BOTTOM OF CLADDING CLEARANCE

To ensure the edge of the flashing does not mechanically remove protective coatings on the cladding, there must be enough clearance between the edge of a vertical flashing, or a notched flashing, and the cladding.

Similarly, the edges of cladding running parallel to flashings, such as at a window head, should have clearance to avoid mechanical damage and allow drainage.

Having the lower edges of flashings apart from the surface they are covering helps to improve the cut edge durability of the flashing. Kick-out barge details are preferred to bird's beak barge details for the same reason. The size of the clearance is not critical, but typically it is more than 5 mm.

## GROUND CLEARANCE

Clearance is required between the bottom of espan® cladding and large flat surfaces. For timber-framed dwellings, E2/AS1 requires a clearance of 35 mm to an adjacent roof, 100 mm to paved ground, and 175 mm to unpaved ground.

## MINIMUM GROUND CLEARANCE FOR LINED BUILDINGS

Importance Levels from NZS 3604:2011 (Table 1.1):

- Level 1 - Structures presenting a low degree of hazard to life and other property
- Level 2 - Normal structures and structures not in other importance levels
- Level 3 - Structures that may contain people in crowds or contents of high value to the community, or may pose risks to people in crowds.
- Level 4 - Structures with special post-disaster functions.

Greater clearance may be required where gardens abut a wall, where lawn grasses are not grazed or maintained, or where soil spillage from adjacent banks may occur. Future landscaping effects on ground levels must also be considered.

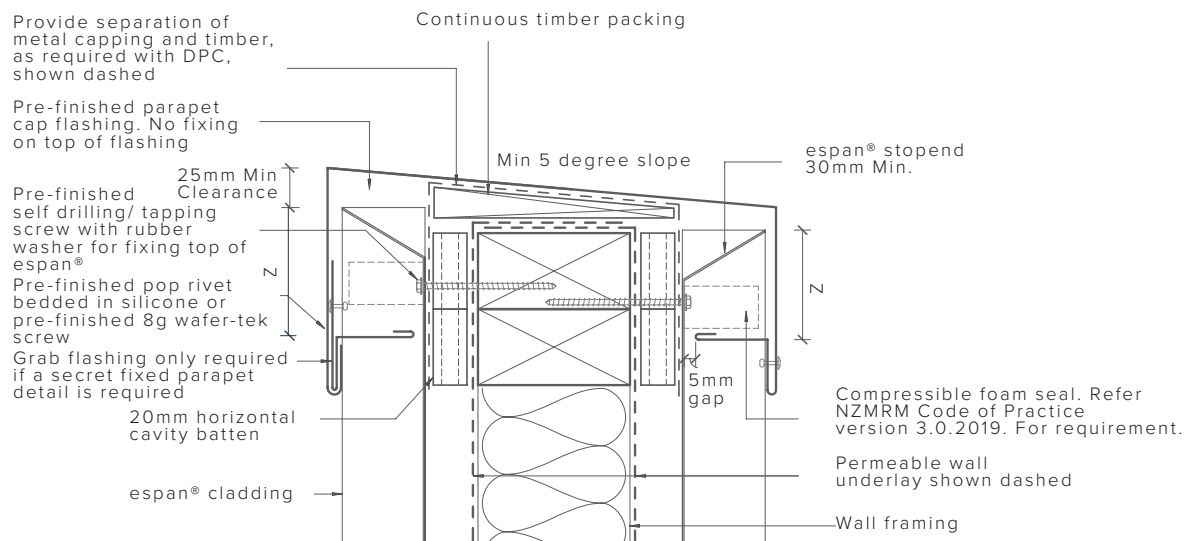
Refer to NZMRM Code of Practice for more information:  
[www.metalroofing.org.nz](http://www.metalroofing.org.nz)

espan® MINIMUM GROUND CLEARANCE IMPORTANT LEVEL 2 LINED BUILDINGS.	
MINIMUM CLEARANCE	APPLICATION
25mm	Garage door opening
35mm	Walls under canopies
100mm	Paved
125mm	Unpaved gravel
150mm	Unpaved lawn
175mm	Unpaved pasture

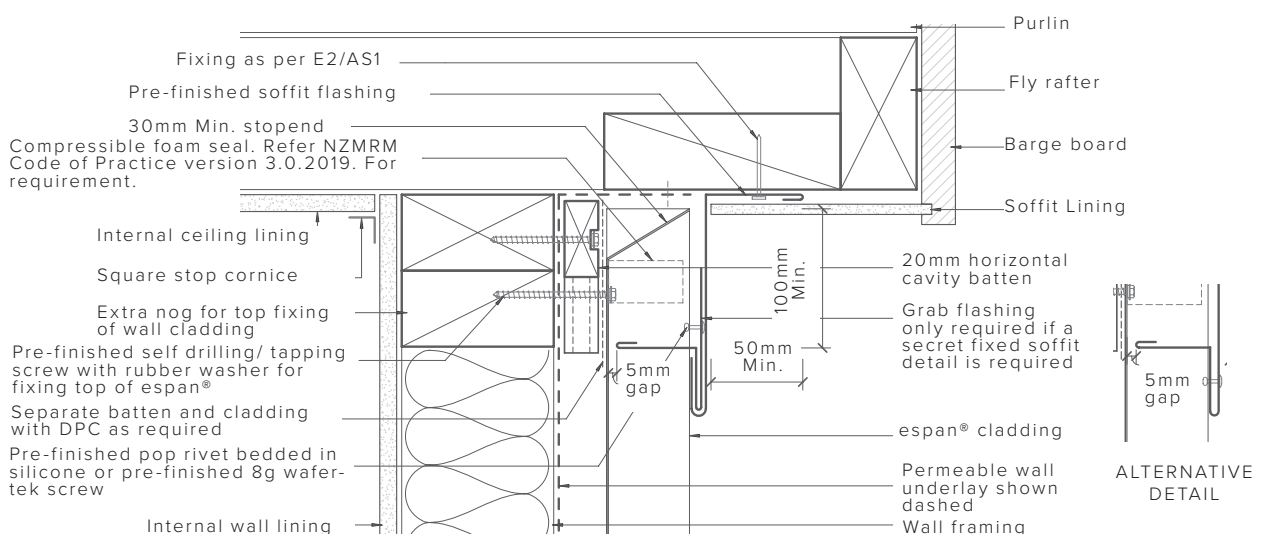


# RESIDENTIAL WALL CLADDING DETAILS

## PARAPET AND BALUSTRADE CAPPING



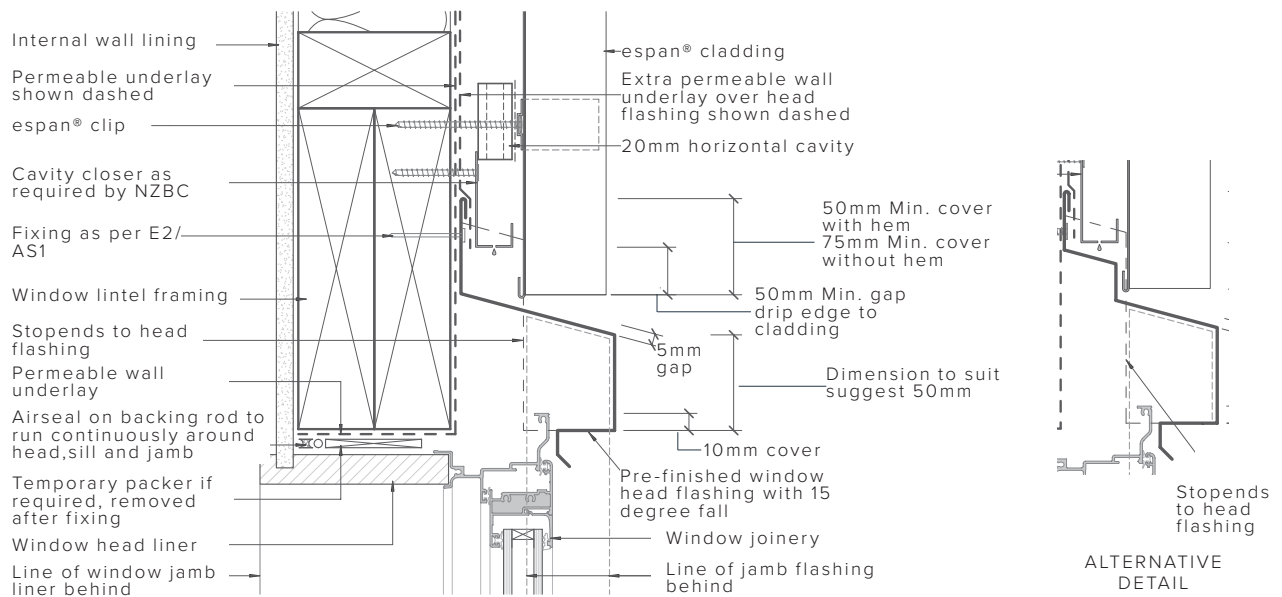
## SOFFIT



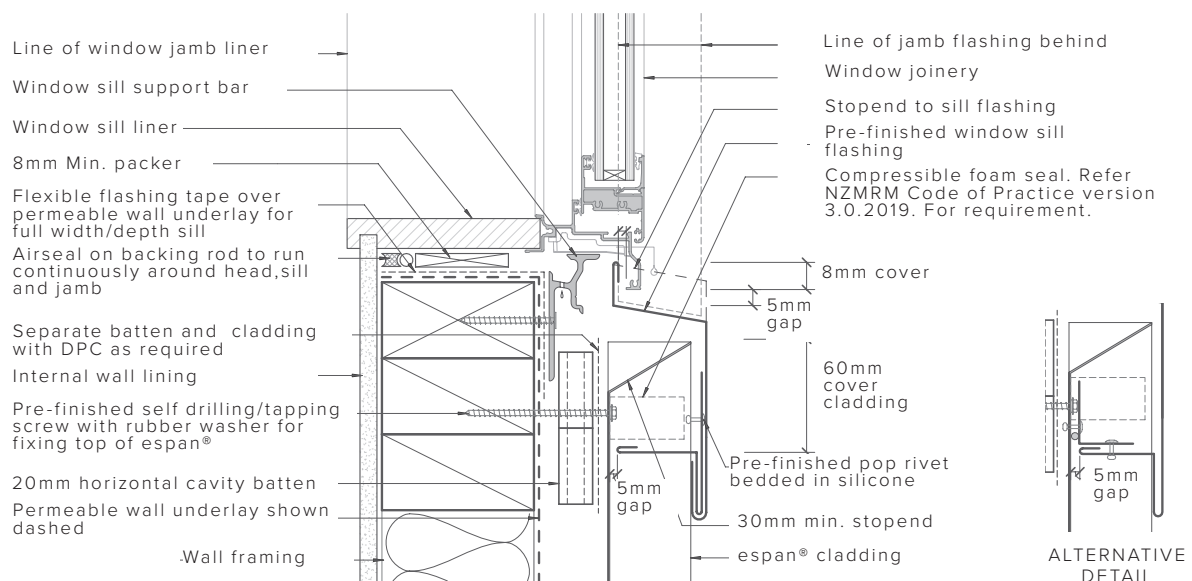
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## BUTT WINDOW HEAD



## BUTT WINDOW SILL

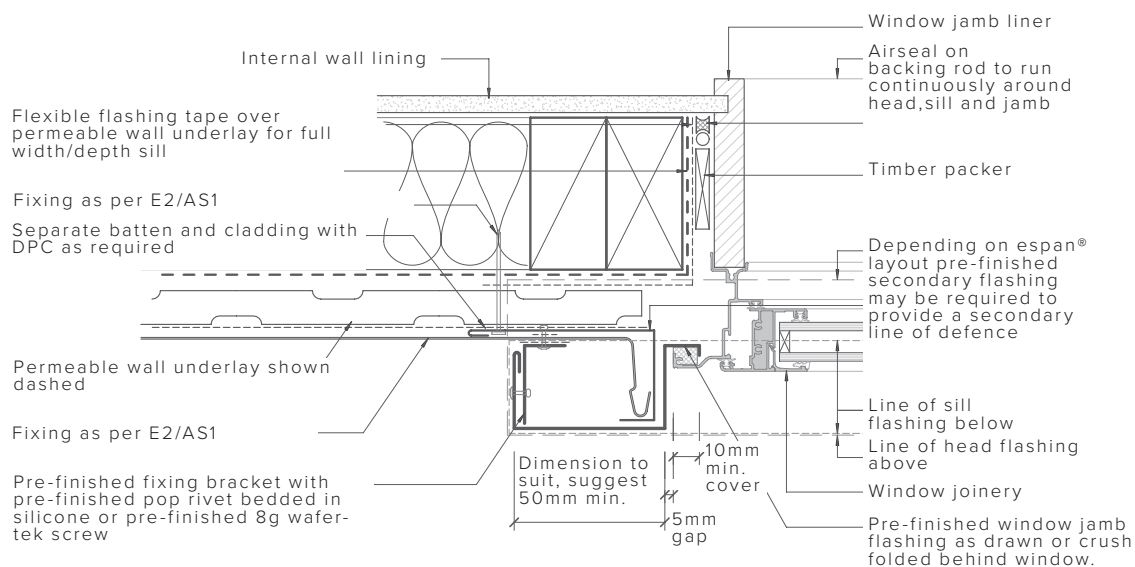


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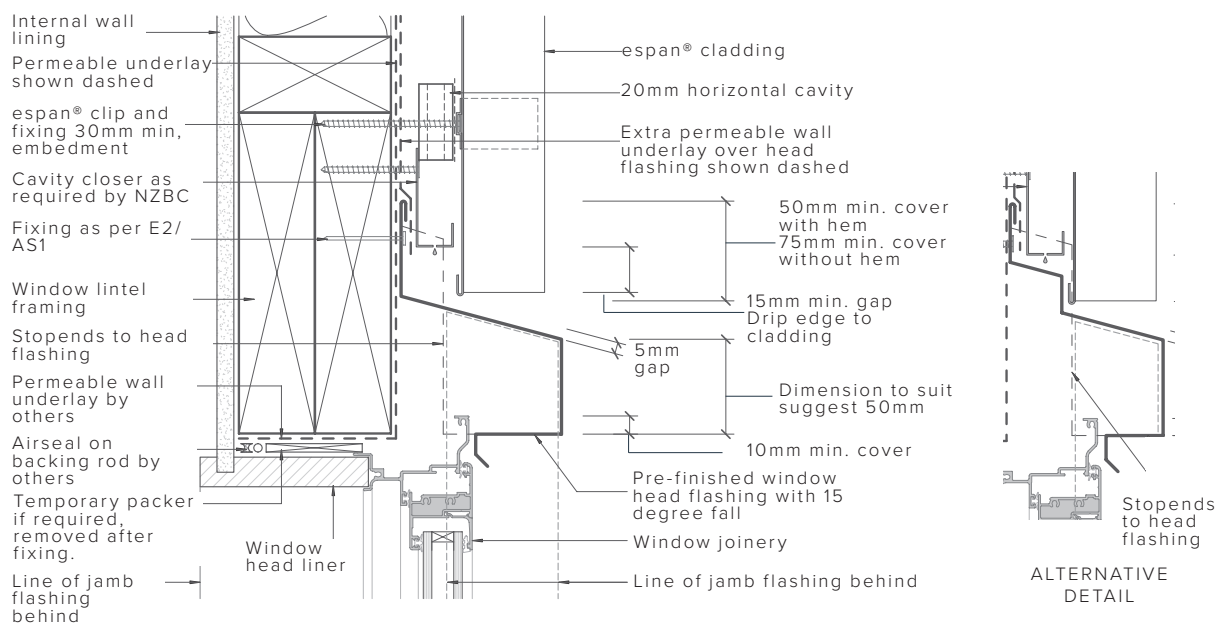
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# RESIDENTIAL WALL CLADDING DETAILS

## BUTT WINDOW JAMB

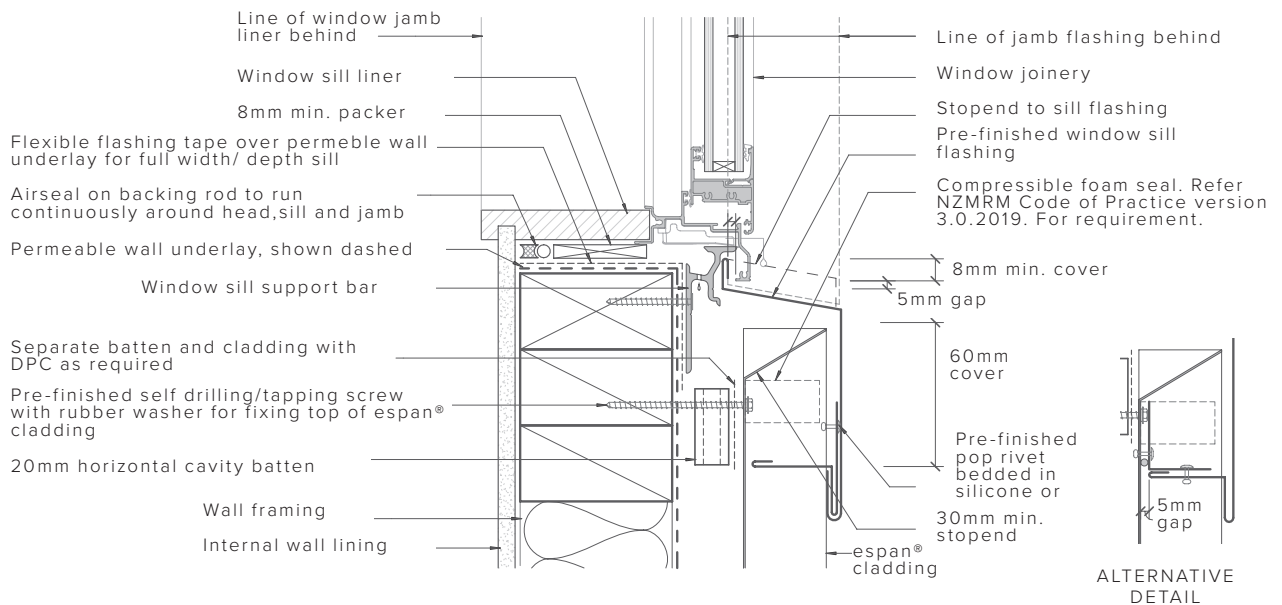


## RECESSED WINDOW HEAD

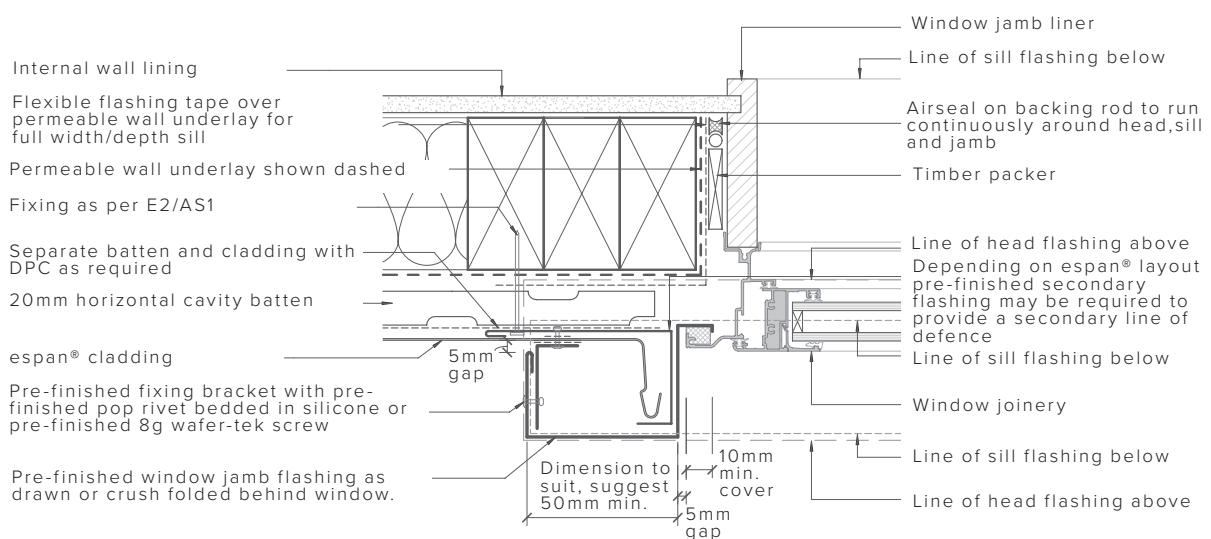


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## RECESSED WINDOW SILL



## RECESSED WINDOW JAMB



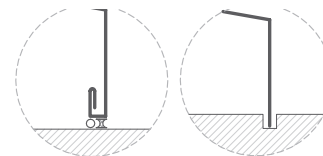
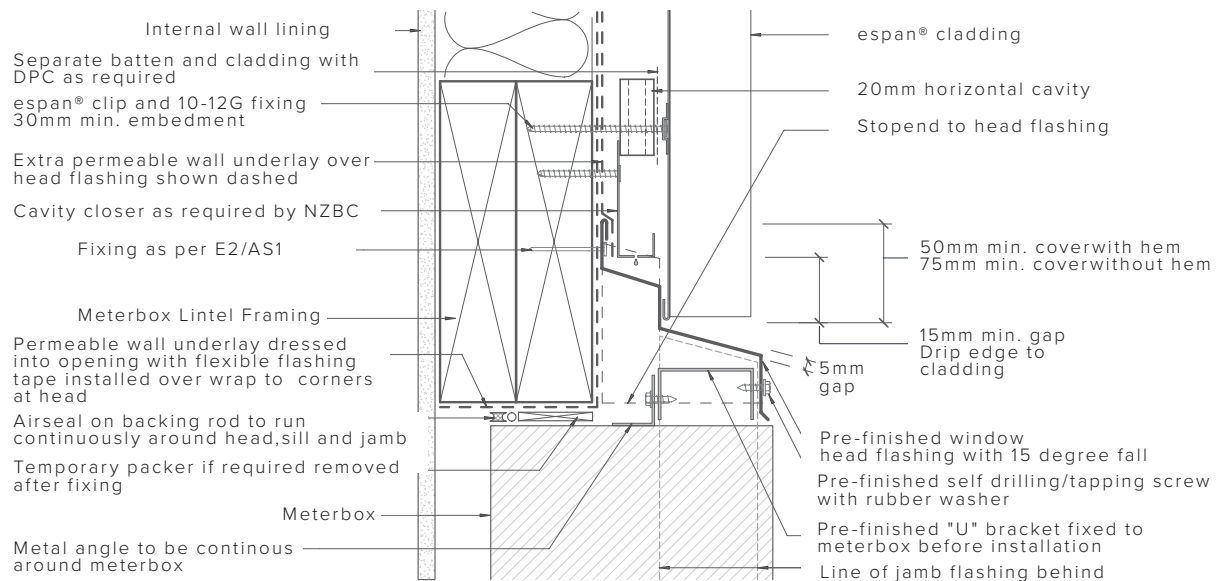
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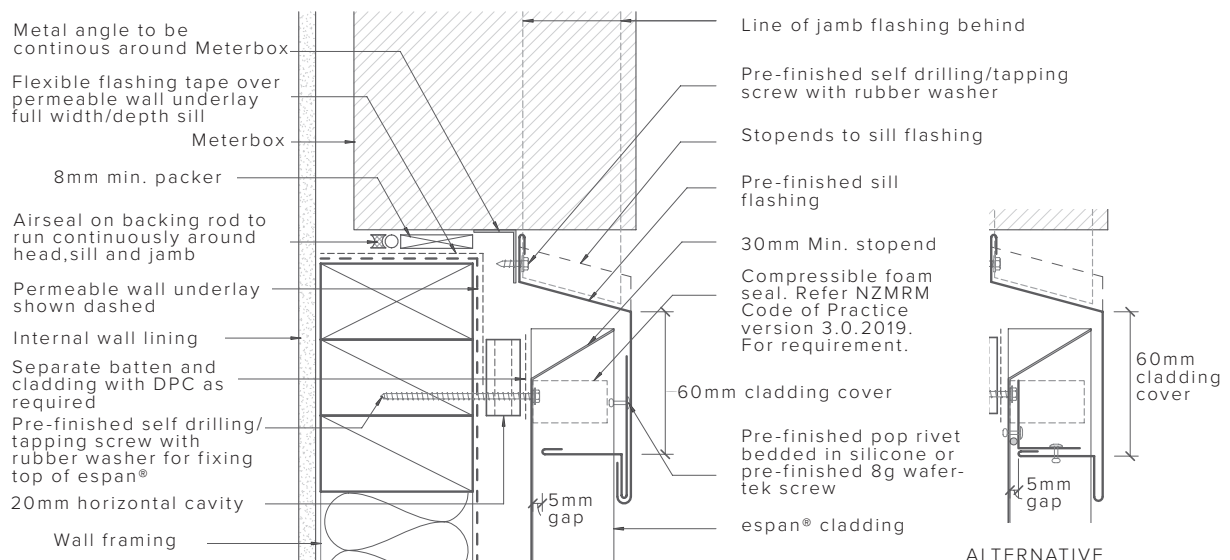
# RESIDENTIAL WALL CLADDING DETAILS

## METERBOX HEAD



ALTERNATIVE DETAILS

## METERBOX SILL

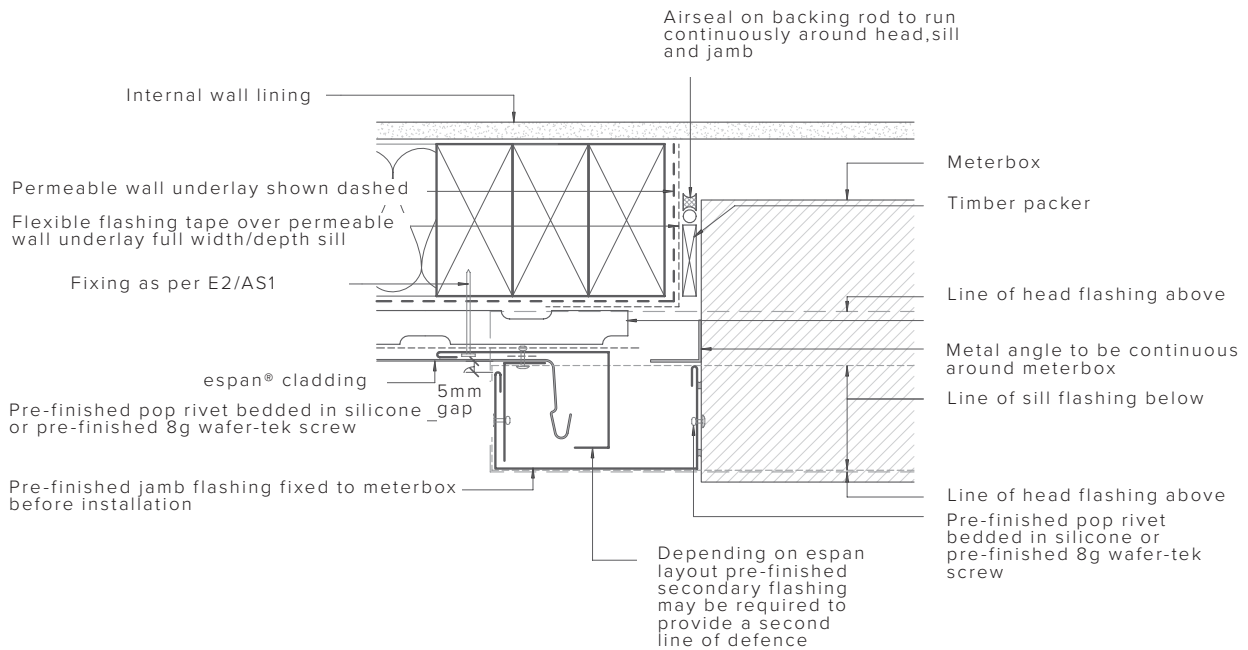


ALTERNATIVE DETAIL

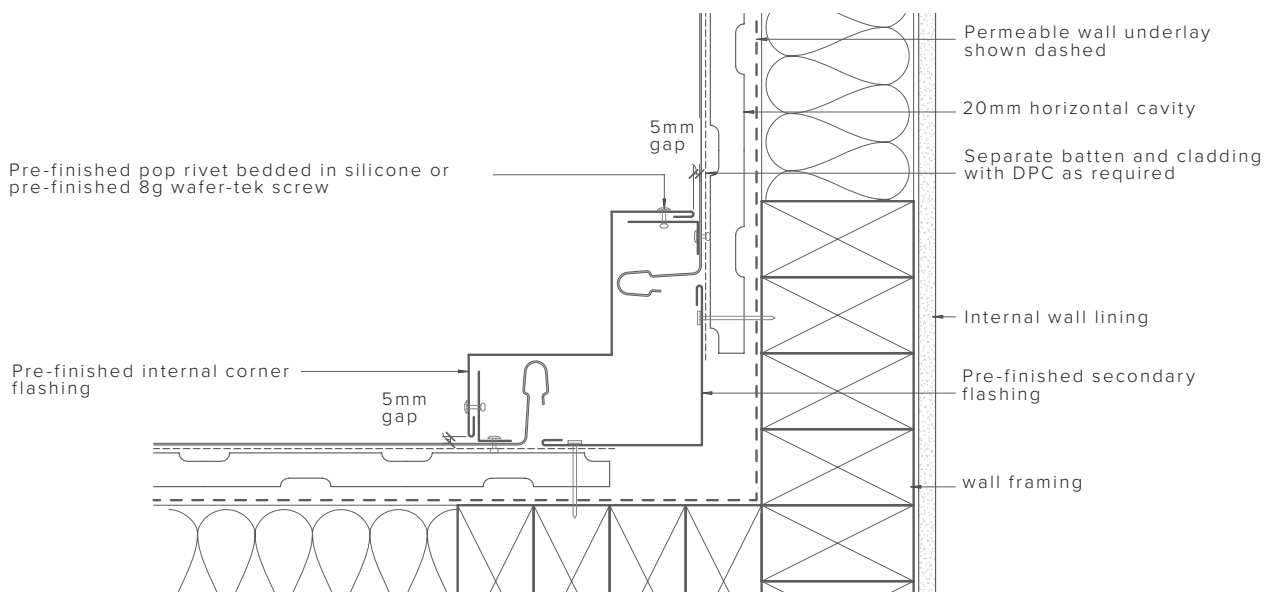
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## METERBOX JAMB



## INTERNAL CORNER

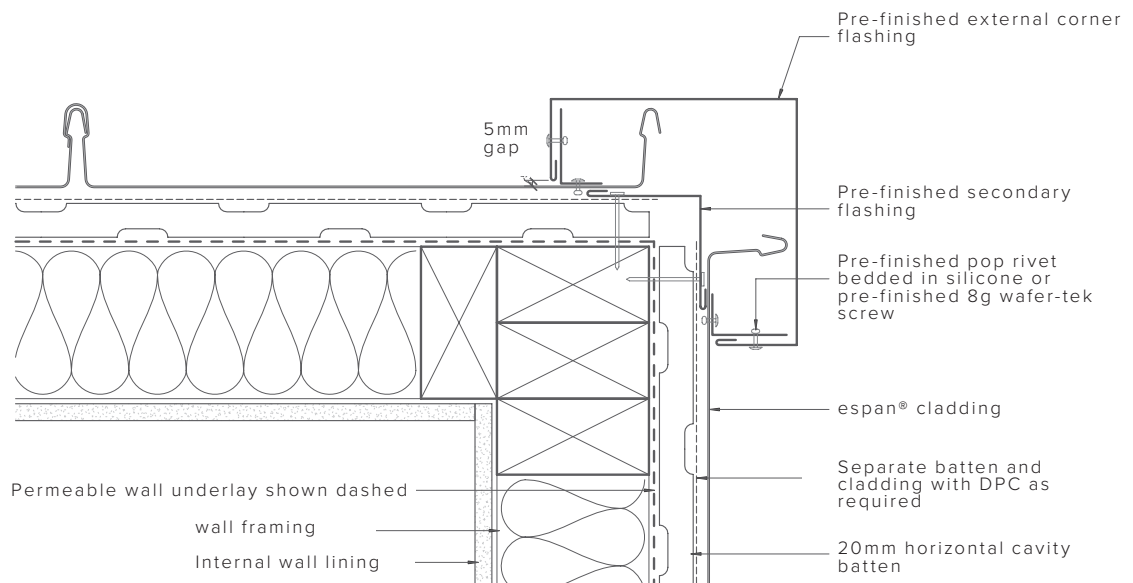


### DISCLAIMER:

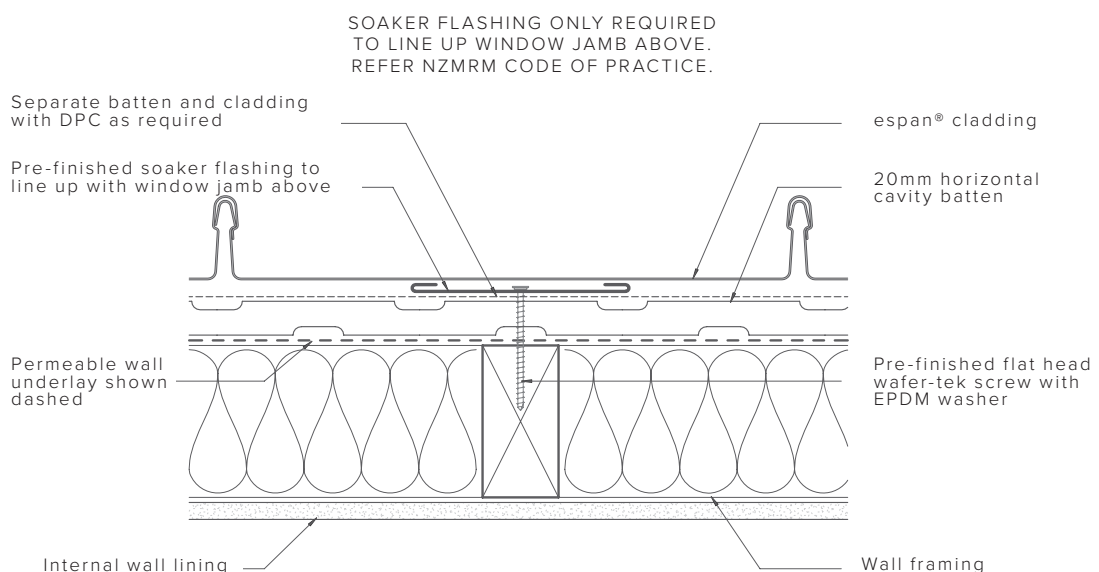
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# RESIDENTIAL WALL CLADDING DETAILS

## EXTERNAL CORNER



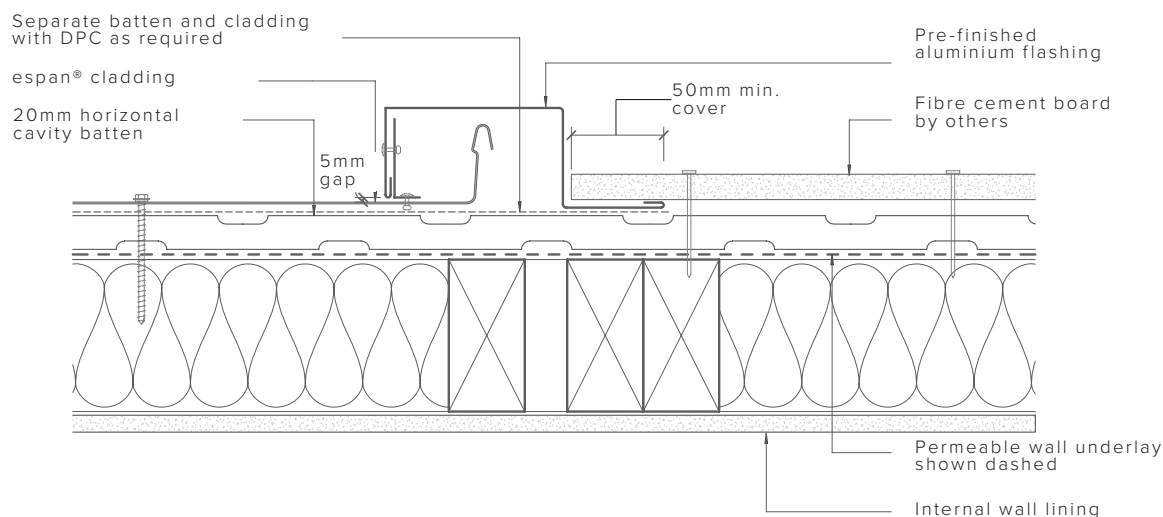
## SOAKER FLASHING



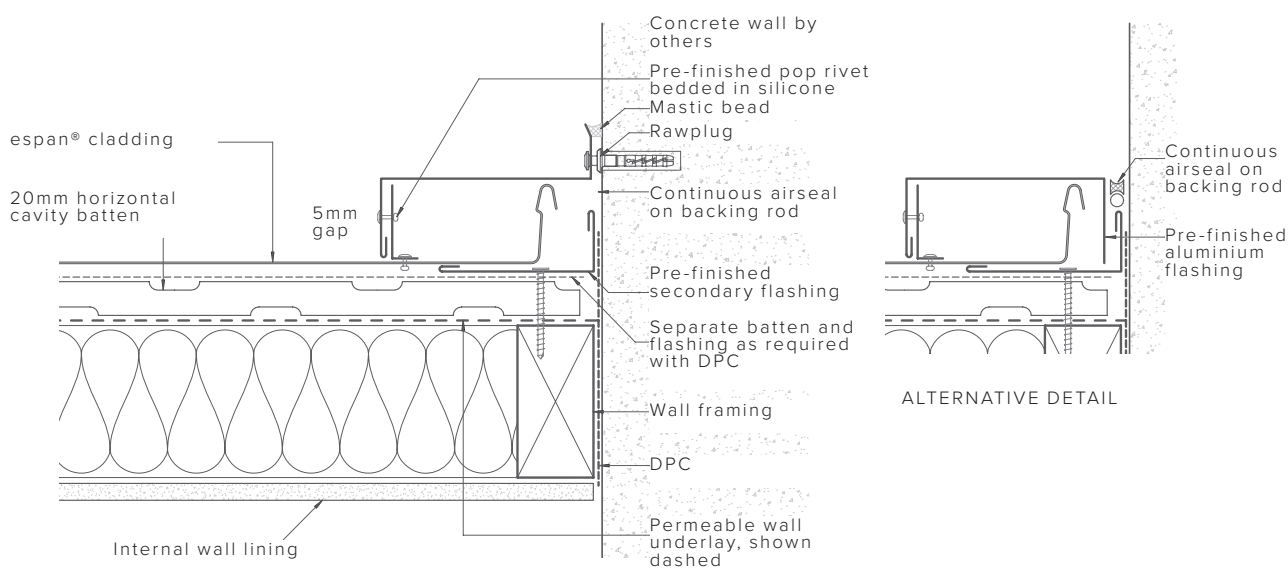
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## CHANGE IN CLADDING



## CLADDING ABUTMENT



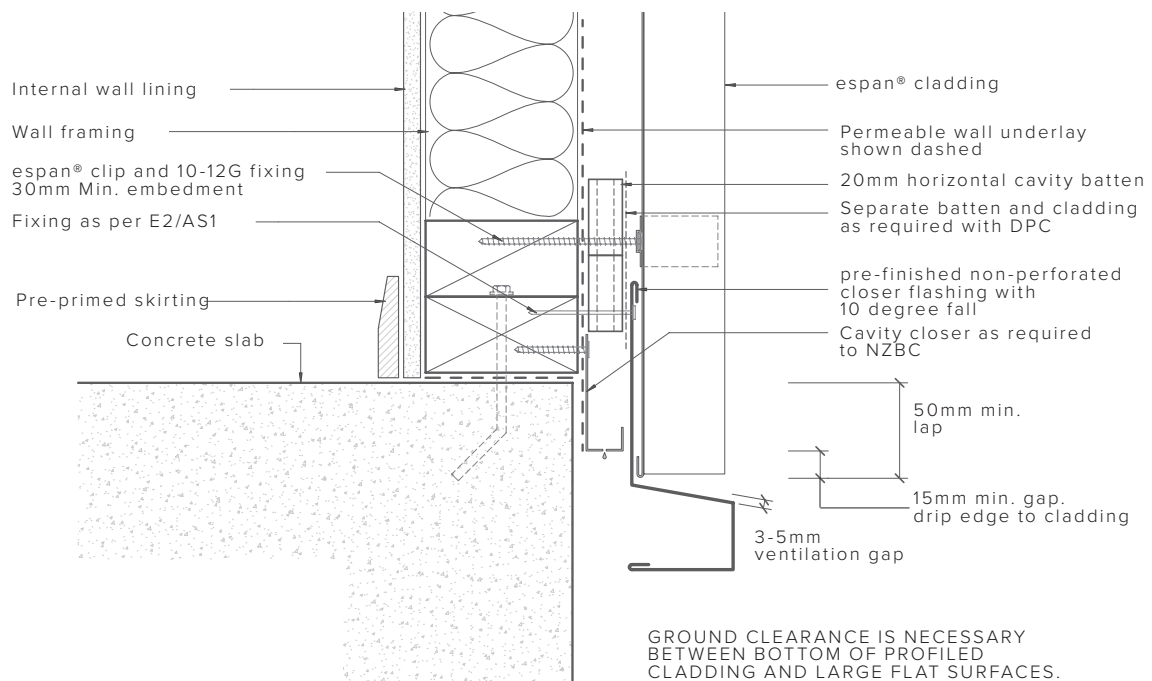
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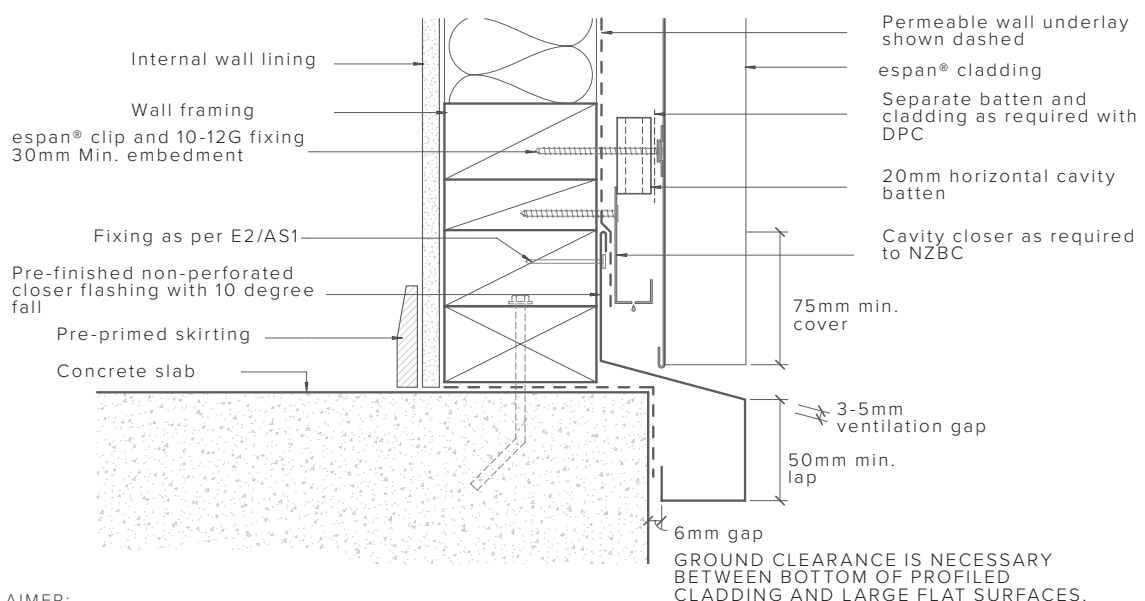


# RESIDENTIAL WALL CLADDING DETAILS

## BOTTOM OF CLADDING (FLUSH)



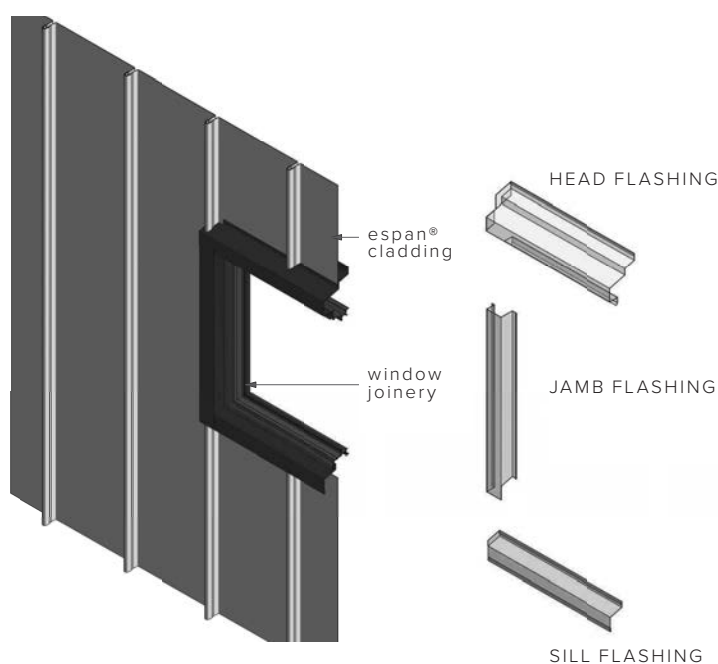
## BOTTOM OF CLADDING (RECESSED)



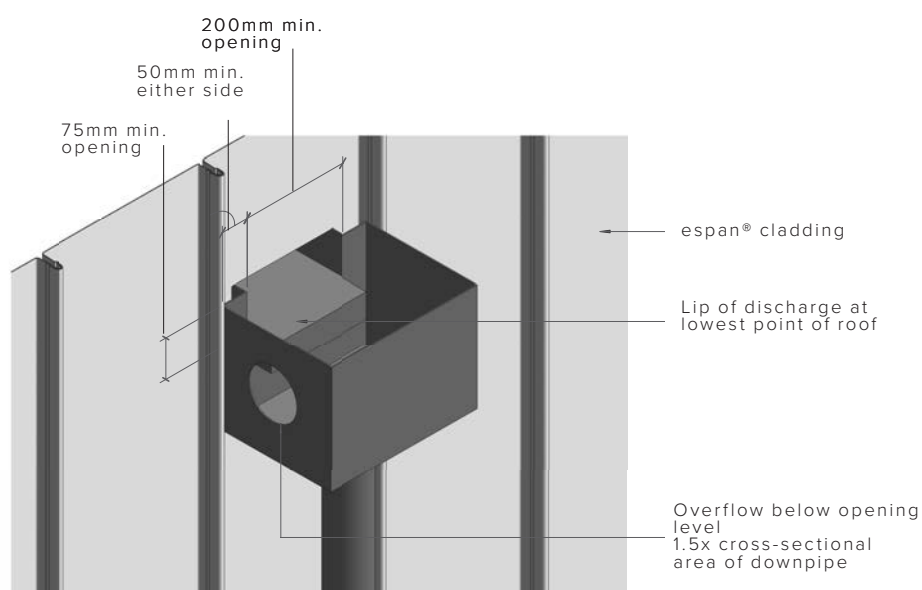
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## 3D WINDOW FLASHING



## CLADDING ABUTMENT



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# COMMERCIAL ROOF DETAILS

## FLASHING COVER DIMENSIONS

The weather-tightness of a flashing is determined by the flashing cover, not the flashing dimension. There are two categories of exposure or pitch that determine the flashing cover width. Extra High Wind Zone can be extended to include wind speeds of up to 60m/s.

Category A: Low, Medium or High Wind Zones, and where the pitch is no less than 10°.

Category B: Very High and Extra High Wind Zones, or where the pitch is less than 10°.

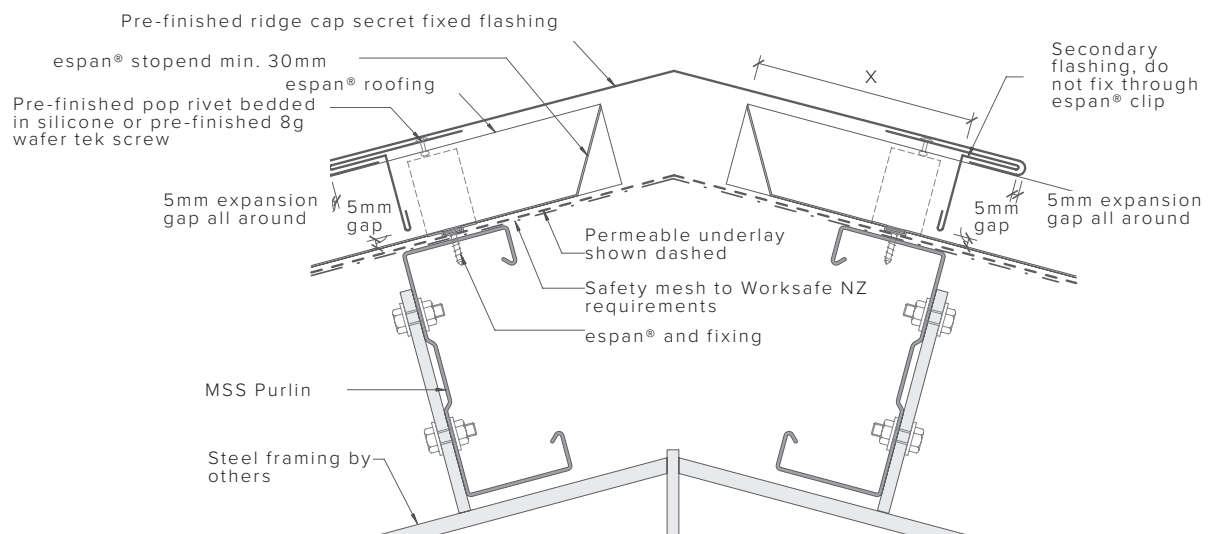
IMPORTANT: Dimensions below are flashing cover dimensions and are not flashing dimensions - Refer installation details.

FLASHING TYPE	LEGEND	DIRECTION	CATEGORY A	CATEGORY B
RIDGE	X	Transverse over sheeting	130mm	200mm
SAW TOOTH RIDGE	X	Transverse over sheeting	130mm	200mm
	Z	Vertically down face (smooth)	50mm	75 mm
		Vertically down face (profiled)	75 mm	100 mm
BARGE	Longitudinal		one rib as espan® profile height over 35mm. Where a flashing or folded sheet of espan is folded the turn up must be greater than 35mm.	
	Z	Vertically down face (smooth)	50mm	75mm
	Z	Vertically down face (profiled)	75mm	100mm
APRON	L	Transverse over sheeting	150mm	200mm
	M	Longitudinal	one rib as espan® profile height over 35mm. Where a flashing or folded sheet of espan is folded the turn up must be greater than 35mm.	
	N	Vertically up face (smooth)	50mm with hem 75mm no hem	75 mm with hem or 100 mm no hem
	N	Vertically up face (profiled)	75 mm with hem 100mm no hem	100mm with hem 125mm no hem
	G	End of wall cladding	25mm min. clearance from an apron flashing or another horizontal surface	
PARAPET	Z	Vertically down face (smooth)	50mm	75mm
	Z	Vertically down face (profiled)	75mm	100mm
CHANGE OF PITCH	Transverse over sheet		150mm	200mm
	Transverse under sheet		250mm	250mm

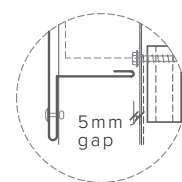
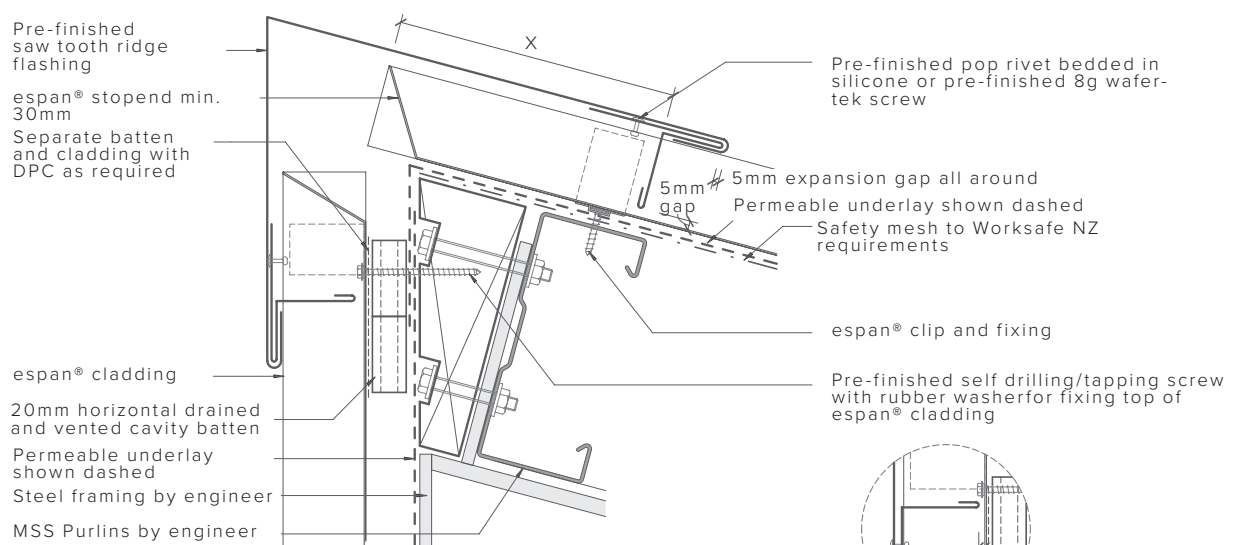


# COMMERCIAL ROOF DETAILS

## ROOF RIDGE DETAIL

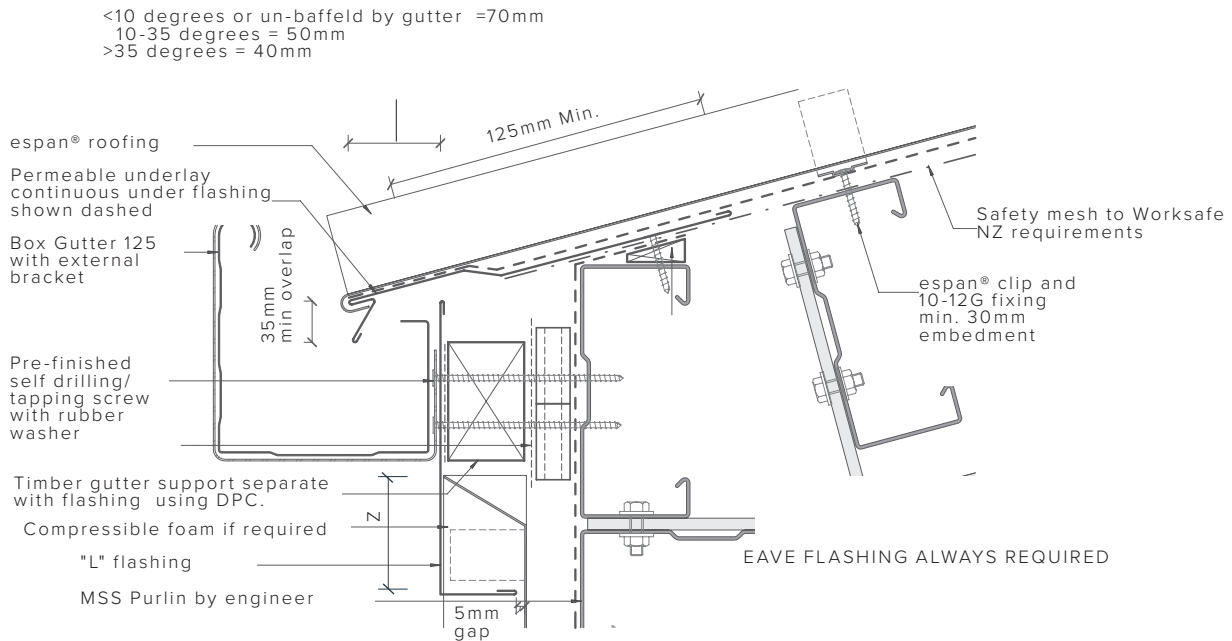


## SAW TOOTH DETAIL

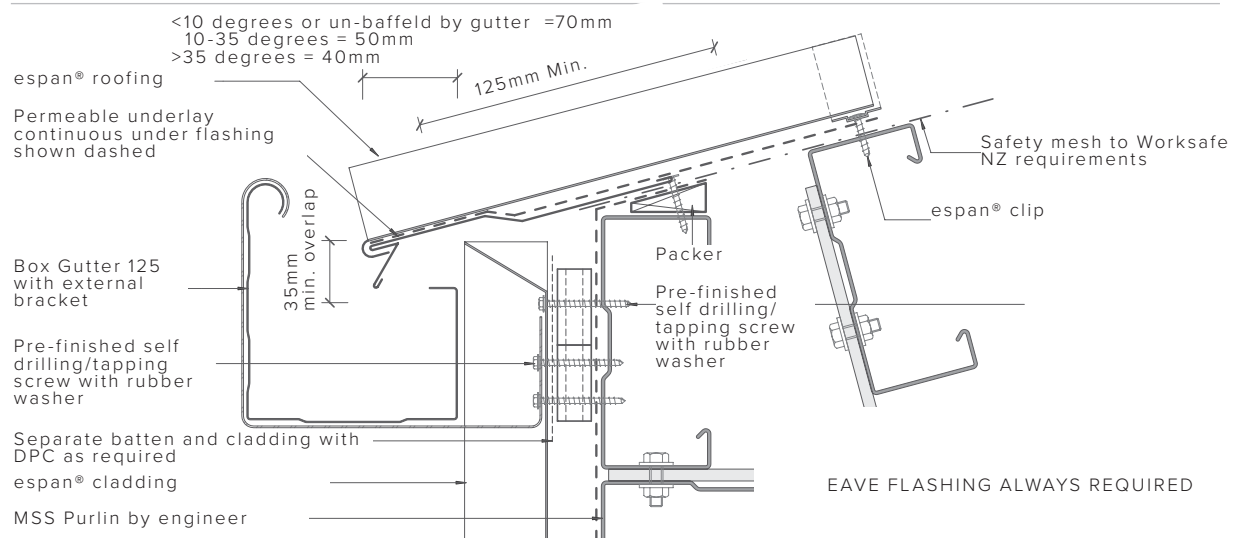


ALTERNATIVE DETAIL

## FLUSH EAVE WITH BOX GUTTER DETAIL



## ALTERNATIVE FLUSH EAVE WITH BOX GUTTER DETAIL

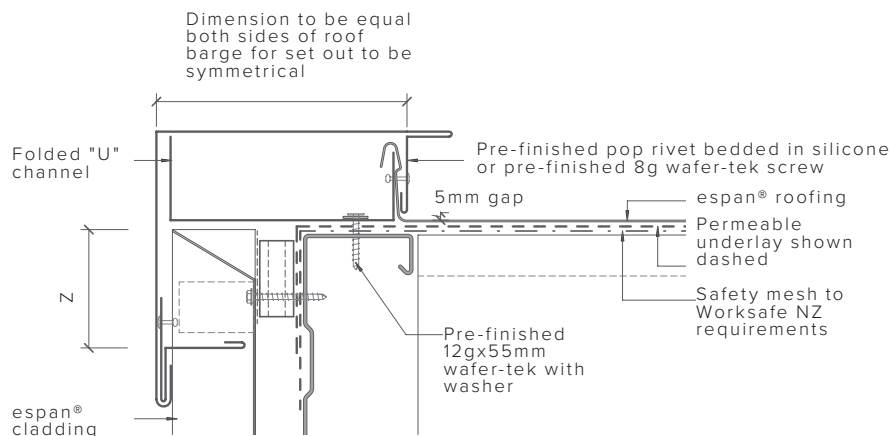


### DISCLAIMER:

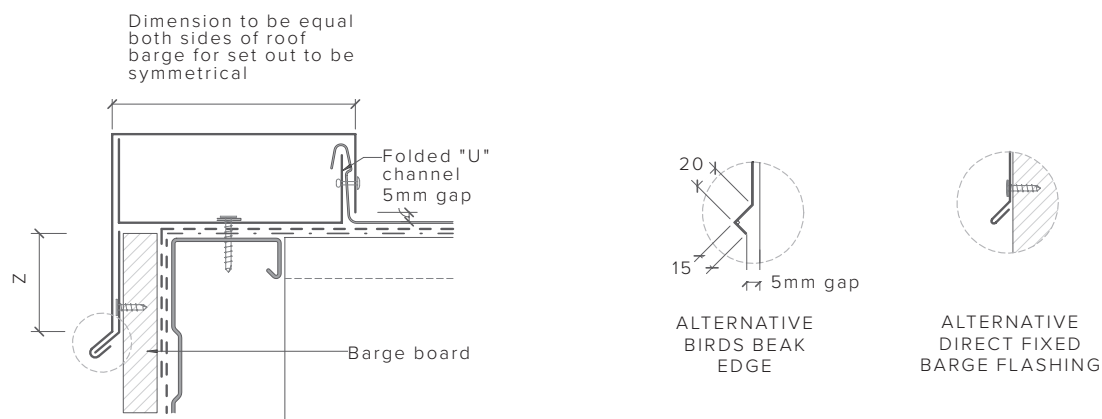
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# COMMERCIAL ROOF DETAILS

## BARGE WITH PROFILED CLADDING



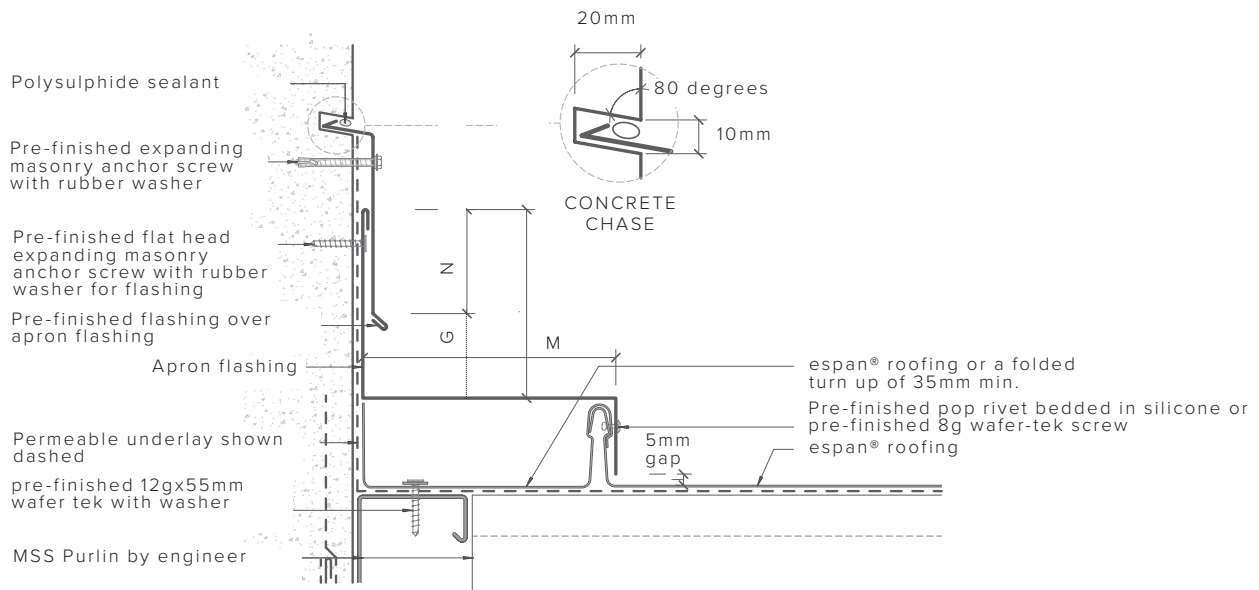
## BARGE WITH TIMBER FASCIA



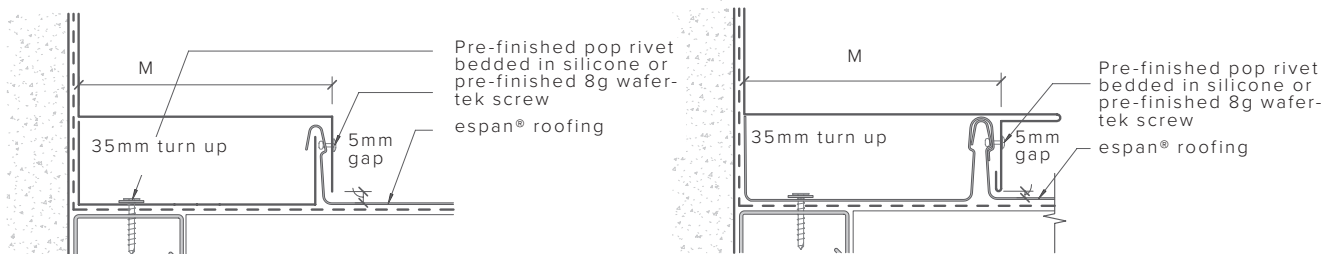
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## PARALLEL APRON



## ALTERNATIVE PARALLEL APRON



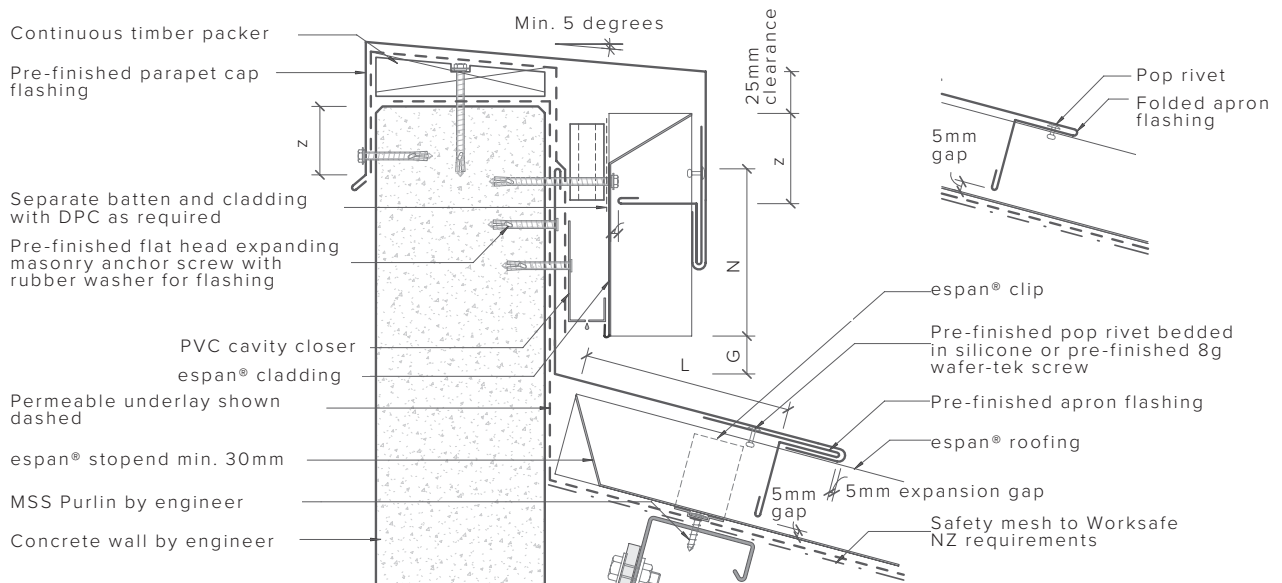
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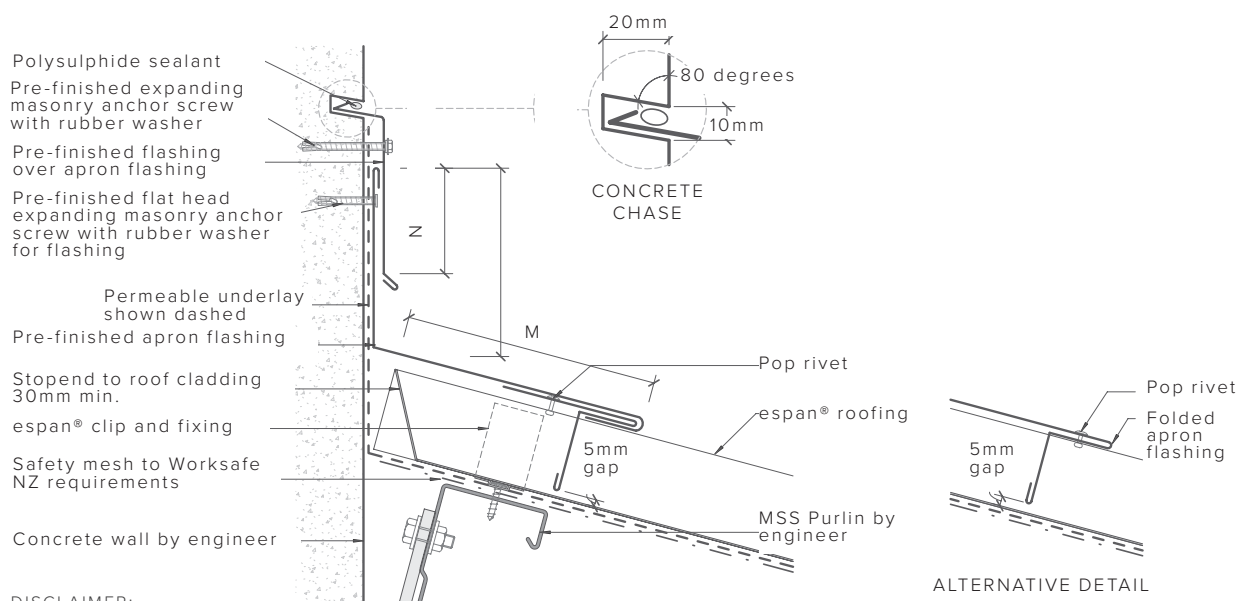


# COMMERCIAL ROOF DETAILS

## PARAPET WITH TRANSVERSE APRON



## TRANSVERSE APRON

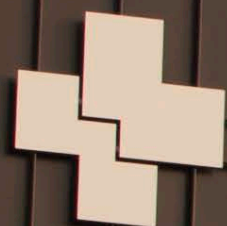


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espan® 470 in COLORSTEEL® Sandstone Grey Low Gloss.



WigramHealth

WigramHealth

# COMMERCIAL WALL CLADDING DETAILS

## BOTTOM OF CLADDING CLEARANCE

To ensure the edge of the flashing does not mechanically remove protective coatings on the cladding, there must be enough clearance between the edge of a vertical flashing, or a notched flashing, and the cladding.

Similarly, the edges of cladding running parallel to flashings, such as at a window head, should have clearance to avoid mechanical damage and allow drainage.

Having the lower edges of flashings apart from the surface they are covering helps to improve the cut edge durability of the flashing. Kick-out barge details are preferred to bird's beak barge details for the same reason. The size of the clearance is not critical, but typically it is more than 5 mm.

## GROUND CLEARANCE

Clearance is required between the bottom of espan® cladding and large flat surfaces. For timber-framed dwellings, E2/AS1 requires a clearance of 35 mm to an adjacent roof, 100 mm to paved ground, and 175 mm to unpaved ground.

## MINIMUM GROUND CLEARANCE FOR LINED BUILDINGS

Importance Levels from NZS 3604:2011 (Table 1.1):

- Level 1 - Structures presenting a low degree of hazard to life and other property
- Level 2 - Normal structures and structures not in other importance levels
- Level 3 - Structures that may contain people in crowds or contents of high value to the community, or may pose risks to people in crowds.
- Level 4 - Structures with special post-disaster functions.

Greater clearance may be required where gardens abut a wall, where lawn grasses are not grazed or maintained, or where soil spillage from adjacent banks may occur. Future landscaping effects on ground levels must also be considered.

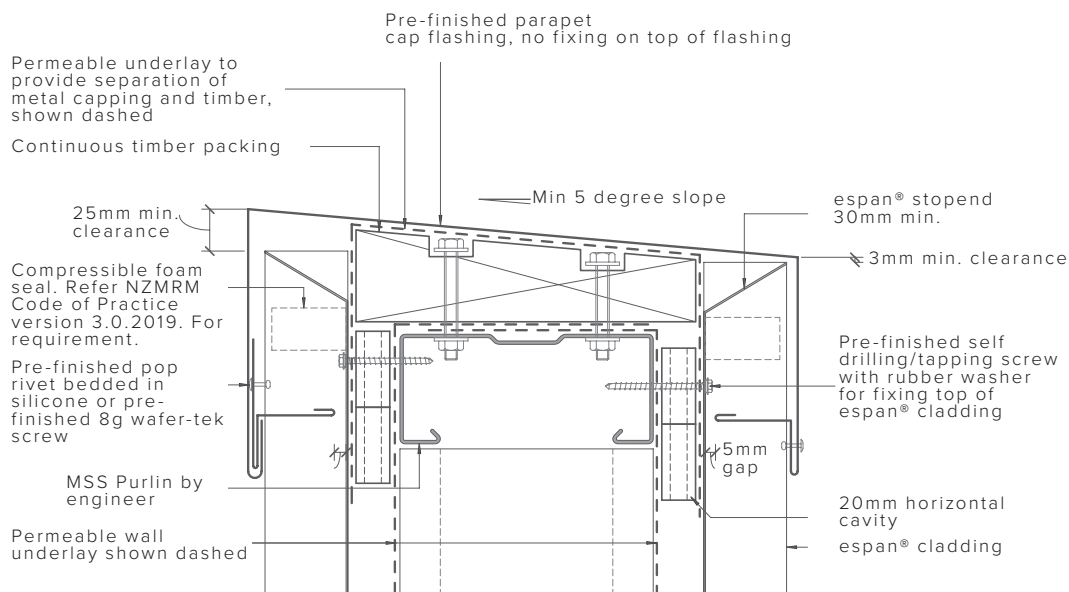
Refer to NZMRM Code of Practice for more information: [www.metalroofing.org.nz](http://www.metalroofing.org.nz)

espan® MINIMUM GROUND CLEARANCE IMPORTANT LEVEL 2 LINED BUILDINGS.	
MINIMUM CLEARANCE	APPLICATION
25mm	Garage door opening
35mm	Walls under canopies
100mm	Paved
125mm	Unpaved gravel
150mm	Unpaved lawn
175mm	Unpaved pasture

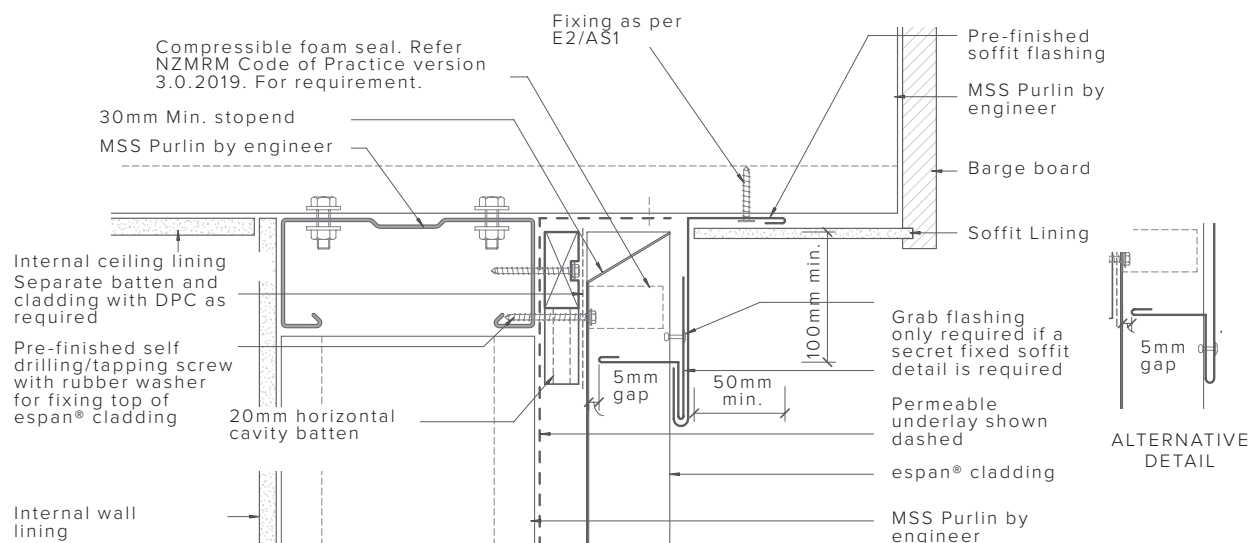


# COMMERCIAL WALL CLADDING DETAILS

## PARAPET AND BALUSTRADE CAPPING



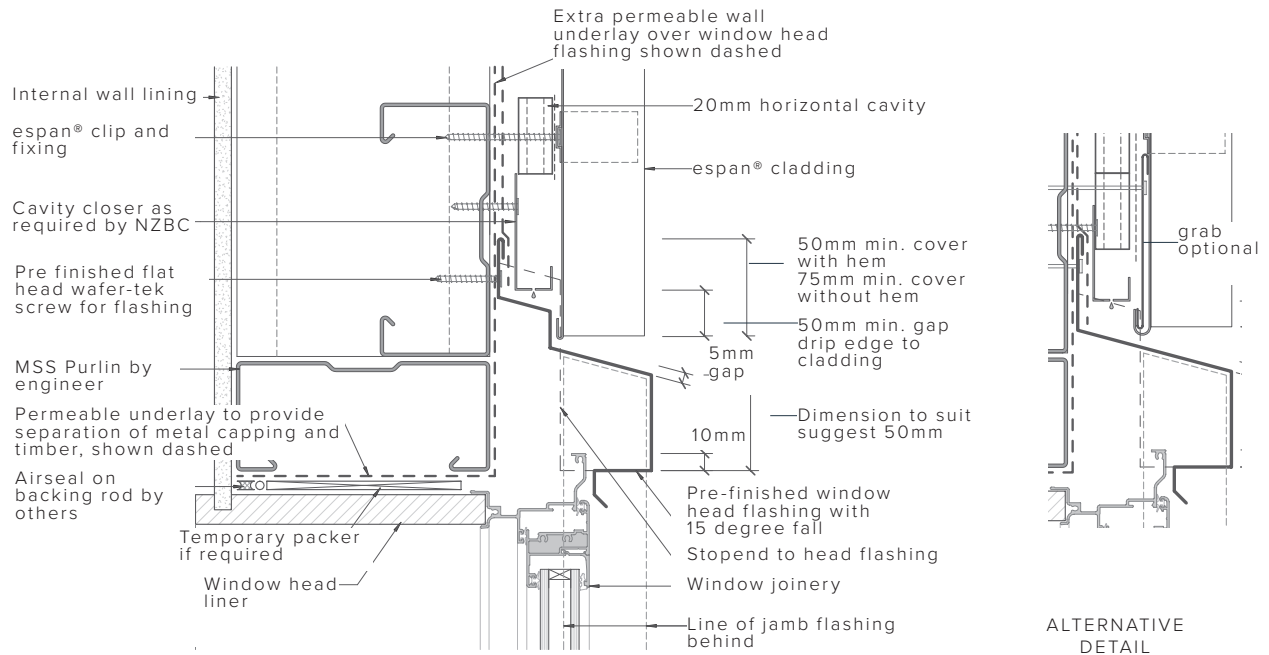
## SOFFIT



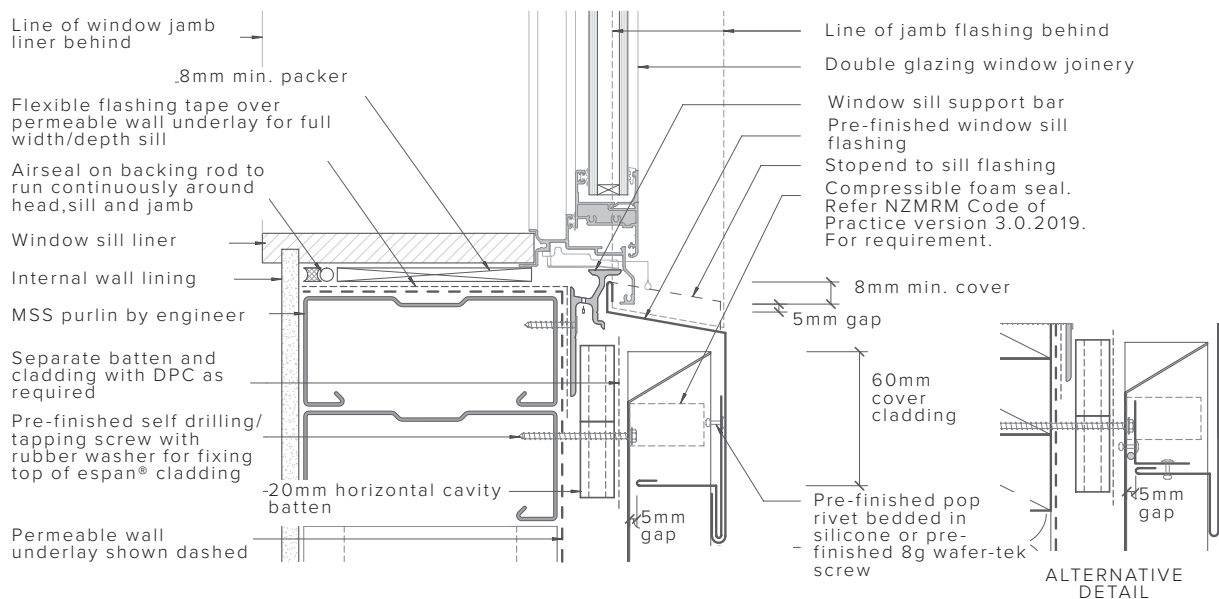
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## BUTT WINDOW HEAD



## BUTT WINDOW SILL

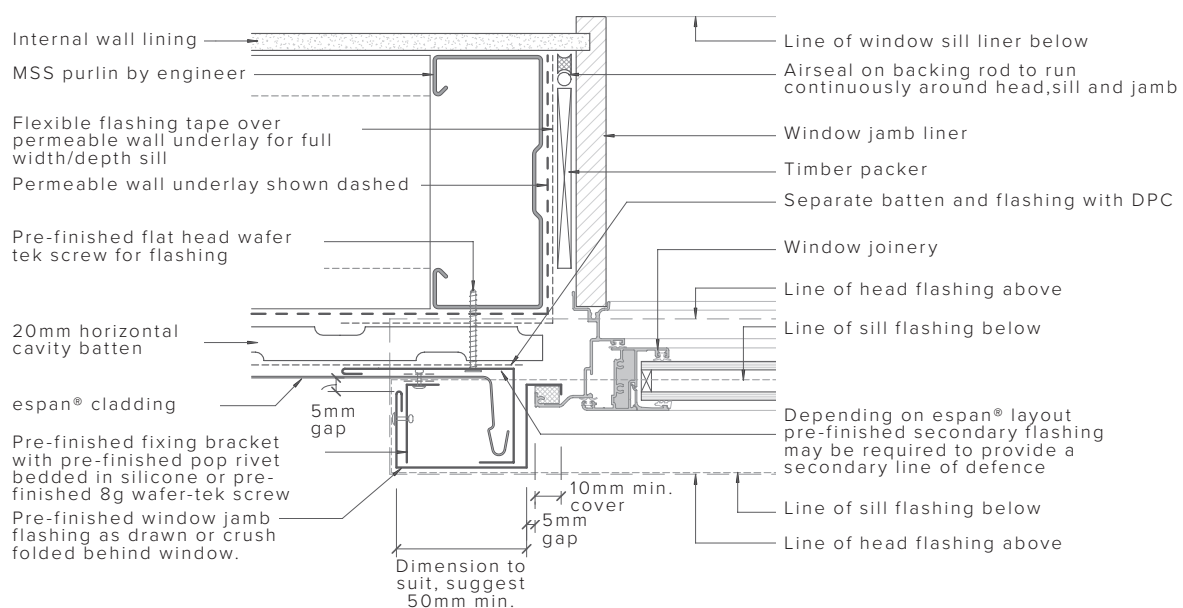


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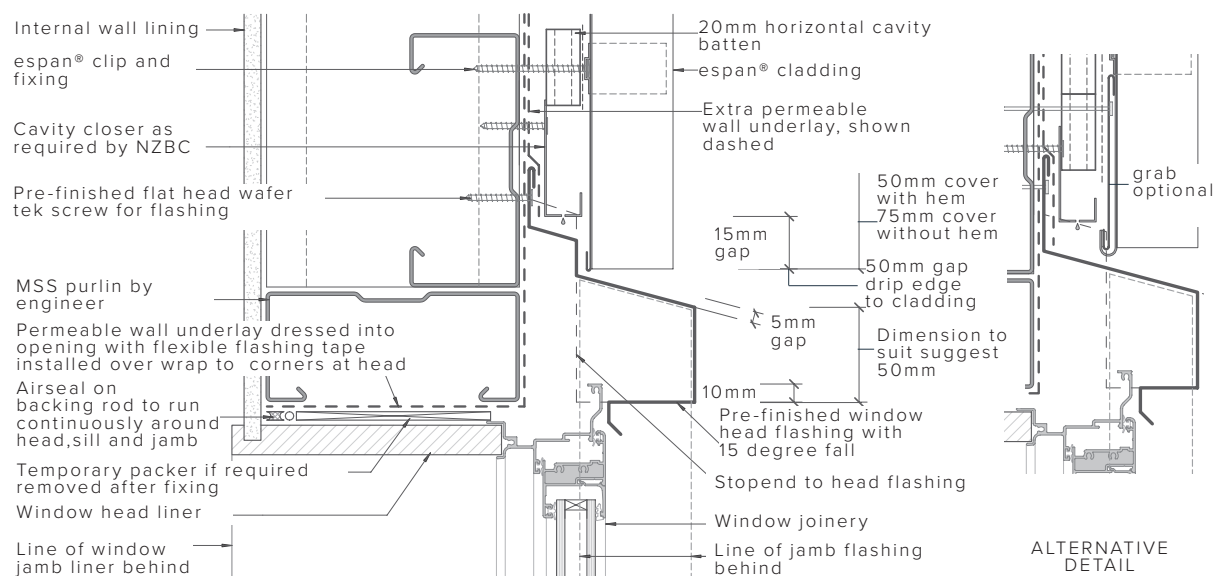
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# COMMERCIAL WALL CLADDING DETAILS

## BUTT WINDOW JAMB



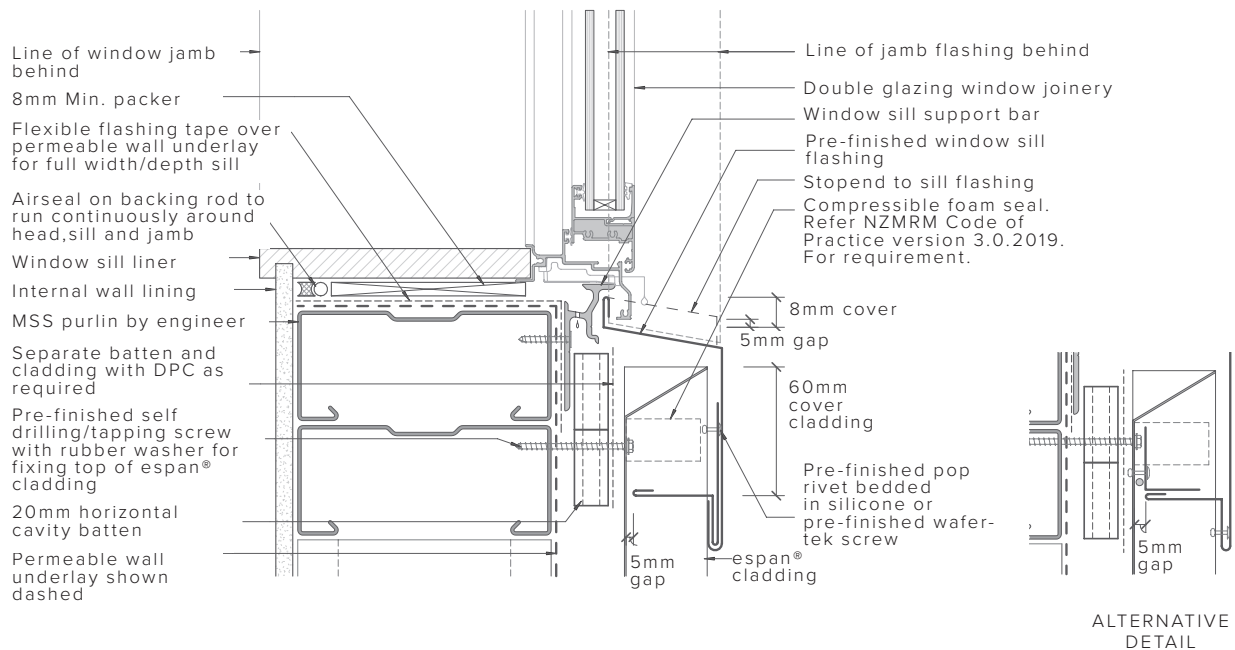
## RECESSED WINDOW HEAD



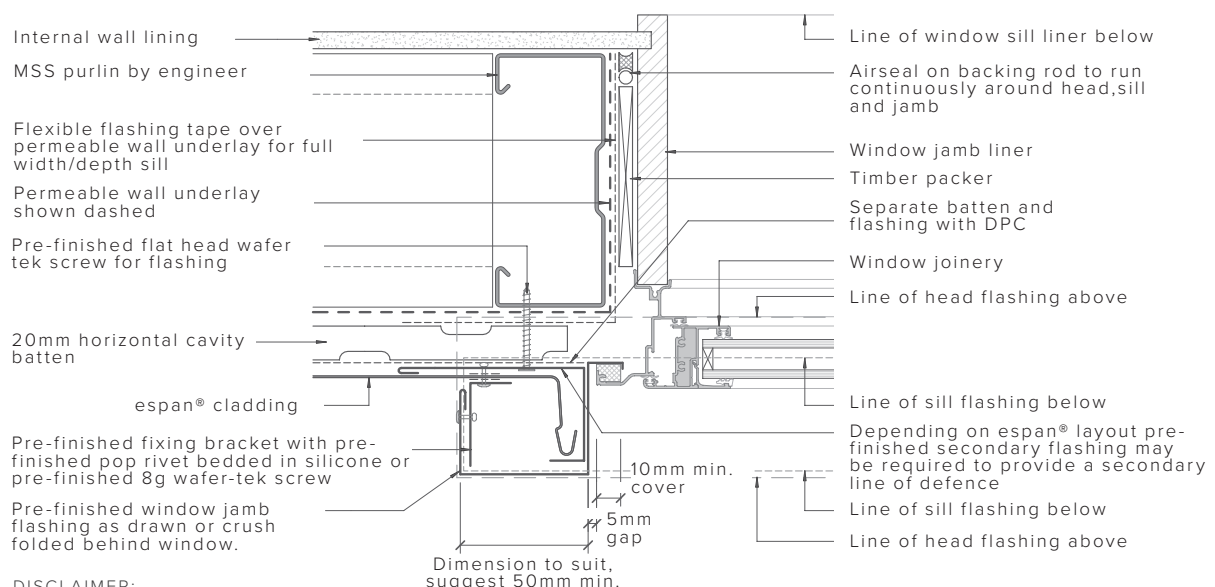
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## RECESSED WINDOW SILL



## RECESSED WINDOW JAMB

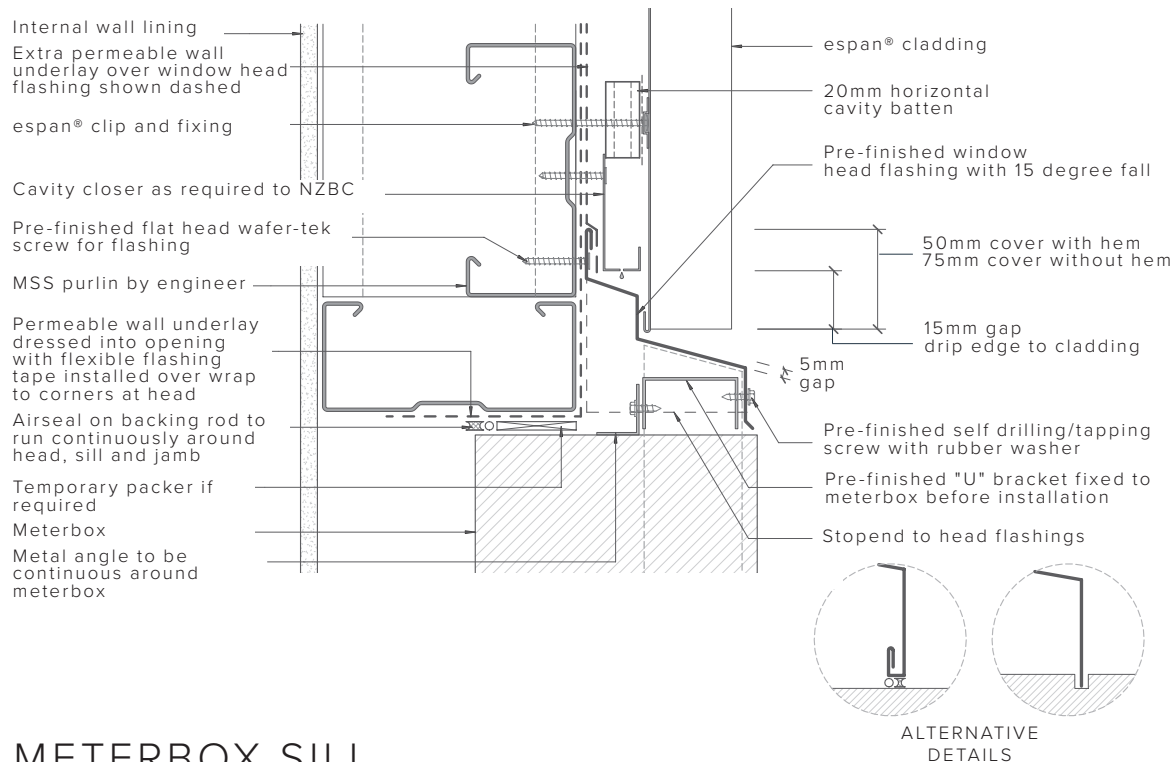


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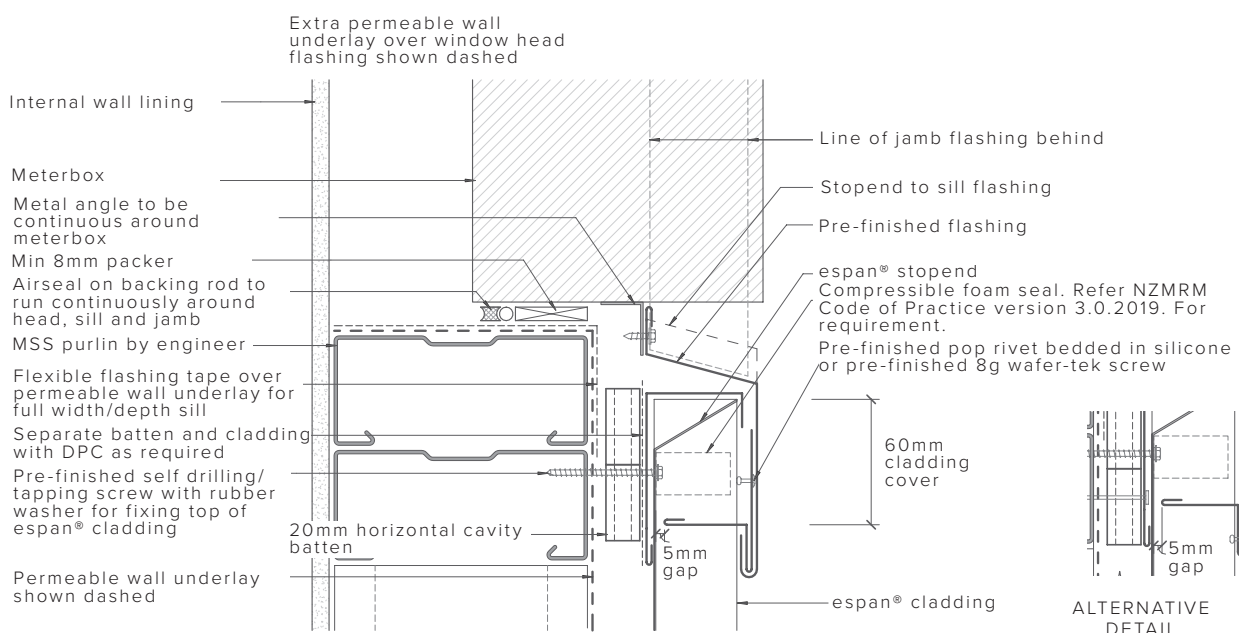


# COMMERCIAL WALL CLADDING DETAILS

## METERBOX HEAD



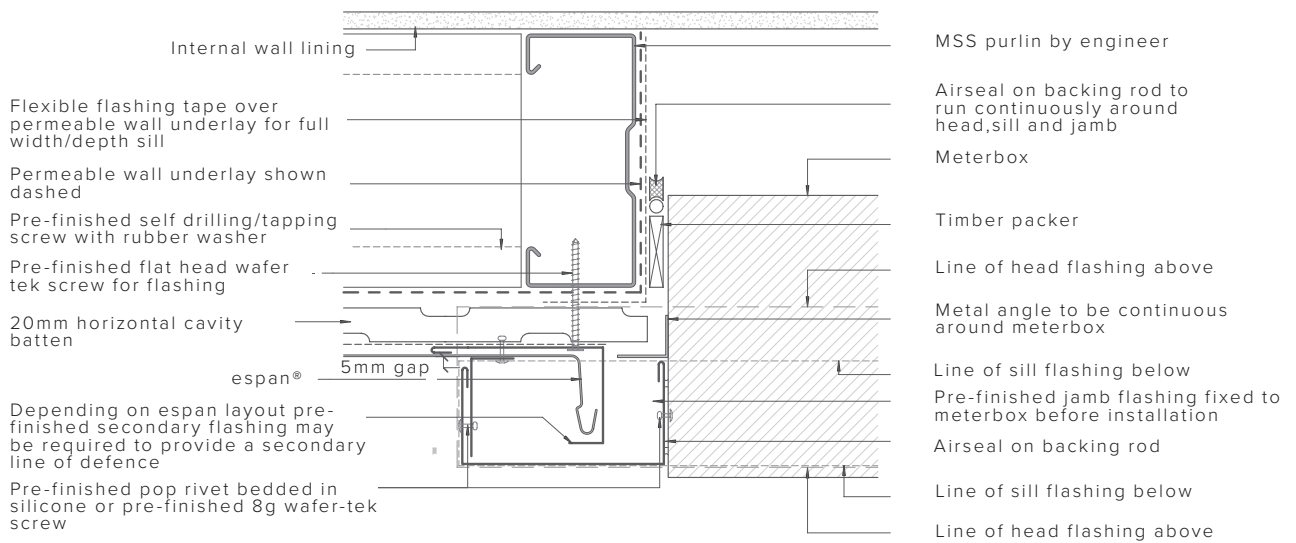
## METERBOX SILL



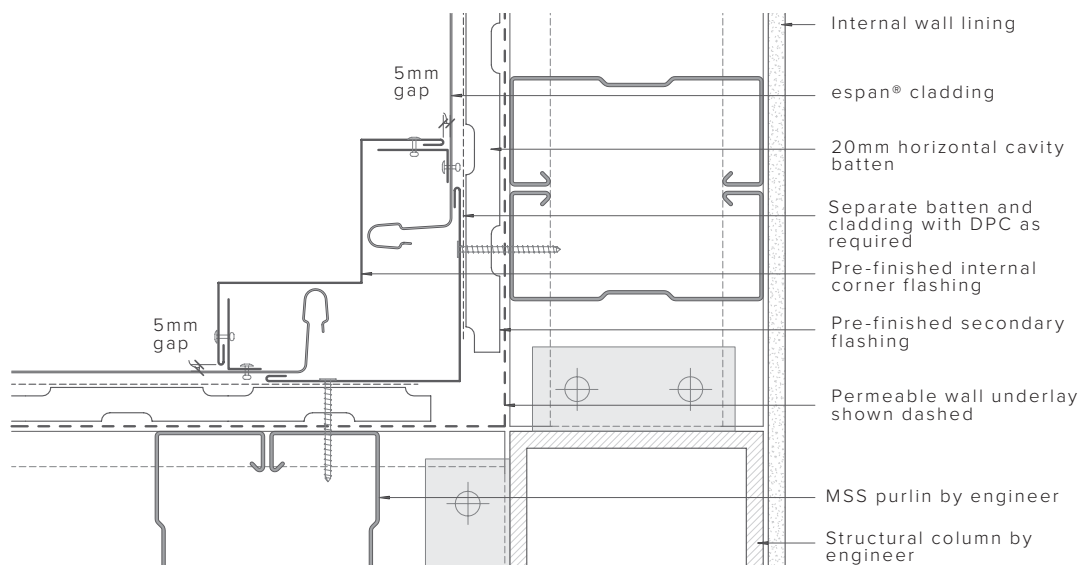
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## METERBOX JAMB



## INTERNAL CORNER

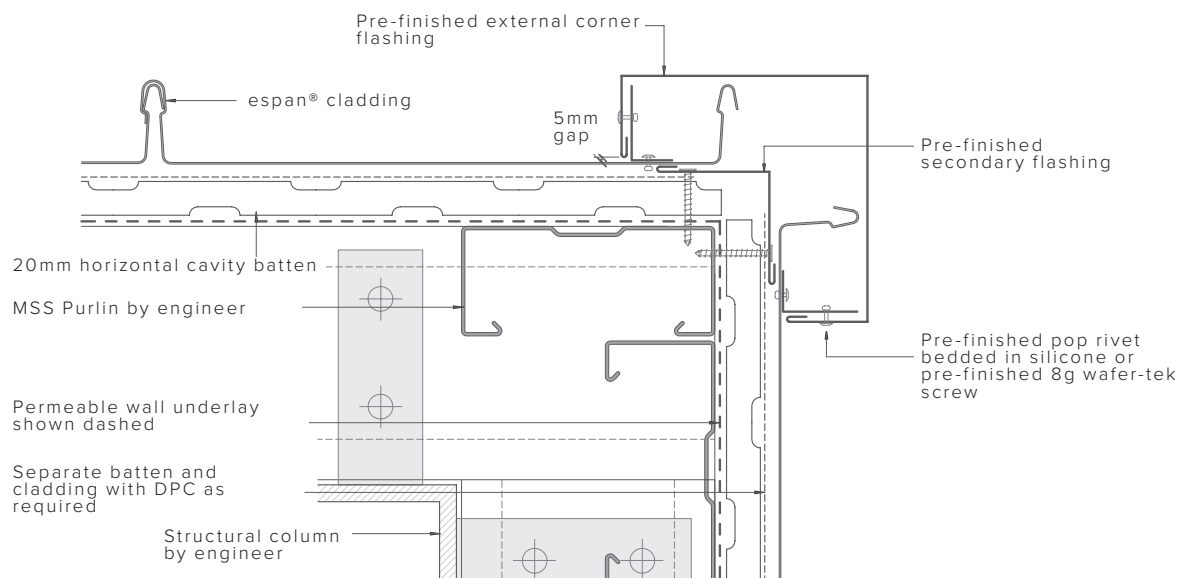


### DISCLAIMER:

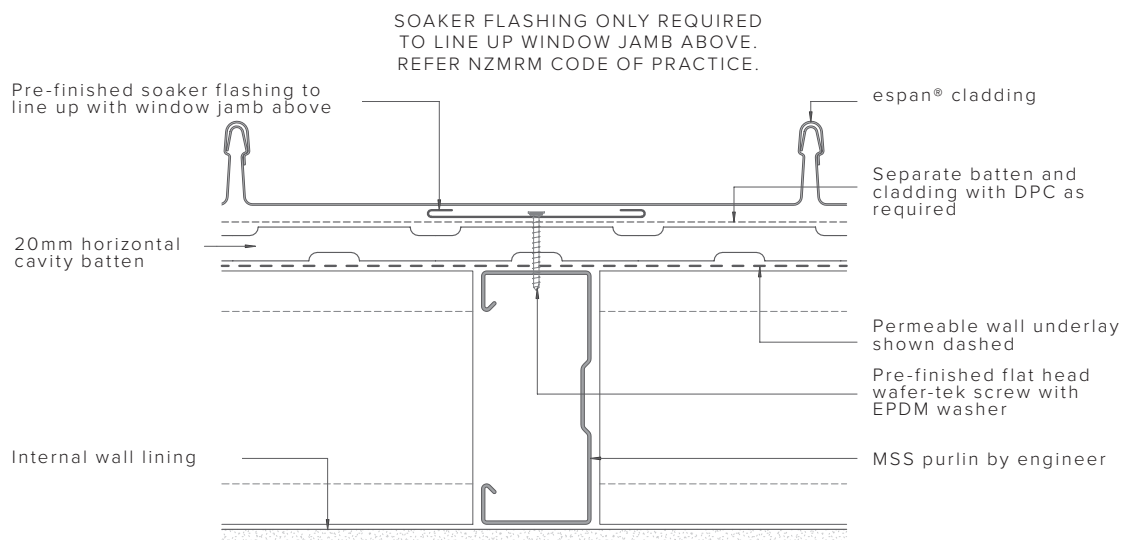
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# COMMERCIAL WALL CLADDING DETAILS

## EXTERNAL CORNER



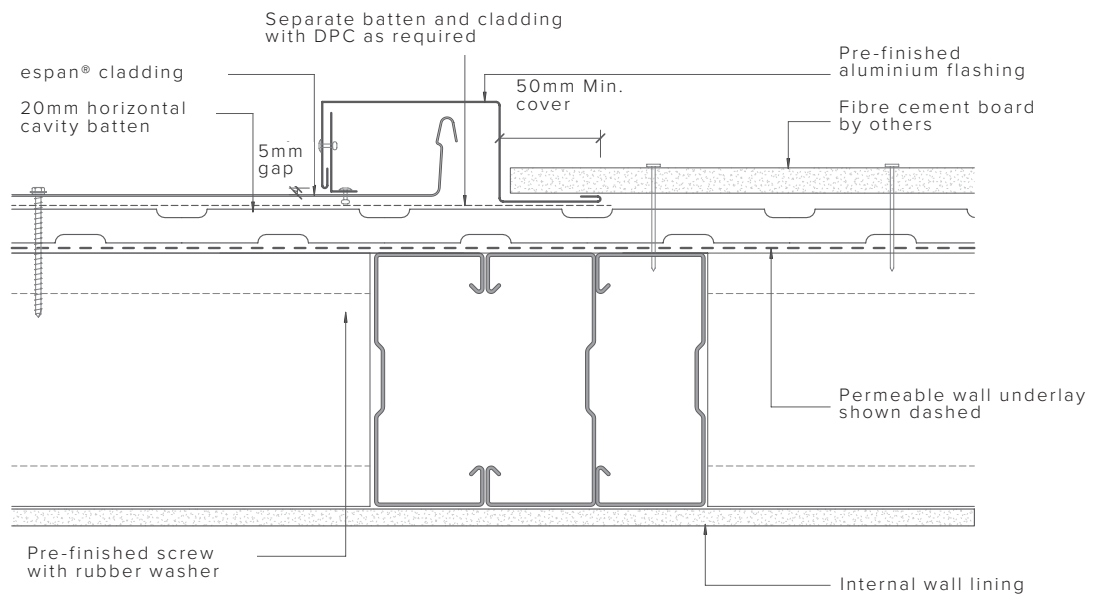
## SOAKER FLASHING



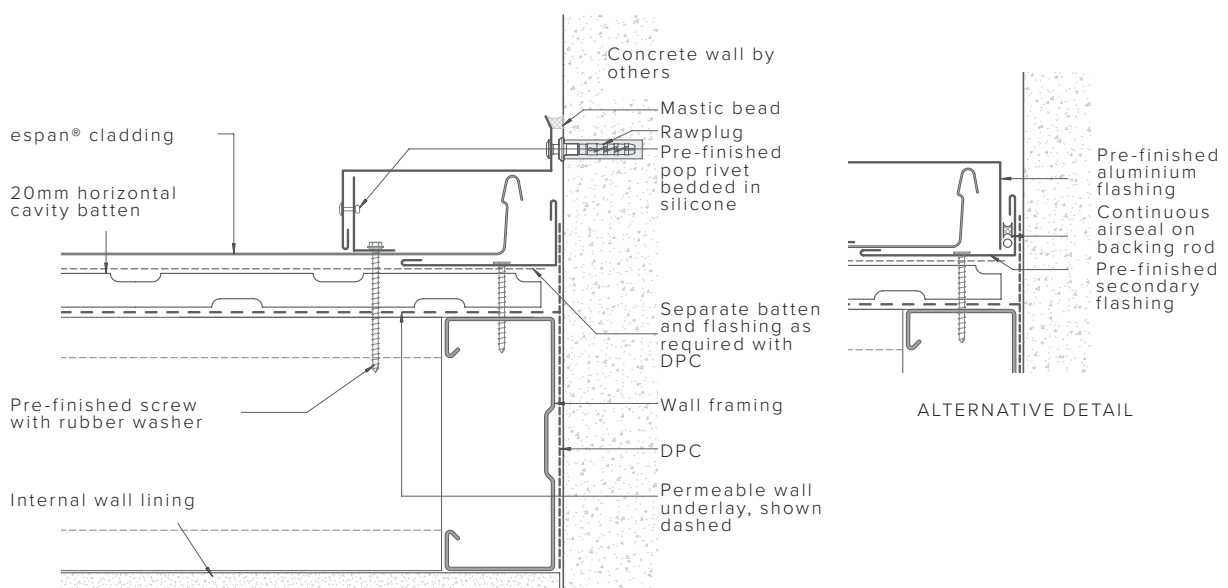
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## CHANGE IN CLADDING



## CLADDING ABUTMENT

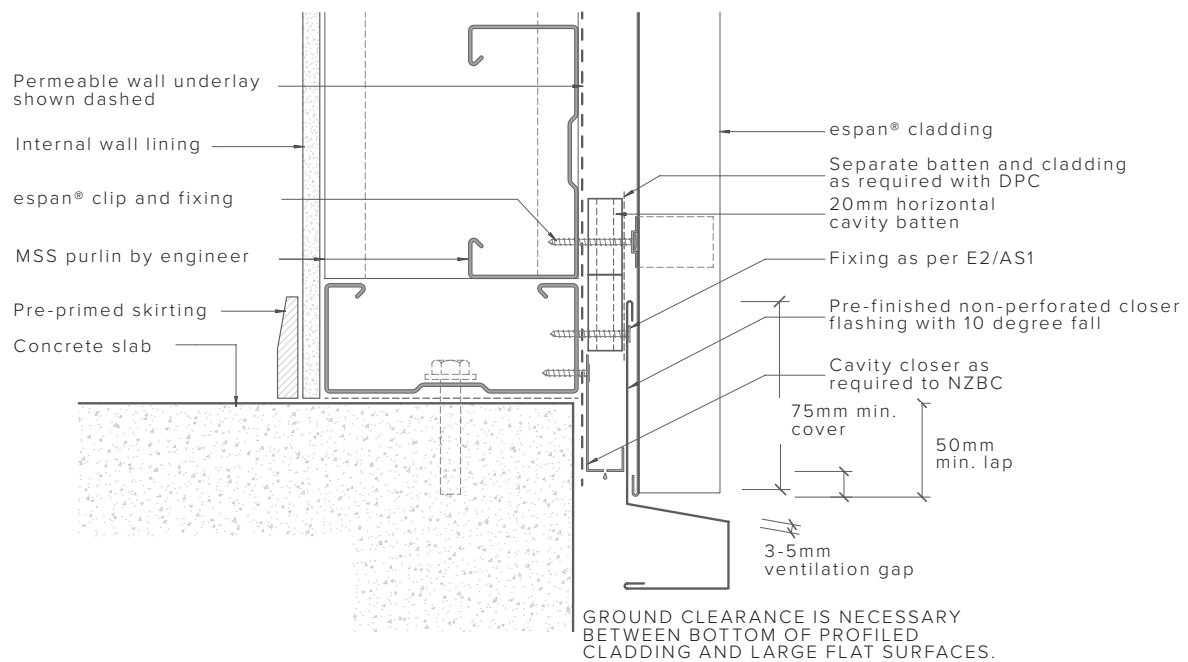


### DISCLAIMER:

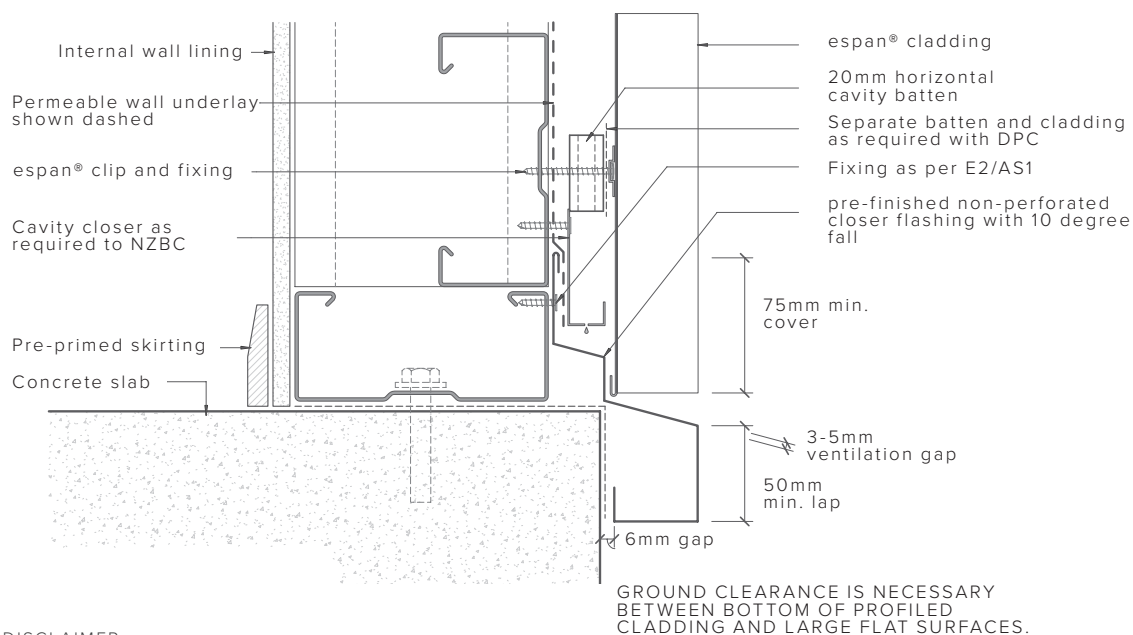
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# COMMERCIAL WALL CLADDING DETAILS

## BOTTOM OF CLADDING (FLUSH)



## BOTTOM OF CLADDING (RECESSED)

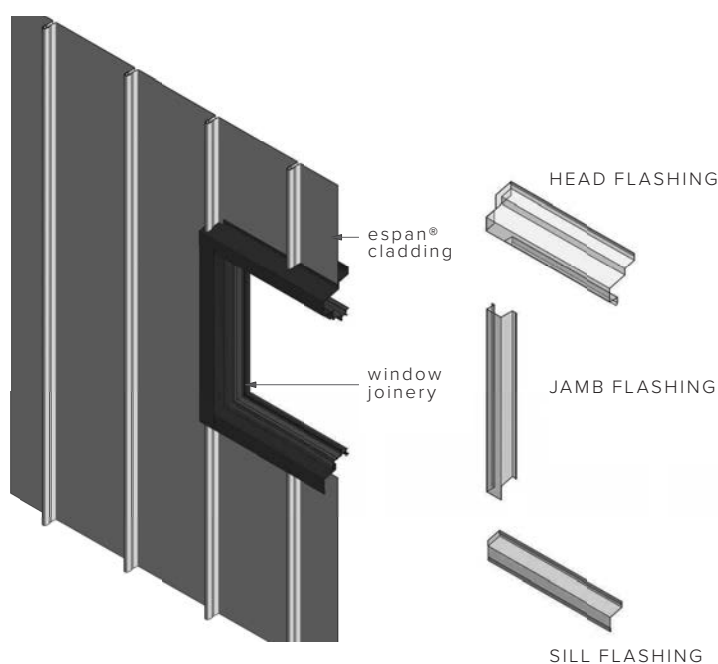


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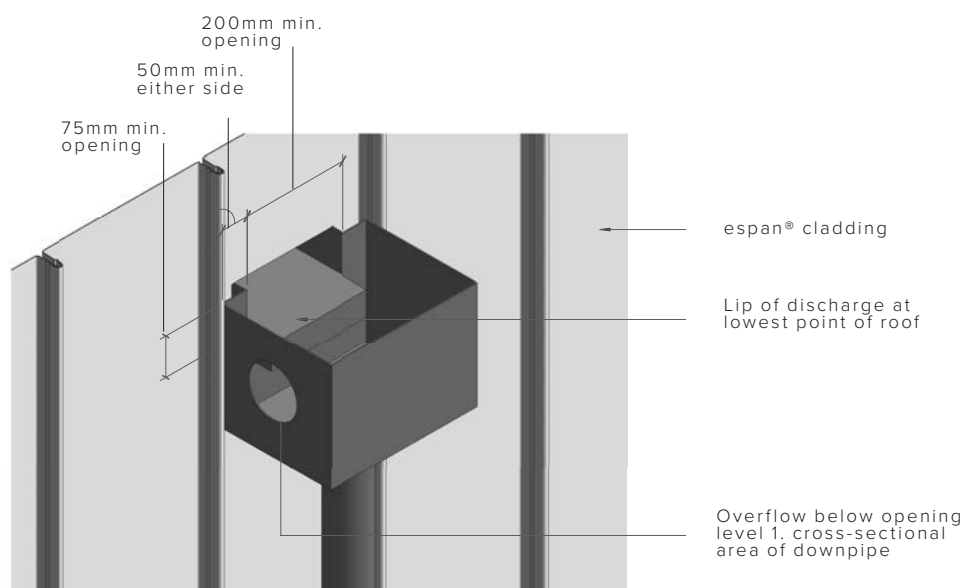
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## 3D WINDOW FLASHINGS



## 3D RAINWATER HEAD



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espan® 470 in COLORSTEEL® New Denim Blue

# SPECIFIC DETAILS

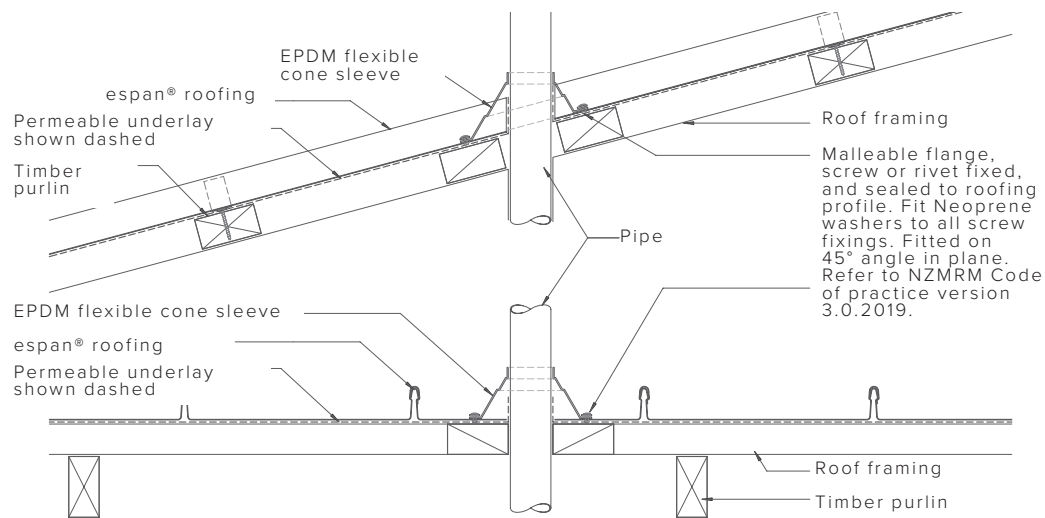
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PIPE PENETRATION DETAILS	88-89
LARGE PENETRATION DETAILS	90-97
SOLAR LAMINATE DETAILS	98-99
CANTERBURY PRICKLE DETAILS	100-103

# PIPE PENETRATION DETAILS

## DIRECT FIXED PIPE PENETRATION DETAIL

MIN 10° FOR PIPE PENETRATION. DIRECT FIX BOOT FLASHING IS APPLICABLE FOR WHEN LESS THAN 50% BLOCKAGE OCCURS. WHEN EXCEEDING 50% BLOCKAGE, REFER TO BACK TRAY FLASHING. REFER ALSO TO NZMRM CODE OF PRACTICE VERSION 3.0.2019.

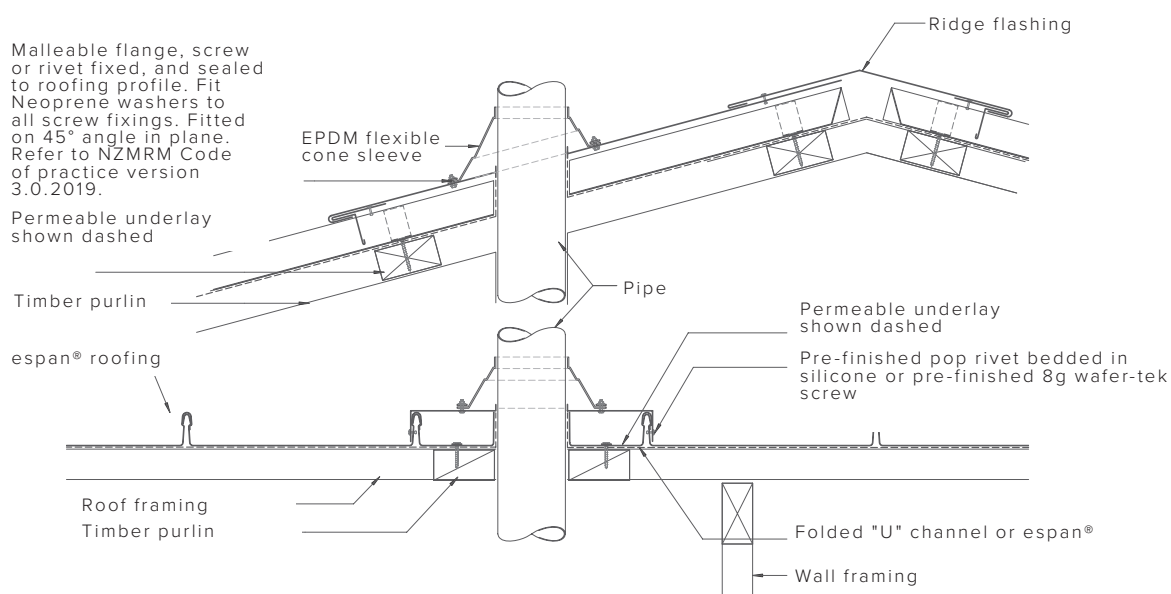


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## BACK TRAY PIPE PENETRATION DETAIL

MIN 3° PITCH FOR BACK TRAY PIPE PENETRATION. REFER ALSO TO NZMRM CODE OF PRACTICE VERSION 3.0.2019.



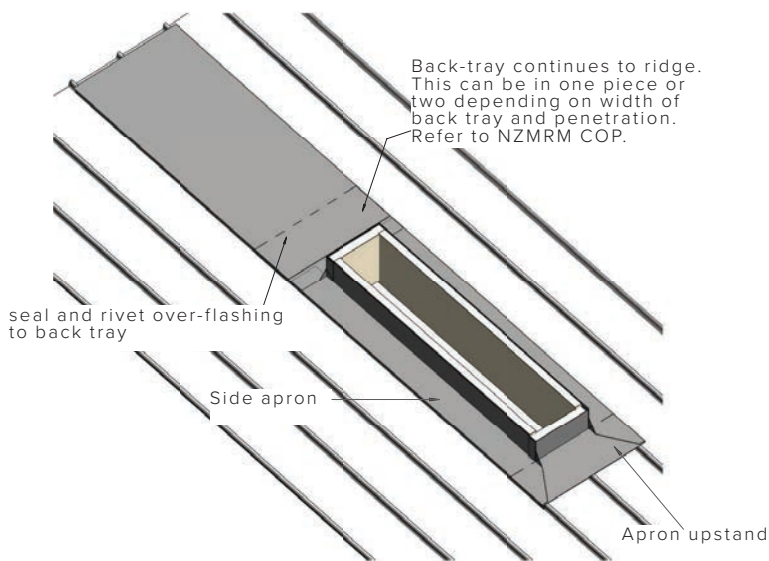
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# LARGE PENETRATION DETAILS

## LEVEL OVER FLASHING

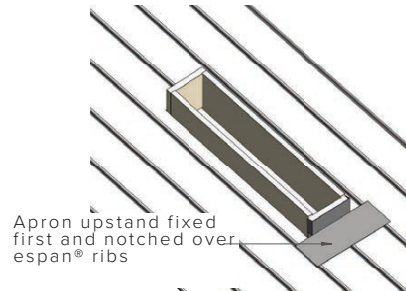


FULLY INSTALLED LEVEL OVER TRAY PENETRATION DETAIL

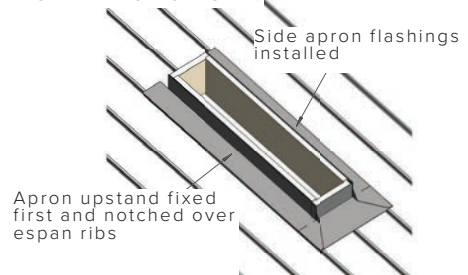
### NOTES:

For penetrations wider than 600mm or those in aggressive environments or in situations where maintenance is difficult, a cricket flashing is required.

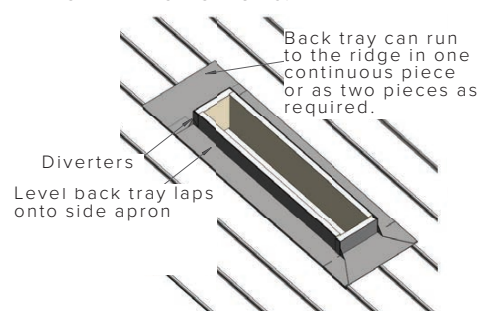
### INSTALLATION STAGE 1:



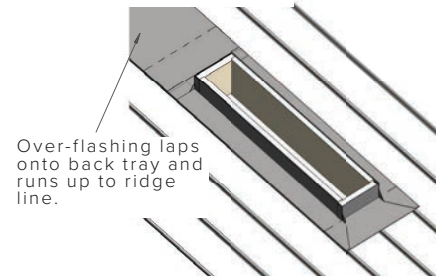
### INSTALLATION STAGE 2:



### INSTALLATION STAGE 3:



### INSTALLATION STAGE 4:

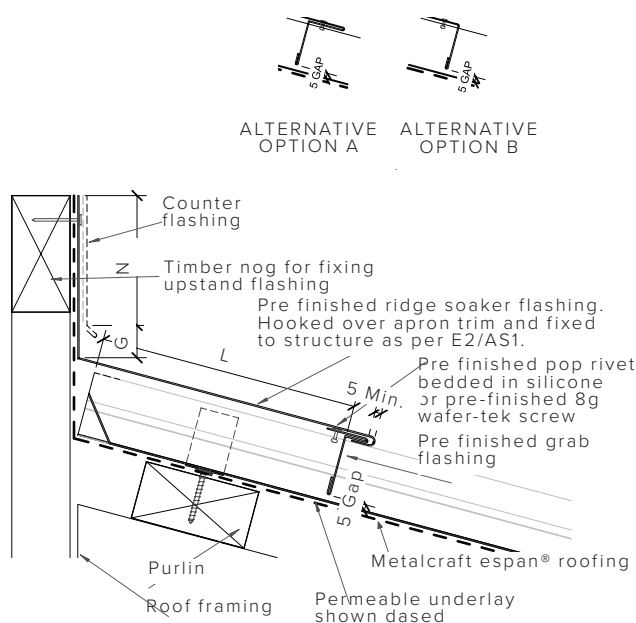


### DISCLAIMER:

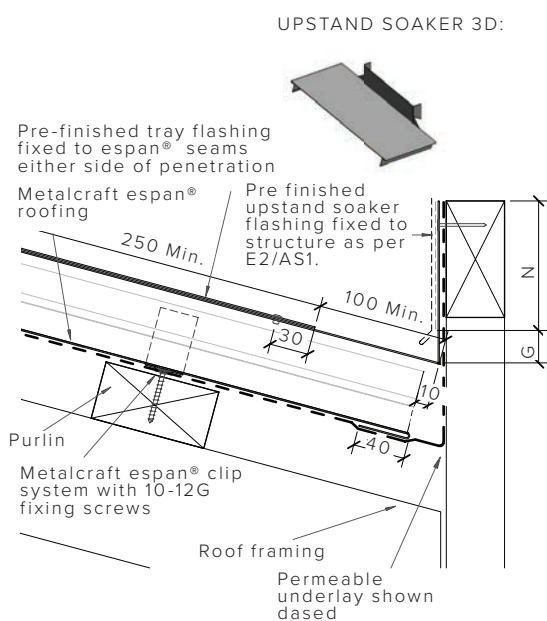
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# LEVEL OVER FLASHING

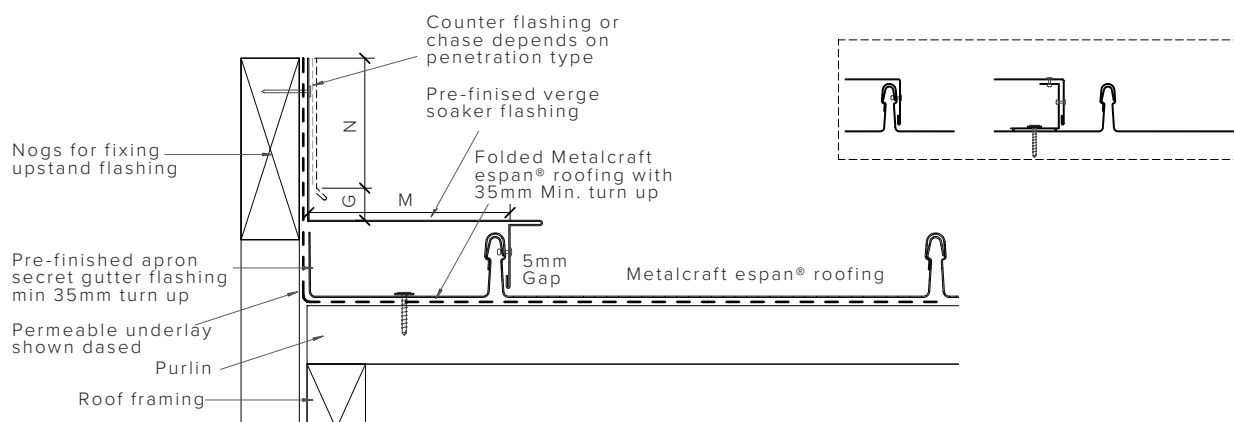
## UPSTAND WITH OVER TRAY



## SOAKER UPSTAND



## VERGE SOAKER UPSTAND



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# LARGE PENETRATION DETAILS

## LEVEL CRICKET FLASHING



FULLY INSTALLED LEVEL UNDER-SOAKER PENETRAITON DETAIL

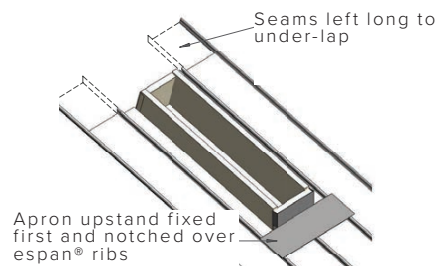
### NOTES:

Level under-soaker upstands are suitable for penetrations up to 600mm wide and only suitable for small catchments. Refer to NZMRM COP for more information and guidelines on penetrations.

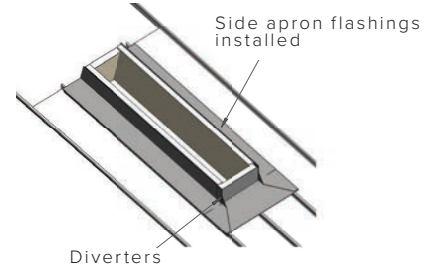
For penetrations wider than 600mm or those in aggressive environments or in situations where maintenance is difficult, a cricket is preferred.

Refer to NZMRM COP for more information and guidelines on penetrations.

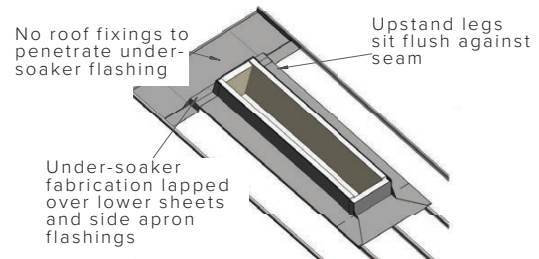
### INSTALLATION STAGE 1:



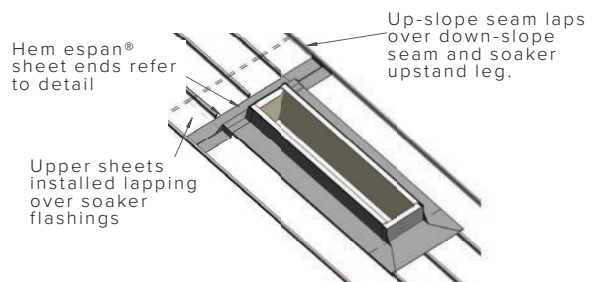
### INSTALLATION STAGE 2:



### INSTALLATION STAGE 3:



### INSTALLATION STAGE 4:

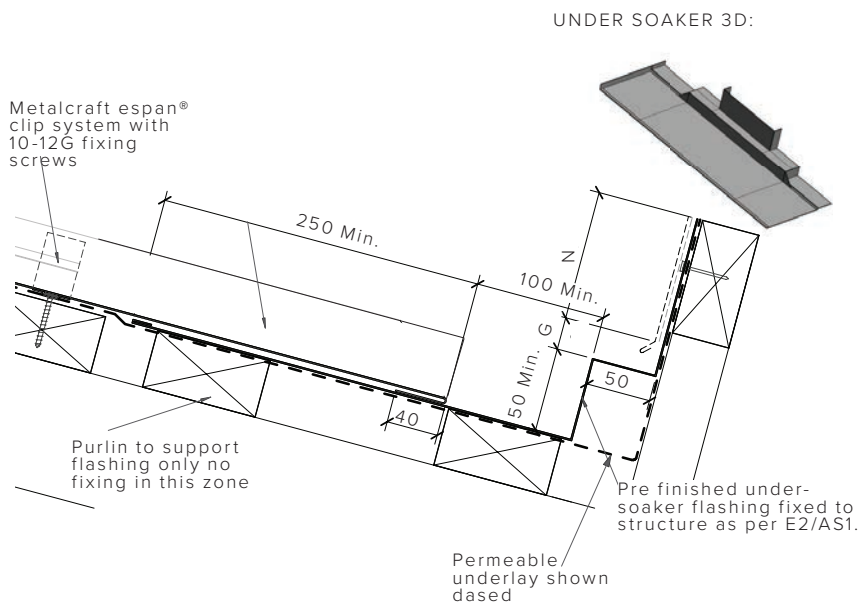


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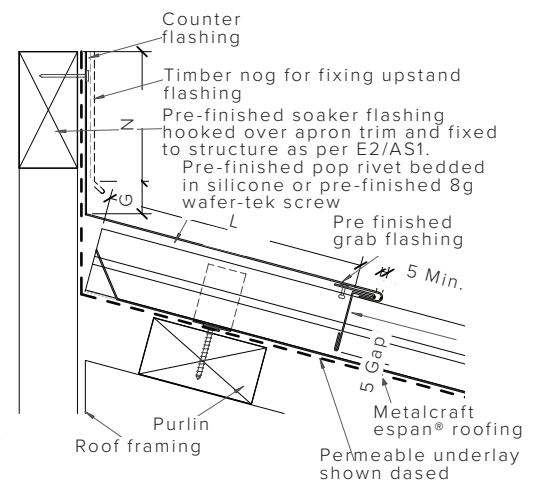
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# LEVEL CRICKET FLASHING

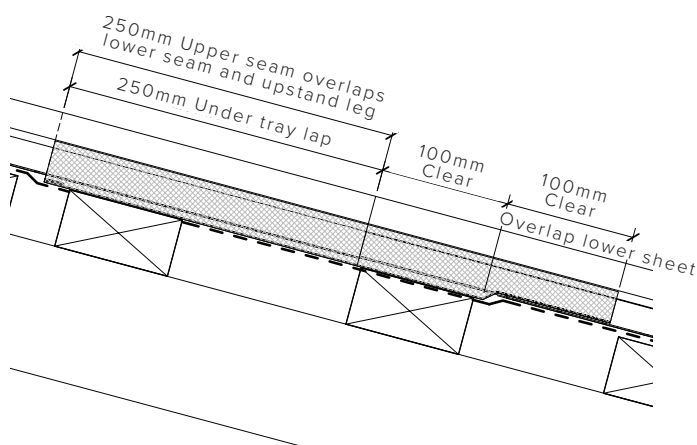
## UPSTAND WITH UNDER TRAY



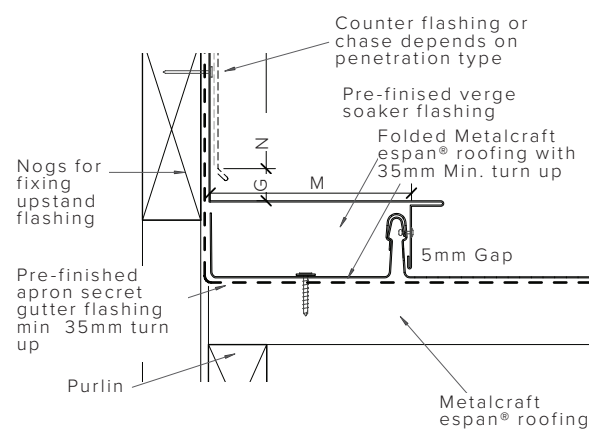
## SOAKER UPSTAND



## UNDER TRAY LAP



## VERGE SOAKER UPSTAND

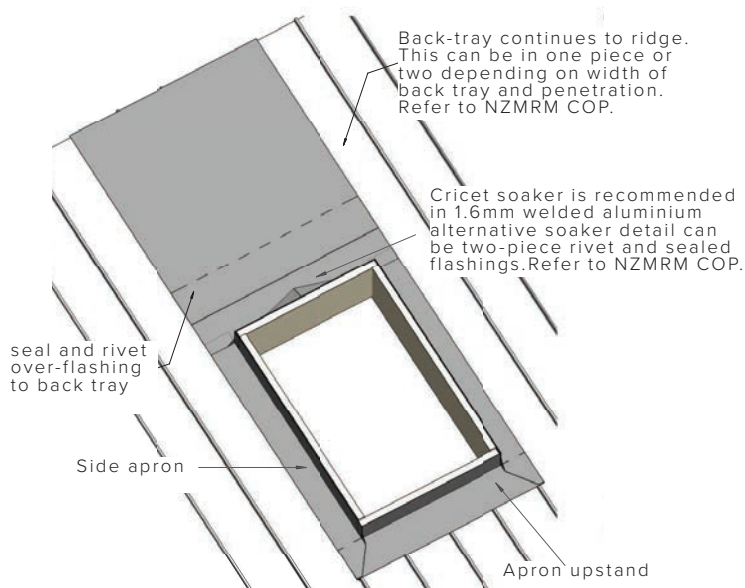


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# LARGE PENETRATION DETAILS

## CRICKET OVER FLASHING



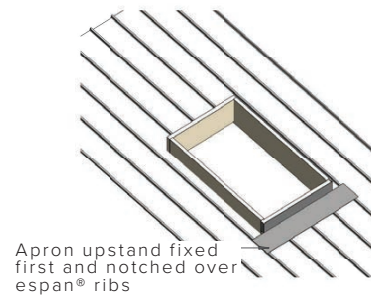
FULLY INSTALLED CRICKET OVER-FLASHING  
PENETRATION DETAIL >600mm

### NOTES:

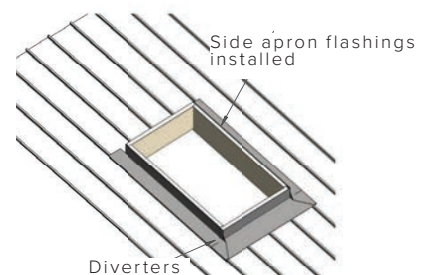
Cricket over-flashings are required for penetrations over 600mm wide and suitable for larger catchments. Refer to NZMRM COP For more information and guidelines on penetration.

The maximum width of a watershed flashing is controlled by the coil width of 1.2 m. The practice of making wider watershed flashings by running flashings horizontally with laps at 1.1 m is not acceptable, as the numerous joins are prone to leakage. Wider watershed flashings can be fabricated using longitudinal standing-seam techniques on suitable support. Refer NZMRM Code Of Practice.

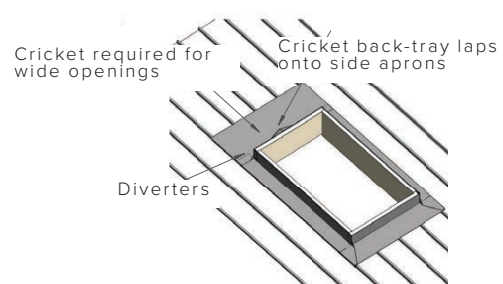
### INSTALLATION STAGE 1:



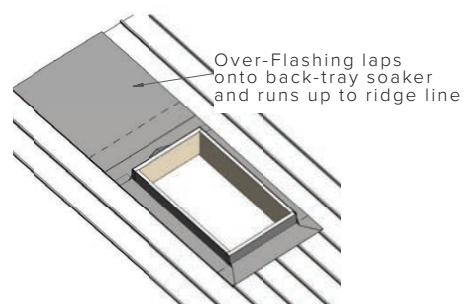
### INSTALLATION STAGE 2:



### INSTALLATION STAGE 3:



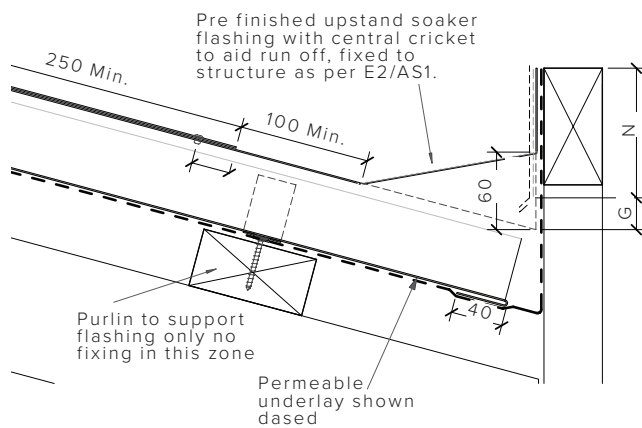
### INSTALLATION STAGE 4:



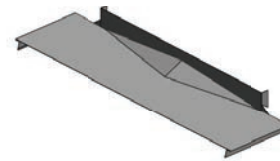


# CRICKET OVER FLASHING

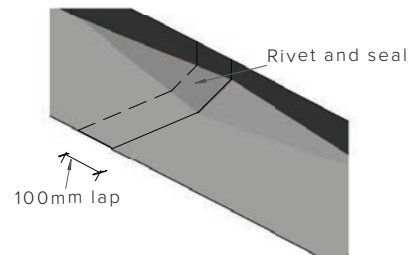
## WIDE UPSTAND WITH OVER TRAY



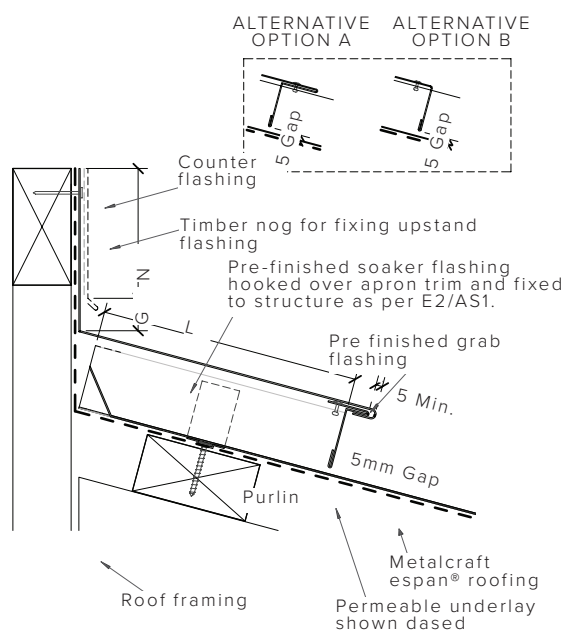
UPSTAND SOAKER 3D  
1.6mm Fully welded aluminium



ALTERNATIVE 2-PIECE CRICKET  
BACK-TRAY FLASHING AS PER  
NZMRM COP.

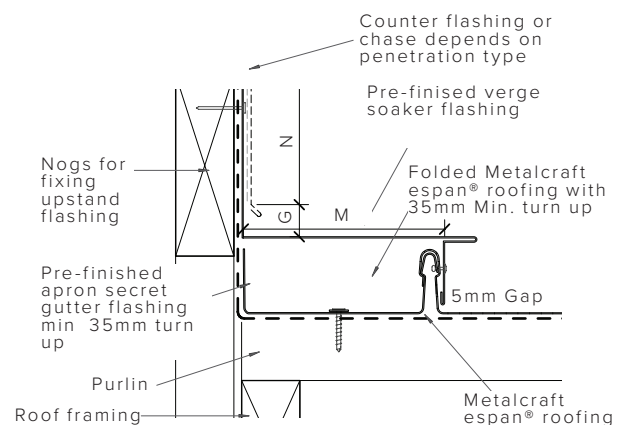


## SOAKER UPSTAND



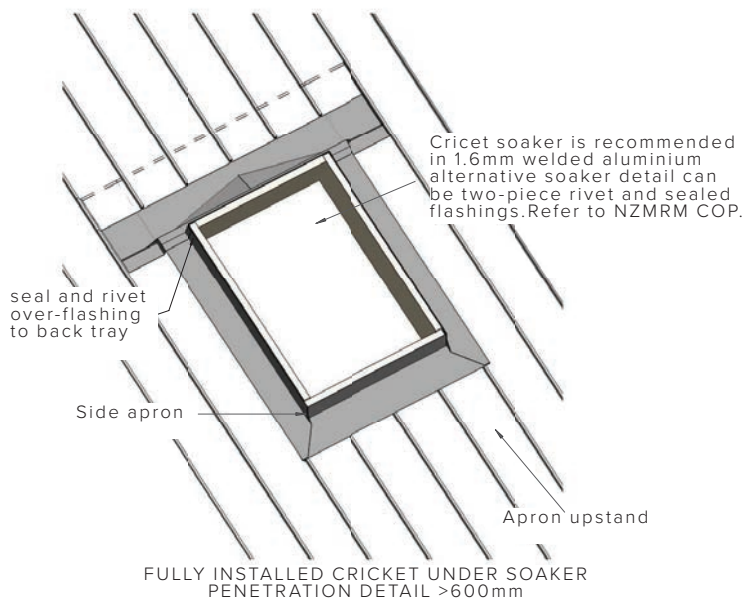
## VERGE UPSTAND

Fix flashing in vertical leg unless access is restricted then top face should be used.



# LARGE PENETRATION DETAILS

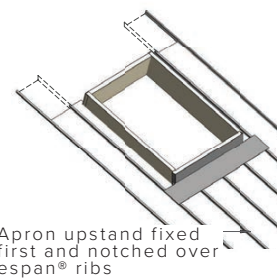
## CRICKET UNDER SOAKER



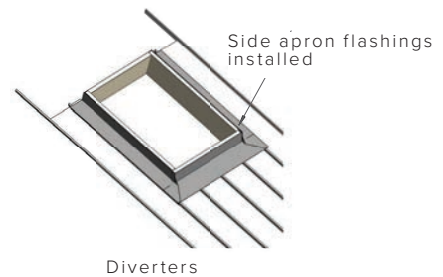
### NOTES:

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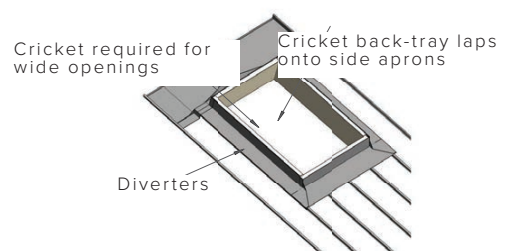
### INSTALLATION STAGE 1:



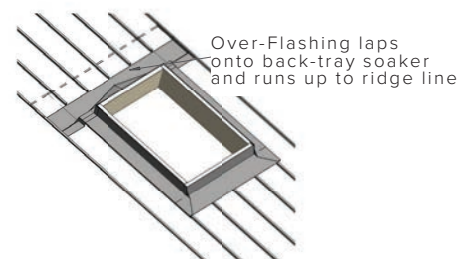
### INSTALLATION STAGE 2:



### INSTALLATION STAGE 3:

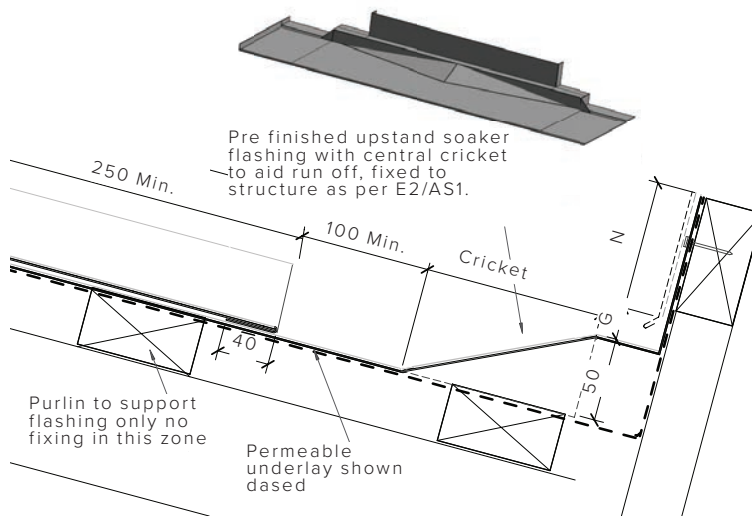


### INSTALLATION STAGE 4:

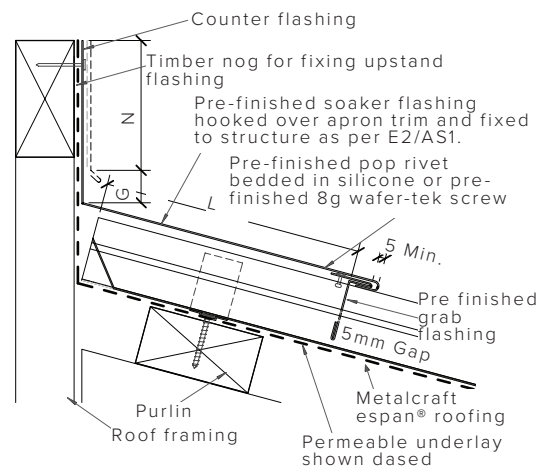


# CRICKET UNDER SOAKER

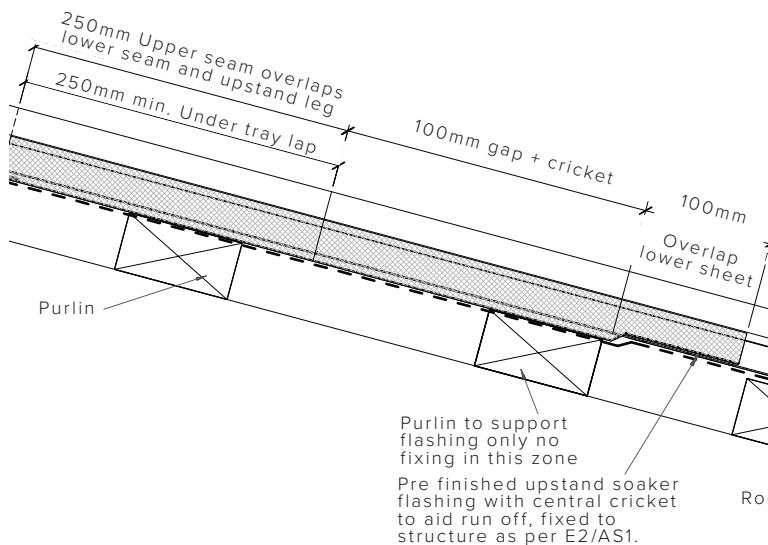
## UPSTAND WITH OVER TRAY



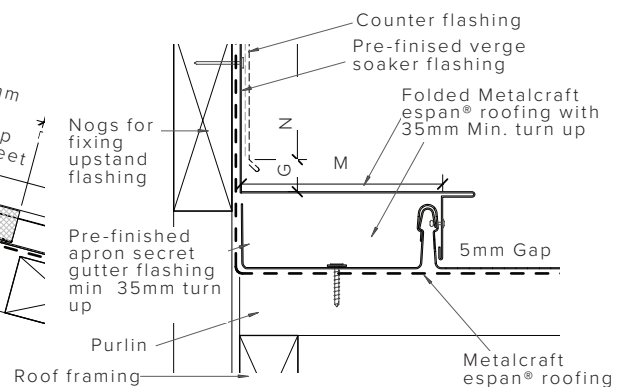
## RIDGE SOAKER UPSTAND



## UNDER TRAY LAP

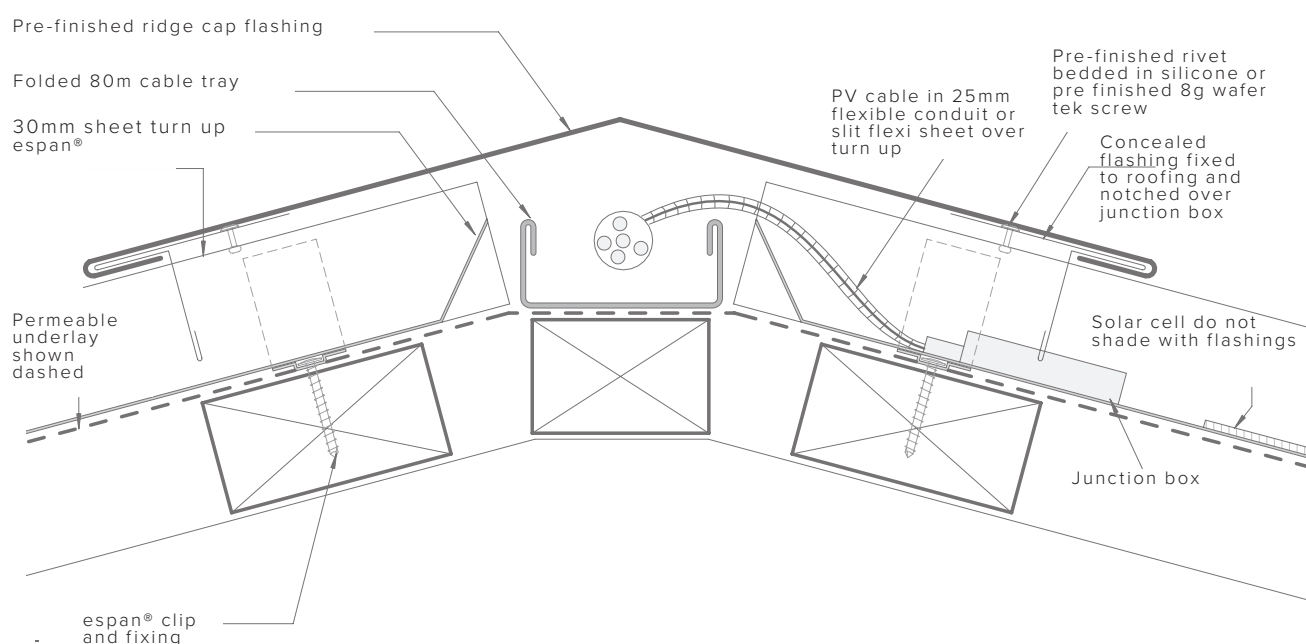


## VERGE SOAKER UPSTAND



# SOLAFLEX LAMINATE DETAILS

## ROOF RIDGE DETAIL



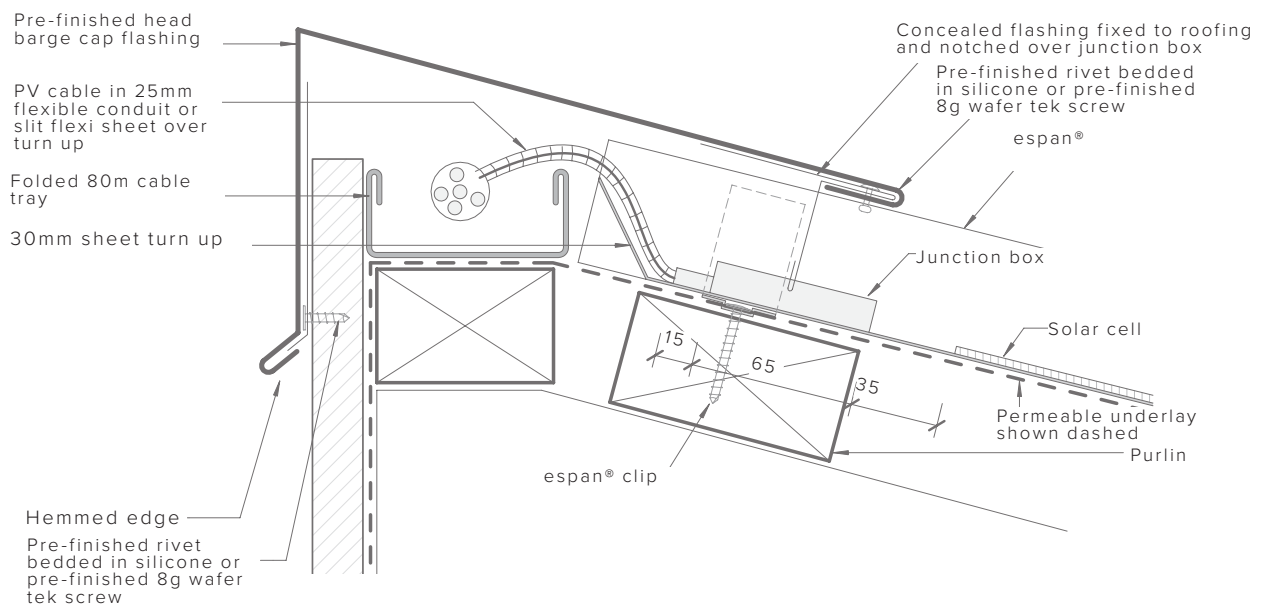
## NOTES

1. Ridge to be in line with end of junction box
2. Must not shade solar cell concealed flashing to be notched over junction box as closely as possible
3. Turn up can be notched and folded if required
4. Minimum flashing covers, as per NZMRM Code of Practice.

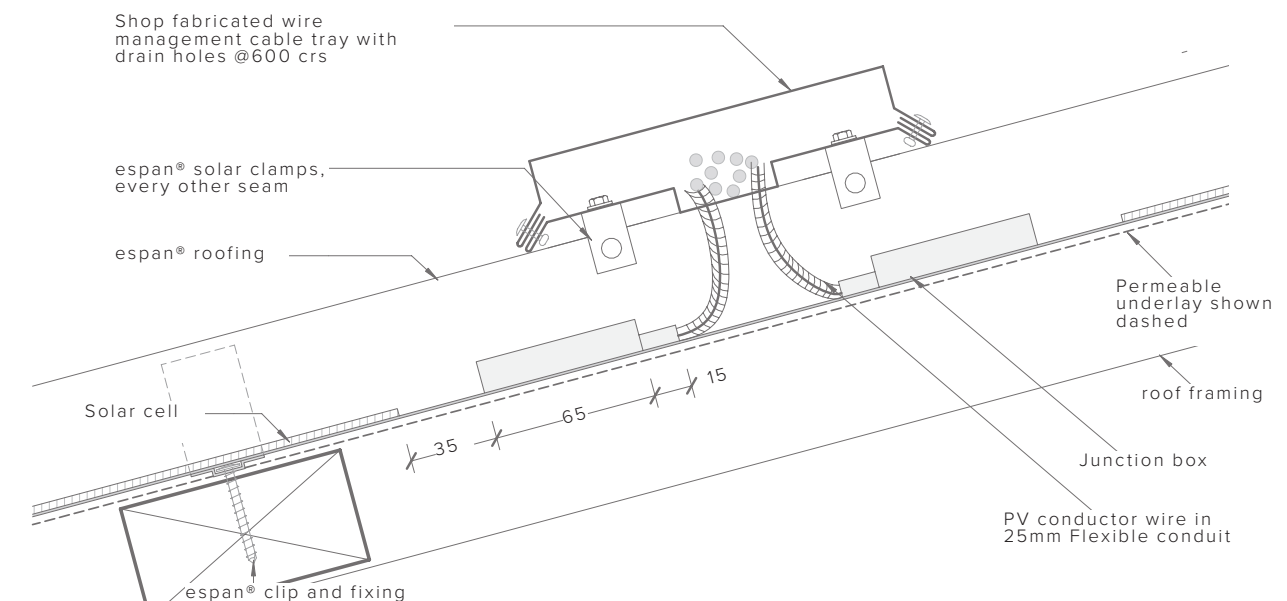
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## HEAD BARGE DETAIL



## MID-ROOF WIRE MANAGEMENT TRAY



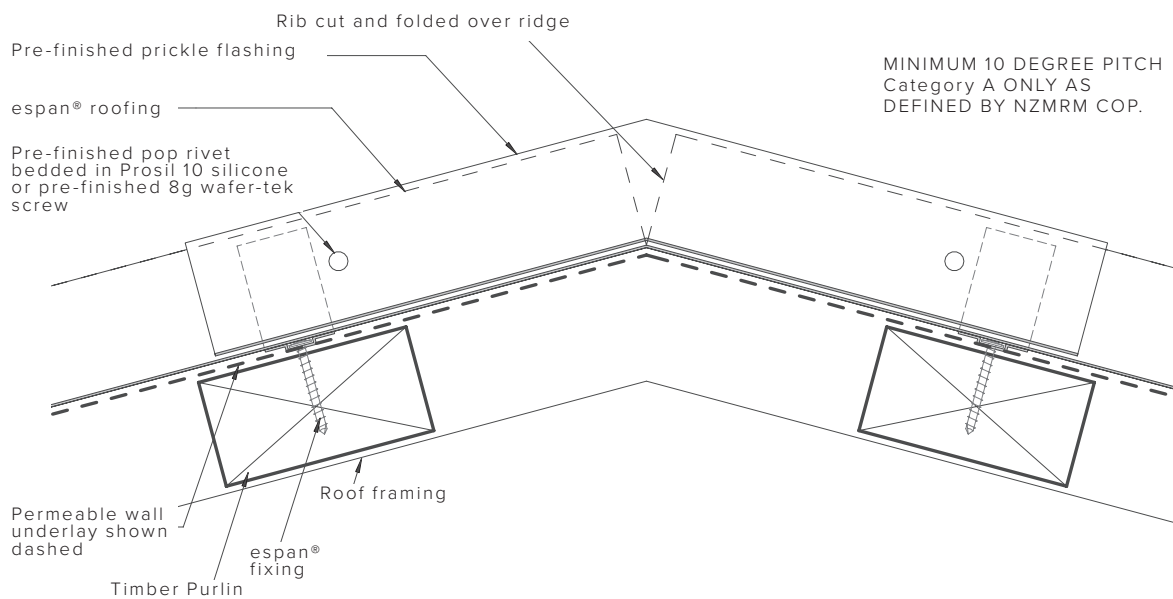
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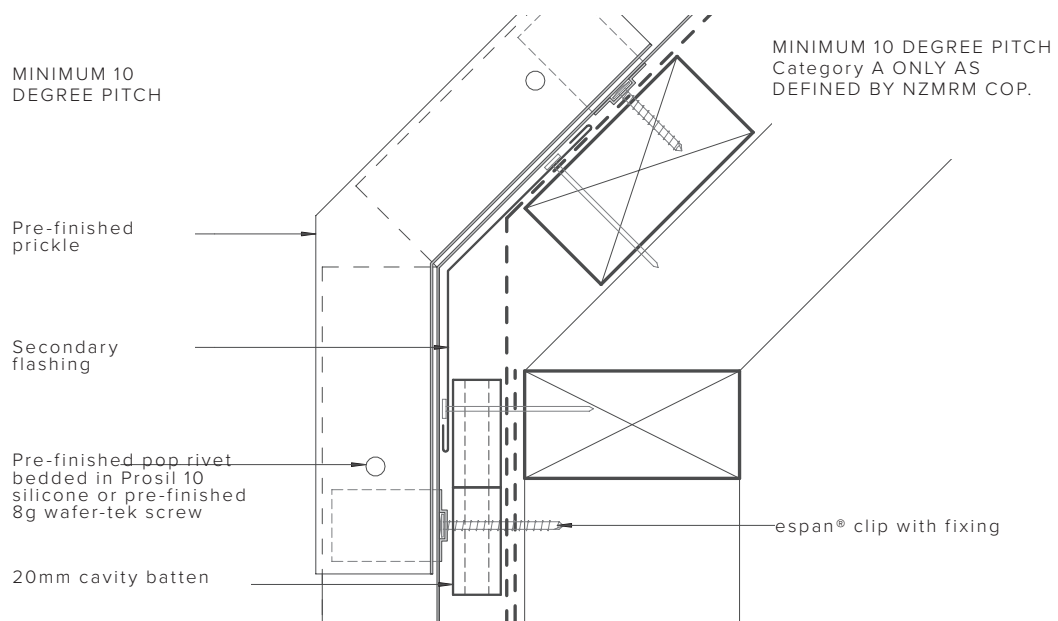


# CANTERBURY PRICKLE ROOF DETAILS

## ROOF RIDGE PRICKLE



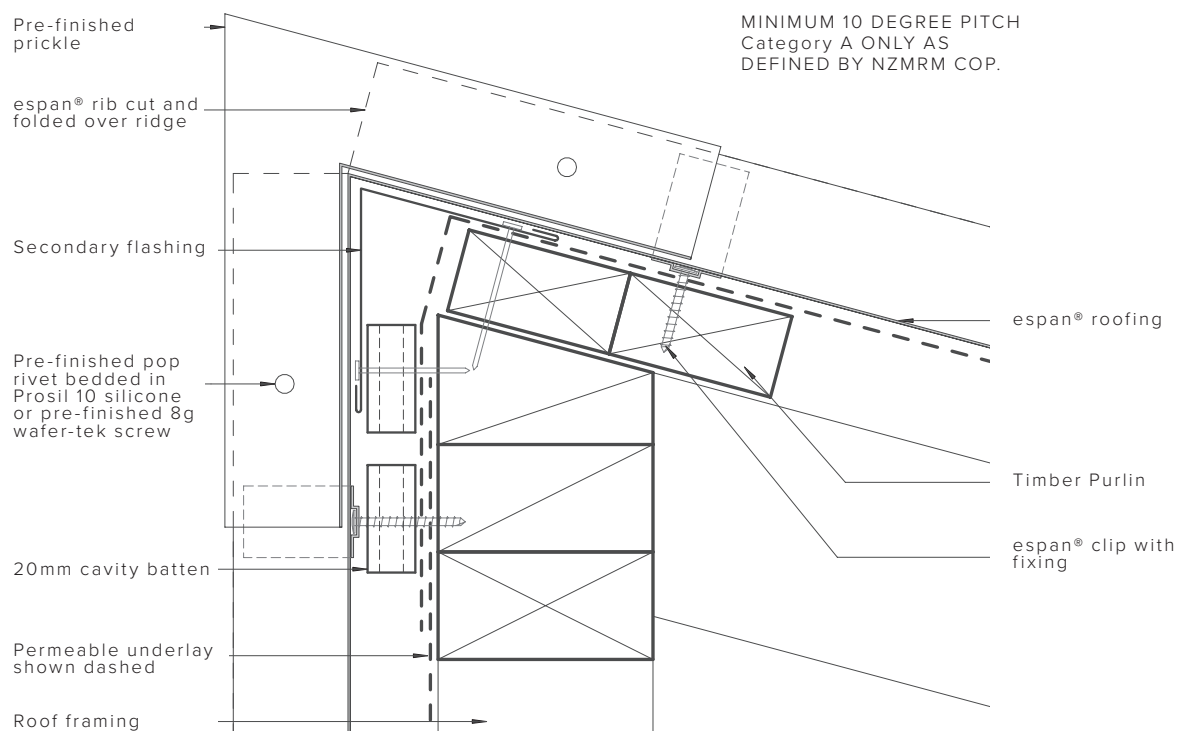
## MANSARD PRICKLE



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## SAW TOOTH PRICKLE



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# CANTERBURY PRICKLE FIXING DETAILS

## STEP 1

Measure distance from eave to apex accurately; be sure to allow for gutter overhang.

Notch over roll just wide enough to allow working room for snips (approx. 25mm).



## STEP 2

Notch under roll – outside edge only, to top of roll. Leave inside upstand.



## STEP 3

Cut down inside of ribs- ensure cut is centred, square and straight. NB: cut must go to pan or sheet may tear when folding.

Round off cut corners with snips.

Bend sheet – ideally over a straight edge to ensure straight crease line. Please note: over folding may cause an oil canning effect.



## STEP 4

Lay notched and folded sheets.

Use generous amount of Admil's 'Prosil 10' all-purpose RTV adhesive and sealant to fill gap at bottom of notch cuts:



## STEP 5

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Apply a generous bead of 'Prosil 10' to apex of Prickle from underside to seal fold point; then apply bead along bottom surfaces that contact roof sheet taking care to run bead on inside edge to minimise spreading excess sealant onto roof sheet:



## STEP 6

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Once 'Prosil 10' has been applied generously to prickle, place over rib and ensure best fit. If necessary, use a hammer with care to flatten bottom edges to roof tray to ensure a tidy finish, without denting or scratching the painted surfaces.



## STEP 7

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To secure the Prickle in position, use rivet holes on the lower part of the vertical surface on both ends and both sides of the Prickle; then use rivets to secure in position:







espan® 340 in COLORSTEEL® Lichen.









espan® 340 in COLORSTEEL® Lichen







# BRANCHES

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## CROMWELL

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