ZENITH® ROOFING & WALLING

LYSAGHT

DESIGN & INSTALLATION MANUAL
NON-CYCLONIC



INSPIRATION TO BUILD BETTER

AUSTRALIAN STANDARDS

Australian Standard	Definition
AS 1397:2021	Continuous hot dip metallic coated steel sheet and strip – Coatings of zinc alloyed with aluminium and magnesium
AS 1562.1:2018	Design and installation of sheet roof and wall cladding – Part 1: metal
AS 3566.1-2002	Self drilling screws for building and construction Industries Part:1 General requirements and mechanical properties
AS 4040.0-1992	Methods of testing sheet roof and wall cladding
AS 4040.1-1992 (Reconfirmed 2016)	Methods of testing sheet roof and wall cladding - Method 1: Resistance to concentrated loads
AS 4040.2-1992 (Reconfirmed 2016, Amendment 1:2018)	Methods of testing sheet roof and wall cladding, Part 2: Resistance to wind pressures for non-cyclone regions
AS 4055:2021	Wind loads for housing
AS/NZS 1170.2:2021	Structural design actions, Part 2: Wind actions
AS/NZS 2728:2013	Prefinished/ pre-painted sheet metal products for interior/ exterior building applications – Performance requirements
AS/NZS 3500.3:2021	Plumbing and Drainage-Part 3: Storm water drainage
SA HB 39:2015	Installation code for metal roof and wall cladding

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ZENITH® ROOFING & WALLING

1.0 Introduction & General Notes

LYSAGHT® steel cladding has long been a valuable design resource for Australian architects, providing, as it does, aesthetically appealing and versatile facades that bend, often literally, to their creative will and add exciting visual dimensions to their designs.

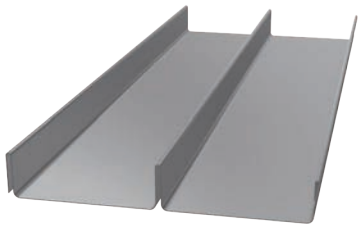
In the ZENITH® cladding range, that design value has reached new heights with profiles that deliver bolder aesthetics than seen before, paired with the exceptional performance you have come to know and expect from LYSAGHT® steel products.

ZENITH® architectural profiles. A touch of Europe from Australia's trusted experience in steel.

The ZENITH® range includes:

LONGLINE 305®

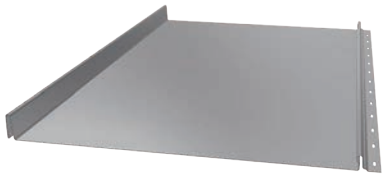
This striking cladding features slender, high ribs and broad, flat pans that make a dramatic statement on any structure. Using a concealed fixing system to maintain its clean lines LONGLINE 305® cladding is available with plain or fluted pans and can also be tapered for a fan-like effect where curvilinear roofs require a tailored cladding solution.



LONGLINE 305®

ENSEAM®

Broad flat pans and a lower, yet substantial rib combine to form yet another distinct visual dynamic in ENSEAM® cladding. While possessing clean and striking good looks, this profile also has an easy style that makes it a very versatile cladding solution for contemporary architectural designs.



ENSEAM®

IMPERIAL™

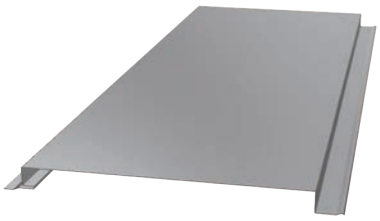
The sky is truly the limit with IMPERIAL™. Featuring broad, flat pans and slender, well-defined ribs, this cleanly elegant cladding complements virtually any architectural design. Combine those good looks with a curving capacity not readily achieved in all cladding, and you have the ultimate profile for style and versatility.



IMPERIAL™

DOMINION®

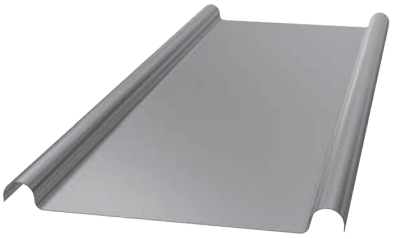
Whether used in long lengths running vertically or horizontally on a structure, or in shorter lengths to create a 'block-like' effect, DOMINION® facade wall panel makes a strong and extremely stylish statement. With raised panels and recessed, 'express' joins, this profile conveys a sleek, contemporary character with a pleasing detail created by the shadowed 'channels'.



DOMINION®

BAROQUE™

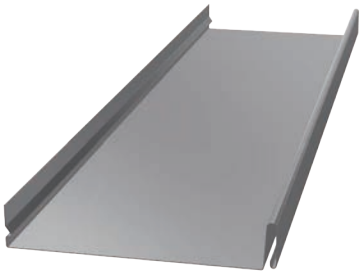
A heritage-inspired profile, BAROQUE™ features wide, flat pans defined by generous semi-circular ribs. At once delivering a strong linear visual which is gentled by the unusual, rounded rib-form, this profile offers a most unique visual character which sits easily with both traditional and contemporary architecture.



BAROQUE™

SNAPSEAM™

With the broad flat pans and distinctive ribs of ENSEAM®, SNAPSEAM™ offers greater flexibility for longer lengths and greater spanning capacity thanks to it's clever concealed fix clips. These clips allow for enhanced thermal expansion and contraction and provide greater fixing security.



SNAPSEAM™

SCOPE

This Manual is a guide to the design and installation of the ZENITH® range of steel roofing and walling manufactured by Lysaght. We intend that it be used by all trades and professions involved with specifying and applying the ZENITH® range of products.

We refer only to genuine steel roofing and walling manufactured by us and marketed under our brand names. Our recommendations should only be used for our products because they are based on comprehensive testing of our profiles, base metal thicknesses (BMT) and material finishes. More general design in installation with regard to steel cladding may be found in the LYSAGHT® Roofing and Walling Installation Manual. This Manual covers a range of topics not covered in this Manual.

WARRANTIES

For over 150 years we have consistently manufactured the highest quality building products. The LYSAGHT® brand is synonymous with Australian building.

Our continuing confidence in our products is shown in the warranties we offer.

Our products are engineered to perform according to our specifications only if they are used in the appropriate conditions and installed to the recommendations in this Manual and our other publications.

Naturally, the warranties require specifiers and installers to exercise due care in how the products are applied and installed and are subject to final use and installation. Also, owners need to maintain the finished work.

We invite you to ask about the warranties applicable to your proposed purchase, at your supplier of LYSAGHT® products.

GENERAL NOTES TO READ BEFORE YOU USE THIS GUIDE

This Manual has been prepared for a range of the ZENITH® range roofing and walling applications including water drainage systems, using products manufactured or supplied by Lysaght.

CYCLONIC AREAS

In general, this book refers to non-cyclonic conditions. Design information for cyclonic areas is in our ZENITH® Cyclonic Area Design Manual. The information in this manual is suitable for use only in areas where a tropical cyclone is unlikely to occur as defined in AS/NZS 1170.2.

PROFESSIONAL ADVICE

All erection and connection details are to be made in accordance with the relevant standard connection details drawing contained in this Manual.

We recommend you get professional advice to ensure your particular needs are adequately met.

To ensure maximum lifespan of your building, consult your nearest Lysaght branch for information regarding maintenance, handling, storage and any other technical assistance you may require.

FURTHER INFORMATION ON PRODUCTS AND SERVICES

WWW.LYSAGHT.COM

Your supplier of LYSAGHT® products

Lysaght Information Service on 1800 641 417



Contemporary and traditional, residential or commercial: all are accomplished with ease using ZENITH® building products.



2.0 Design Preliminaries

2.1 PRODUCT SELECTION

When you design ZENITH® cladding into your building you have a wide range of profiles from which to choose. Whilst roofing and walling obviously have to keep out the weather, they also have significant effects on the looks, cost and durability of a building.

If you are unsure about any product feature, visit www.lysaght.com, call our information line or seek advice from the relevant specialists.

WALLS

The design of walling from a steel perspective is fairly straightforward. Once you have made the aesthetic decision of which profile to use, the main considerations are the support spacings (Section 2.5), fixing details (Chapter 3) and the details of flashing (Chapter 9).

ROOFS

There are many factors in designing roofs including:

- the shape: is the roof to be 'flat' or pitched or curved?
- the supporting structure and support spacing;
- the wind forces that the roof must sustain;
- the pitch which affects the looks, the profile's ability to efficiently carry rain to the gutters, and fixing details;
- thermal expansion of long sheets (Chapter 8);
- the attributes of other materials used in the roof design.

This Manual doesn't attempt to cover the structural design details of supports or aesthetics: there are many other texts and Australian Standards that cover them.

This chapter gives tables of recommended support spacings, and the maximum roof length for pitch and rainfall intensity for ZENITH® products.

The appropriate design will depend on your particular needs and circumstances. You should get advice from the relevant specialists where required.

2.2 MATERIALS AND FINISHES

All of the ZENITH® range are manufactured from Australian made steel from BlueScope.

MATERIAL SPECIFICATIONS

- Next generation ZINCALUME® aluminium/zinc/magnesium alloy coated steel complies with AS 1397 G300, AM125 (300 MPa minimum yield stress, 125g/m^2 minimum coating mass).
- COLORBOND® is pre-painted steel for exterior roofing and walling. It is the most widely used. The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397. Minimum yield strengths for the ZENITH® range is G300 (300 MPa). Minimum coating mass is AM100 (100g/m^2).
- COLORBOND® Metallic steel is pre-painted steel for superior aesthetic qualities displaying a metallic sheen.
- COLORBOND® Ultra steel is pre-painted steel for severe coastal or industrial environments (generally within about 100m - 200m of the source). The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397. Minimum coating mass is AM150 (150g/m^2).
- PERMALITE® marine grade aluminium products are designed for severe costal or industrial environments and are covered in separate documentation available on www.permalite.com.au or from your local Lysaght office.
- Galvanised zinc coated steel complies with AS 1397 G300, Z450 (300 MPa minimum yield stress, 450g/m^2 minimum coating mass).
- Heritage galvanised zinc coated steel complies with AS 1397 G300, Z600 (300 MPa minimum yield stress, 600g/m^2 minimum coating mass).

2.3 PAINT AND COLORBOND® STEEL FINISHES

COLORBOND® steel finishes can be damaged by some handling, installation or maintenance activities. If damage occurs to the COLORBOND® steel pre-painted finish, refer to Technical Bulletin TB-2, published by BlueScope.

Replacement of severely damaged COLORBOND® steel should consider that the replacement sheet may not match perfectly due to the possible long term fading of the installed sheets exposed to weathering.

You may overpaint whole roofs and paint accessories to match specific colours. The overpaint guidelines are also discussed in Technical Bulletin TB-2.

ZENITH® is available in ZINCALUME® steel and a range of COLORBOND® steel, COLORBOND® Ultra steel, COLORBOND® Metallic steel, COLORBOND® steel Matt colours.
See www.lysaght.com for full colour range.

2.4 COLORBOND® STEEL WITH THERMATECH® TECHNOLOGY(1)

COLORBOND® steel's core colour range in the Classic and Matt finish features our specially designed Thermatech® solar reflectance technology. Thermatech® reflects more of the sun's heat on hot, sunny days which may help increase your comfort while reducing your dependence on air conditioning. Thermatech® is available in all core colours except Night Sky®.

2.5 SUPPORT SPACING AND OVERHANG

The maximum recommended support spacing's for end and internal spans shown in this manual are based on data in accordance with AS 1562.1 and AS 4040.1.

The roof support spacing's in the tables are recommended to produce adequate performance of claddings under concentrated loading (incidental or maintenance) and consider resistance to wind pressure and maintenance foot traffic.

The wind pressure considered is based on building up to 10m high in region B, Terrain Category 3, Ms = 0.85, Ml = 1.0, Mt = 1.0 with Cpe = -0.9, Cpi = 0.20, kl = 2.0 for end spans and kl = 1.5 for internal spans.

The maximum overhang for the ZENITH® range is generally 50mm. The overhang is the projection of the sheet past a support. For roofs the maximum overhang is a guide and is based on a nominal incidental load applied adjacent to the free edge. All roof overhangs should be treated as a non-trafficable area.

The walling spans consider resistance to wind pressure only. The pressure considered is based on building up to 10m high in region B, Terrain Category 3, Ms = 0.85, Ml = 1.0, Mt = 1.0 with Cpe = -0.65, Cpi = 0.20, kl = 2.0 for end spans and kl = 1.5 for internal spans. These spacing may vary by serviceability and strength limit states for particular projects.

2.6 MAXIMUM LENGTHS OF ROOFING

The valleys (or pans) of roofing have to carry water to the gutters. If in heavy rain, the valleys overfill, water can flow into the roof through the side-laps and flashings.

Factors affecting waterproof and drainage capacity of the laps of a profile include:

- the width and depth of the valleys or pans;
- the pitch of the roof—rain flows faster on a steeper pitch;
- rainfall intensity for the geographical area;
- the length of the roof from ridge to gutter; and
- penetrations that cause nearby valleys to carry extra rain diverted from valleys obstructed by the penetration (Figure 6.1.1).

The maximum recommended roof lengths for drainage for each profile are given in Table 6.1.1.

An additional consideration for wide flat panned sheeting profiles is oil canning. To minimise the effect of oil canning it is recommended that sheet length be kept below 8m.

2.7 OIL CANNING

Architectural light gauge steel cladding products with wide flat surfaces may be subjected to oil canning. The oil canning feature can be defined as perceived waviness in the flat zone of a metal cladding when view at certain angles. The visual impact of oil canning is affected by the angle of light across the flat surface and this can be different at different times of the day and seasons.

Internal stresses within the metal can cause a waviness in the surface of the profile. There are many ways that the effects of oil canning can be minimised however due to the inherent nature of metal it can not necessarily be removed completely.

Some of the common causes of oil canning are;

PROFILE DIMENSIONS

The thinner the gauge of metal used and the wider the flat pan section of the profile the more evident oil canning will be. Conversely the thicker the material and the narrower the flat pan the less evident oil canning will be.

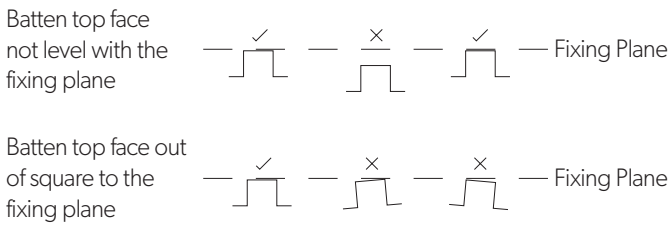
MANUFACTURING

The very nature of the manufacturing process of the profile can lead to oil canning. Any additional stresses put in the metal by way of shaping the metal or by slitting the coil can cause oil canning.

SUBSTRUCTURE

Any unevenness in the supporting substructure or any movement in the substructure will increase the effects of oil canning. The flat panned type cladding products when fixed to supports as specified in this publication will be structurally adequate. However, when used on walls and roof slopes that are visible by pedestrian traffic, these type of cladding products require consideration of the "in-service" aspect of aesthetics.

The wall structure is commonly constructed to a different standard of construction tolerances and thus should not be relied upon as a suitable fixing plane. Consequently, for aesthetics, these type of products require a support system that is installed plumb, level (uniform) and square to provide a suitable fixing plane for the wall cladding / panel to minimise the potential of pan oil-canning from support plane irregularity, installer activity or thermal effects.



Consequently the batten supports must also be of suitable rigidity and thickness to ensure a straight edge and the batten packed appropriately to minimise deviation from the straight edge and the fixing plane. Consideration should be given to using a minimum of 1mm BMT batten material.

CONNECTION DETAILING

Taking care with the connection details of the profile will assist in the effects of the oil canning, as often uneven stresses at the fastening points will exacerbate the oil canning effect. By allowing for expansion and contraction of the material the effects of oil canning will be minimised. This can be done by utilising by slotted holes sliding brackets and thermal breaks. It is important that if you are not familiar with detailing products that are prone to oil canning that you discuss with your local Lysaght representative ways to minimise the effects.

To prevent clip fixed wall cladding from sliding downward in the fixing clips, you should pierce-fix through each sheet under the flashing or capping, along the top of the sheets. Alternatively refer figure 11.2.6.

MATERIAL FINISH

The colour and finish of the material chosen will also effect the oil canning in the profile. Profiles of a dark colour make oil canning more obvious to the eye, as well as increasing the solar absorption of the material the thermal expansion and contraction of the material will also increase. The surface finish, i.e. a gloss or matt finish, will also affect the appearance of the oil canning. The higher the gloss finish the more the obvious the oil canning will be to the eye.

WEATHER

The weather plays a major role in the appearance of oil canning. The change in temperature on the surface of the profile will impact on the thermal expansion of the profile. Even though there may not a large temperature difference in the ambient temperature there can be significant differences in temperature on the surface of the metal. A profile may be subjected to early morning frost, but by being positioned in full sun the surface temperatures can easily reach over 50°C during the day. There are many factors that can adjust the temperature experienced by the profile from the colour of the profile to location, orientation and shielding.

LIGHT

Light will impact on how noticeable oil canning is. Some days and times of day the oil canning may be more noticeable than others. The orientation that the light is reflecting off the waviness of the oil canning effects the way it is perceived by the eye.

HANDLING & STORAGE

Due care needs to be taken with all profiles especially those with large flat pans. Any additional stress put on the material will increase the likeness of oil canning appearing in the pans. Oil canning is generally an aesthetic issue and structural integrity is typically not affected. In the absence of specific contract requirements oil canning should not be the sole grounds for panel rejection.

See Lysaght Product Advisory Bulletin PAB05 for more details on the subject of oil canning in metallic sheets.

2.8 LOW ROOF PITCHES

Unless there is adequate positive fall in a roof, there is danger of ponding, which can lead to a reduced service life, or reduced rainwater capacity. Reduced service life is of particular importance in more severe environments.

Roof slopes lower than the recommended minimum may be available subject to enquiry and will be dependent upon the roof application and building details. Lower roof slopes may require additional provisions to be adhered to. Please call your nearest service centre for advice.

2.9 DESIGN CRITERIA

The ZENITH® cladding system is designed based on the criteria of the following Australian standards and industries guide:

- AS 1170.2 Structural design actions Part 2: Wind actions
- AS 1562.1 Design and installation of sheet roof and wall cladding Part 1: Metal
- AS 4040.0 Methods of testing sheet roof and wall cladding Part 0: Introduction, list of methods and general requirements
- AS4040.1 Methods of testing sheet roof and wall cladding Method 1: Resistance concentrated loads
- AS 4040.2 (incorporating amendment No.1) Methods of testing sheet roof and wall cladding Method 2: Resistance to wind pressures for non-cyclone regions
- AS 4055 Wind Loads For Housing
- SA HB 39 Handbook - Installation code for metal roof and wall cladding

2.10 LIMIT STATES WIND PRESSURES

The ZENITH® range offers the full benefits of the latest methods for modelling wind pressures. The Wind Pressure capacities are determined by full scale tests conducted at Lysaght's NATA-registered testing laboratory, using the direct pressure-testing rig.

Testing was conducted in accordance with AS 1562.1 for general compliance, AS4040.1 for resistance to concentrated load, AS4040.2 for resistance to non-cyclonic wind pressures. The pressure capacities for serviceability are based on a deflection limit of (span/120) + (maximum fastener pitch/30). The pressure capacities for strength have been determined by testing the cladding to failure (ultimate capacity). These pressures are applicable when the cladding is fixed to specified minimum supporting member or above.

2.11 WIND FORCES ON ROOFS

Winds create considerable forces on both the topside and the underside of roof cladding, and you must consider these forces in the design and fixing of any roof. The forces are:

- **inward forces** tending to collapse the roof cladding inwards, caused by wind acting directly on the windward side; and
- **outward forces** tending to lift the roof cladding from its framing, and the entire roof structure from the rest of the building. Outward forces can be caused both by uplift from negative wind pressures, outside the building; and by positive wind pressure inside the building.

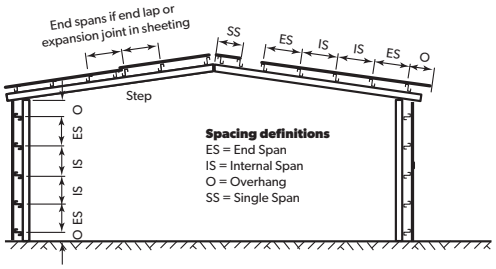
Generally the greatest wind forces imposed on roofs are due to the outward forces. Because the dead weight of roofing materials is relatively small, the outward forces must be resisted by the roof fasteners.

It is very important that the battens and roof framing are adequately fixed to the rafters and walls, and that under extreme conditions the wall framing is anchored to the footings. Special anchoring provisions may apply in cyclonic areas. Specialist advice should be sought in these circumstances.

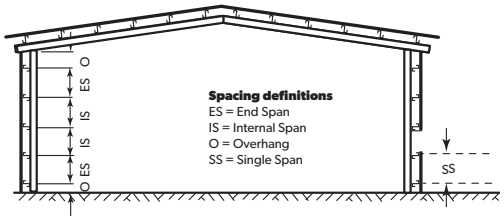
Figure 2.1:

Span types for Roofing and Walling.

Roofing & Walling Profiles

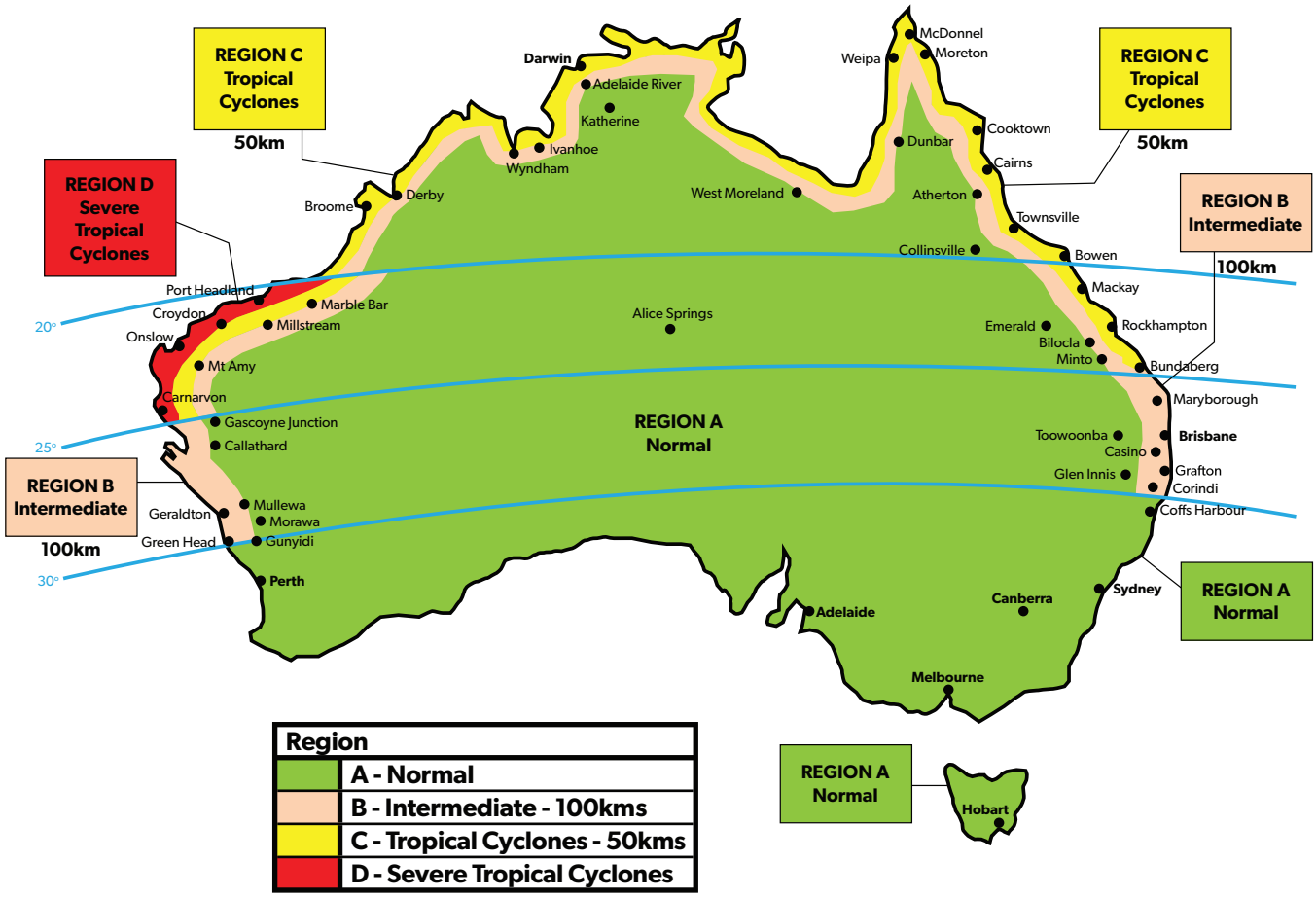


Walling Profiles Only



2.12 NON-CYCLONIC AREAS & CYCLONIC AREAS

Non-cyclonic areas and cyclonic areas of Australia are defined and detailed in AS/NZS 1170.2 and AS 4055.



2.13 ENVIRONMENTAL CONDITIONS

Coated steel products can be damaged by some environmental conditions including industrial, agricultural, marine, intensive animal farming, swimming pools or other aggressive conditions.
If any of our products are to be used in these conditions, or unusually corrosive environments, seek advice from your local Lysaght branch.

Keep the product dry and clear of the ground. If stacked or bundled product becomes wet for extended periods, separate it, wipe it with a clean cloth and stack it to dry thoroughly.

2.14 METAL AND TIMBER COMPATIBILITY

Contact with (or run-off from) some materials can damage coated steel products. Buildings can also be susceptible to condensation on inside surfaces.

The materials include certain metals, treated timbers and chemicals.

- Don't allow any contact of coated steel products with incompatible materials. (Table 2.14.1).
- Don't allow discharge of rainwater from incompatible materials onto coated steel products. (Table 2.14.1).
- Ensure that supporting members are compatible with the coated steel products or, alternatively, appropriately coated.

If there are doubts about the compatibility of other products being used, seek advice from our information line.

Incompatible materials include:

- lead
- copper
- monel metal
- bare steel
- stainless steel
  (except with SUPERDURA® Stainless steel cladding)
- carbon (in pencils and some rubbers)
- green or some chemically-treated timber
  (like CCA or tanalith treatments)
- materials subject to cycles of dryness and wetness or which have excessive moisture content
  (such as improperly-seasoned timber)
- wet and dry concrete
- soils
- vegetable matter
- cleaning agents (e.g. brick cleaning)
- any material which will inhibit normal exposure to the atmosphere

Table 2.14.1:

Acceptability of drainage from upper surface onto a lower metal surface and direct contact.

COMPATIBILITY OF DIRECT CONTACT BETWEEN METALS OR ALLOYS

ROOF DRAINAGE SYSTEM COMPONENTS & ANY CLADDING MATERIAL	ACCESSORIES OR FASTENER OR (UPPER SURFACE)								
	ZINCALUME® STEEL	GALVANISED (ZINC COATED STEEL)	ZINC	COLORBOND® STEEL, COLORBOND® ULTRA STEEL, COLORBOND® METALLIC STEEL, COLORBOND® STEEL MATT	SUPERDURA® STAINLESS STEEL	STAINLESS STEEL	ALUMINIUM ALLOYS	COPPER & COPPER ALLOYS [1]	LEAD
ZINCALUME® STEEL	YES	YES	YES	YES	NO	NO	YES	NO	NO
GALVANISED (ZINC COATED STEEL)	YES	YES	YES	YES	NO	NO	YES	NO	NO
ZINC	YES	YES	YES	YES	NO	NO	YES	NO	NO
COLORBOND® STEEL, COLORBOND® ULTRA STEEL, COLORBOND® METALLIC STEEL, COLORBOND® STEEL MATT	YES	YES	YES	YES	NO	NO	YES	NO	NO
SUPERDURA® STAINLESS STEEL	NO	NO	NO	NO	YES	YES	NO	NO	NO
STAINLESS STEEL	NO	NO	NO	NO	YES	YES	NO	NO	NO
ALUMINIUM ALLOYS	YES	YES	YES	YES	NO [3]	NO [3]	YES	NO	NO
COPPER & COPPER ALLOYS [1]	NO	NO	NO	NO	NO	NO	NO	YES	NO
LEAD	NO	NO	NO	NO	NO	NO	NO	YES	YES

[1] Monel - copper/nickel alloy.

[2] For further guidance refer to AS/NZS 3500.3

[3] In benign environments, mixing of stainless steel and aluminium may be acceptable.

ACCEPTABILITY OF DRAINAGE FROM AN UPPER SURFACE TO A LOWER METAL SURFACE

LOWER ROOF DRAINAGE SYSTEM MATERIAL	ACCESSORIES OR FASTENER OR (UPPER SURFACE)									
	ZINCALUME® STEEL	GALVANISED (ZINC COATED STEEL)	ZINC	COLORBOND® STEEL, COLORBOND® ULTRA STEEL, COLORBOND® METALLIC STEEL, COLORBOND® STEEL MATT	SUPERDURA® STAINLESS STEEL	STAINLESS STEEL	ALUMINIUM ALLOYS	COPPER & COPPER ALLOYS [1]	LEAD	GLAZED ROOF TILES, GLASS & PLASTIC
ZINCALUME® STEEL	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES
GALVANISED (ZINC COATED STEEL)	NO	YES	YES	NO	NO	NO	NO	NO	YES	NO
ZINC	NO	YES	YES	NO	NO	NO	NO	NO	YES	NO
COLORBOND® STEEL, COLORBOND® ULTRA STEEL, COLORBOND® METALLIC STEEL, COLORBOND® STEEL MATT	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES
SUPERDURA® STAINLESS STEEL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
STAINLESS STEEL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ALUMINIUM ALLOYS	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES
COPPER & COPPER ALLOYS [1]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
LEAD	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

[1] Monel - copper/nickel alloy.

[2] For further guidance refer to AS/NZS 3500.3

3.0 Fasteners

When you select fasteners, you should consider the design life of the structure, because the fasteners and the cladding material should have similar life expectancies.

3.1 MATERIALS FOR SCREWS

Table 3.1.1:

Product	Appropriate Screw Materials
For most external applications not closer than 400m from the ocean or sever marine influence: • COLORBOND® steel or COLORBOND® Metallic steel • ZINCALUME® AM125 steel	AS 3566 Class 3
For severe exposure conditions: • COLORBOND® steel (200m to 400m from marine environments) • COLORBOND® Ultra steel (100m to 200m from marine environments) AM150	AS 3566 Class 4 Where the colour match of fasteners is an overriding consideration, powder coated/ painted fasteners may be used
For very severe exposure conditions: • SUPERDURA® Stainless steel • PERMALITE® Aluminium	Stainless steel

Stainless steel fasteners are recommended for use only with SUPERDURA® Stainless steel and PERMALITE® Aluminium.

3.2 MATERIALS FOR BLIND RIVETS

For GALVABOND®, ZINCALUME® and COLORBOND® steels, use aluminium blind rivets. Blind rivets are used for fixing flashings, accessories and side-laps.

3.3 MATERIALS FOR SEALING WASHERS

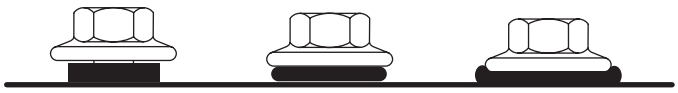
Sealing washers used under the heads of screws used to fasten cladding shaped from COLORBOND® steel must be made from materials that don't have significant levels of conductive carbon black, particularly in marine environments. Use EPDM washers, not neoprene.

3.4 SETTING OF SCREWS

Fasteners with sealing washers should be tightened only until the washer is gripped firmly enough to provide a weathertight seal. The fasteners should not be over-tightened because this may split the sealing washer or deform the sheet, either of which could lead to water penetration. Take particular care when valley fixing because there is no flexibility with the sheet hard against its support. Take particular care to ensure the fastener is driven perpendicular to the sheeting to avoid deformation of the washer.

Figure 3.4.1:

It is important that you set screws correctly.



3.5 FASTENERS FOR PLY SUBSTRATE

When 19mm (roofing) or 15mm (walling) plywood substrates are utilised, the plywood substrate should be fastened to the building subframe in accordance with plywood manufacturers recommendations for flooring ply. Screws shall comply with AS 3566 Class 3 as a minimum.

4.0 Curved & bent roofs

4.1 ROOFING SHAPE OPTIONS

Curved sheets can be used for both roofing and walling applications. Sheeting can be curved into either concave or convex shapes as required.

An excellent method of cladding low-slope gable roofs is to run continuous lengths of roofing from eave to eave, across the full width of the roof. This gives a particularly neat and attractive roof. It is also possible to spring-curve sheets into a concave shape.

4.2 CAPPED BENT RIBBED ROOF

Another method for roofs with a pitch outside the spring curving range is the capped bent ribbed roof.

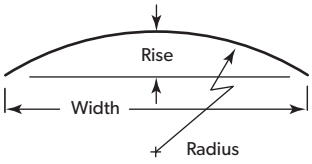
Tray cladding can be used in continuous lengths from eave to eave by cutting the ribs and bending the pans at the ridgeline. The same process is used on Mansard roofs. BAROQUE™ is the only product in the ZENITH® range not suitable for capped bent ribbed roof applications. Caps are fitted over the cut ribs, which open up when the pans are bent. Fitting the rib caps can be time-consuming and care must be taken with sealing to avoid any possibility of leakage.

The ribs must be cut squarely, with a metal cutting blade in a power saw, set to the depth of the rib minus 2mm. Steel caps are then manufactured and installed as shown in Figure 4.1.3.

A neutral-cure silicon sealant should be used.

Figure 4.1.1:

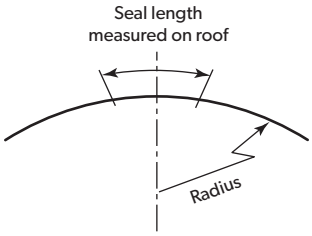
Calculation of radius.



$$\text{Radius} = \frac{\text{Width}^2 + 4\,(\text{Rise})^2}{8 \times \text{Rise}}$$

Figure 4.1.2:

Seal length for side-laps on spring-arched roof.



Seal Length

LONGLINE 305®
(minimum roof pitch 1°) = 0.035 x radius

IMPERIAL™ (325mm Cover)
(minimum roof pitch 1°) = 0.035 x radius

Figure 4.1.3:

Capped bent ribbed roof.

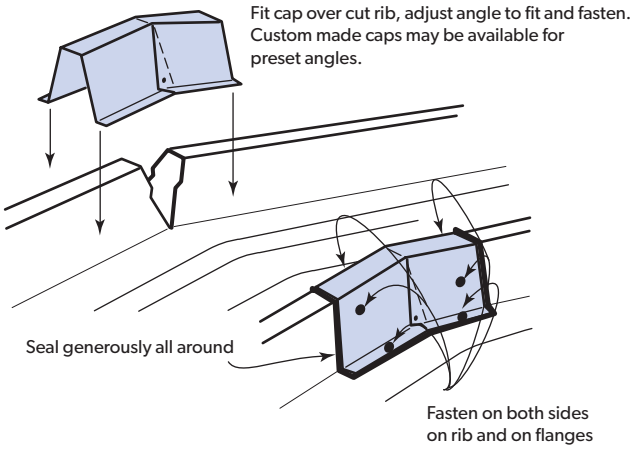


Figure 4.1.4:

Typical curved and bent applications.

Spring-curved-ridge roof
Sheets straight except for a curve near the ridge.



Spring-arched or convex roof
Sheets curved in a radius from eave to eave.



Spring-curved concave roof
Sheets curved concavely in a radius.



Pre-curved sheets
Sheets curved by machine before installation.

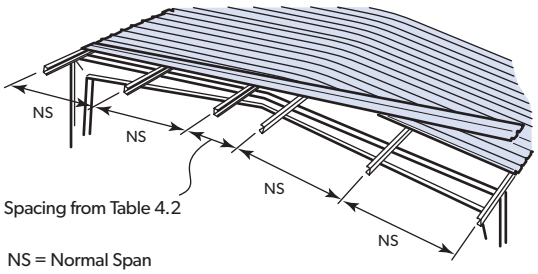


Capped bent ribbed roofs



Figure 4.1.5:

Spring-curved-ridge roof.



4.3 SPRING-ARCHED ROOF

Sheets in a spring-arched (convex) roof are curved in a radius from eave to eave. IMPERIAL™ can be spring curved over a plywood backing for an arched roof. Table 4.1.1 shows the acceptable radii. The top face of all supports must accurately follow and be tangential to the radius of the arch. The radius of curvature can be calculated from the formula in Table 4.1.1.

At the crest of an arch the roof is flat, which is obviously below the specified minimum roof pitch. Therefore side-laps should be sealed over the crest of the arch until there is sufficient pitch to give adequate drainage. The length of seal is shown in Figure 4.1.2.

Over the supports very slight lip wave or slight crease marks may appear in the pans or valleys when subjected to foot traffic or at minimum radius. They don't affect strength and will usually not be seen from the ground.

If end-laps are necessary they should not be located at or near the crest of the arch and each sheet length must span at least three purlin spacings.

Profiles with wide pans are susceptible to local buckling (oil canning) of the pans and this should be carefully considered.

Aside from aesthetic considerations, an oil canned pan may retain water which could lead to discolouration and/or deterioration of the sheet coating and also contributes to thermally induced roof noise. In some projects oil-canning in the pans has been acceptable. Each sheet is first fixed to one side of the roof, and then pulled down to be fixed to the other side. Alternate sheets are laid from opposite sides of the roof.

4.5 TRANSVERSE CURVED WALLS

Flat pan sheeting is readily adaptable to transverse curving in walling applications for a subtle blended visual aesthetic. Min transverse curve radii are outlined in Table 4.2. In transverse curved applications full ply support is required.

Figure 4.5.1:

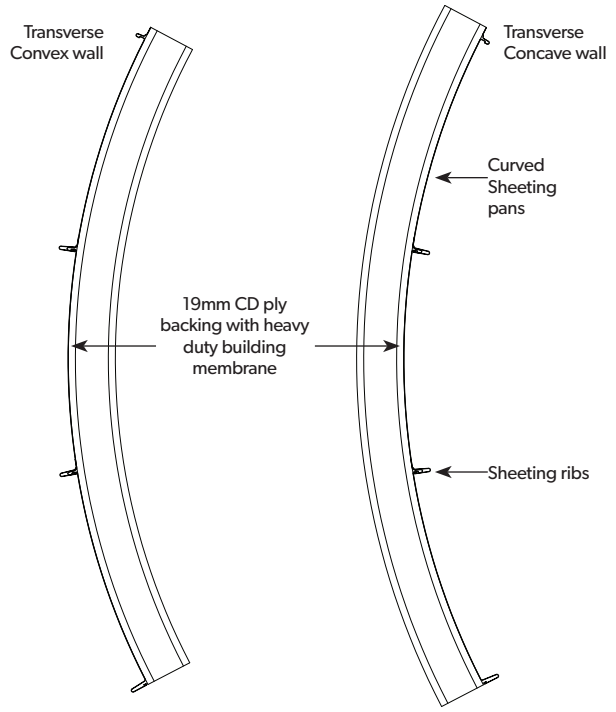


Table 4.2:

	Min Radi Longitudinal			Min Radii Transverse (Walling)	
Profile	**Roll Curve (m)**	**Spring Arched (m) Convex/Concave**	**Max Support Spacing at Min Radius (mm)**	**Transverse Spring Arched for (m) Convex/Concave**	**Max Support Spacing at Min Radius - Transverse Spring Curve (m)**
LONGLINE 305®	N/A	26	1600	N/A	N/A
LONGLINE 300® (fluted)	N/A	20	1200	N/A	N/A
LONGLINE (tapered)	N/A	20	1200	N/A	N/A
ENSEAM®	N/A	N/A	N/A	1.5**	Full ply support
SNAPSEAM™	N/A	N/A	N/A	1.5**	Full ply support
IMPERIAL™ (325mm cover)	1.5	50*	Full ply support with fixed clips at 150mm c/c throughout curve	1.5	Full ply support with Clip spacings as per table 12.1.1
DOMINION®	N/A	N/A	N/A	1.8 / 2.8***	Curved battens (min 0.55mm BMT) at 600mm c/c
BAROQUE™	N/A	N/A	N/A	1.5	Full ply support

* Oil canning maybe an issue to be considered
** For Transverse Convex walling applications ENSEAM® and SNAPSEAM™ ribs should be pop riveted as per Figure 4.4.1 at max 500mm c/c
*** Special care is required in concave applications to avoid paint damage to recess joints whilst installing fixing screws

4.4 PRE-CURVED SHEETS

Pre-curving of IMPERIAL™ is available for various applications - we don't recommend pre-curving for other ZENITH® profiles.

Pre-curved roofing is popular for aesthetics or for function (such as a gutterless eave design). IMPERIAL™ can be curved to a radius of. Because of the spacing of curving rolls, there is usually a straight portion at the end of the sheet beyond the curve (often 500). Allow for this in your design. It can be trimmed off if necessary.

If a pre-curved section of cladding is to be joined to a straight section, it is recommended that you order the curved and straight sheets at the same time, asking for them to be matched in production to ensure a quality end-lap.

Figure 4.4.1:

Additional rib fixing for transverse curved ENSEAM® and SNAPSEAM™.



5.0 Insulation

5.1 HEAT CONTROL METHODS

In roofs, a simple, inexpensive and very effective method is to drape a membrane of reflective foil laminate over the supports before laying the cladding. The laminate can also provide a vapour barrier to minimise condensation. If the membrane is allowed to drape 50 to 75mm between the supports the air space between the membrane and the roof cladding will further improve heat insulation (Figure 5.1.2).

The ZENITH® range (with the exception of LONGLINE 305®) are designed to be installed in conjunction with a heavy duty building membrane as an additional weather-proofing measure.

This building membrane blanket should be installed in accordance with the manufactures recommendations, sealed at the top, free from ripples and puckers, lapped and taped at joins. All laps in the building membrane / blanket must be made with 150mm lap, sealed with double sided tape between the faces of the building membrane and taped with sisal tape on the outside face.

Additional heat insulation is often achieved by using bulk insulation blankets or batts (Figure 5.1.3).

The same principles apply to walls, though the foil is not draped.

Figure 5.1.2:

Reflective foil laminate is simple, cheap and very effective.

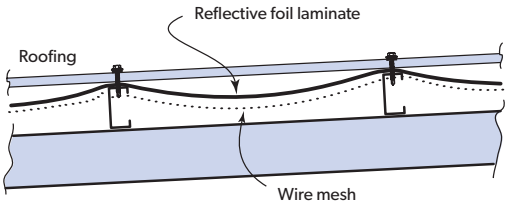


Figure 5.1.3:

Typical roof insulation with foil and blanket.

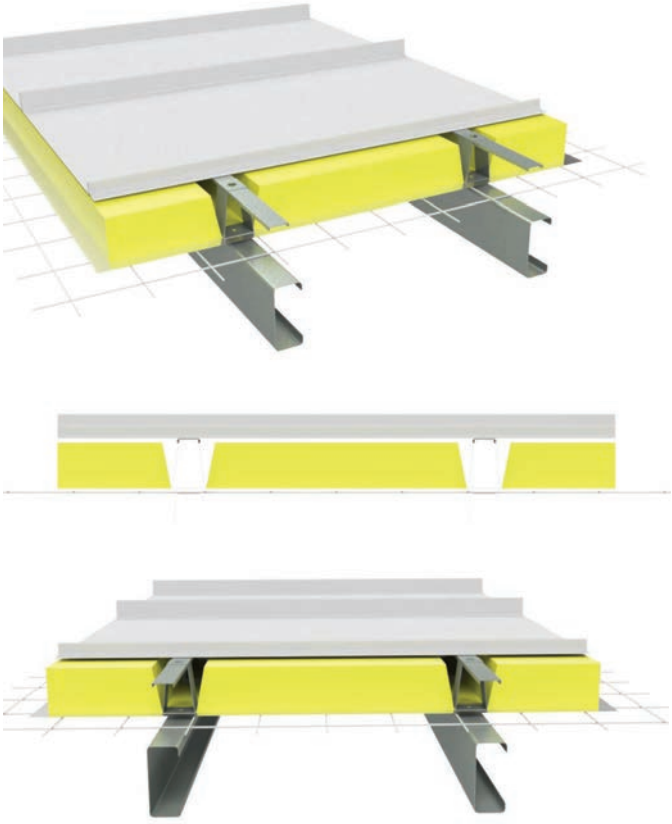


Table 5.1.1:

Approximate thermal transmission (for comparisons only).

	Roofing only		Roofing with reflective foil laminate		Roofing with 50mm insulation blanket & reflective foil laminate	
	Heat radiated from underside	**Heat radiated + convected**	**Heat radiated from underside**	**Heat radiated + convected**	**Heat radiated from underside**	**Heat radiated + convected**
	W/m^2	W/m^2	W/m^2	W/m^2	W/m^2	W/m^2
ZINCALUME® steel	25	40	2.0	9.0	2.0	7.0
COLORBOND® steel						
COOLMAX® (WHITEHAVEN®)	22.5	26.6	0.9	3.8	0.6	2.7
CLASSIC CREAM™, SURFMIST®	37.1	43.8	1.5	6.1	1.1	4.3
SANDBANK®	59.7	70.3	2.4	9.6	1.7	6.9
WILDERNESS®	91.2	106.9	3.6	14.4	2.5	10.3
WOODLAND GREY®	101.4	118.7	4.0	15.9	2.8	11.3
DEEP OCEAN®	108.2	126.6	4.3	16.9	3.0	12.0

Assumptions:
Solar radiation = 850 W/m^2 (average Australian summer), Ambient temperature = 30°C, Wind velocity over roof = 3m/s, Still air under the roof system, Inside temperature = 30°C.

5.2 CONDENSATION

When the air in a building in contact with metal cladding is warmer than the cladding, water vapour (moisture) in the air can condense on the inside of the cladding.

Water vapour passes fairly freely through most building linings into the ceiling and wall spaces where it may directly contact the cladding.

Condensation can lead to deterioration of building components and staining of ceiling and walls. If insulation blankets or batts are wet, or even slightly dampened by condensation, its efficiency is reduced markedly.

The amount of condensation depends upon the amount of water vapour in the air and this varies with climatic conditions. Activities within a building can add substantially to the amount of water vapour, and typical domestic situations include bathing, showering, cooking, washing and drying clothes and dishes, and breathing. It is essential to vent substantial amounts of water vapour to outside the building.

Condensation management is an important design consideration in modern buildings. Building professionals should refer to the Lysaght Publication "Condensation control in Australian buildings constructed with LYSAGHT® claddings" for guidance in this area.

Construction details in this Manual have been prepared in accordance with the principles outlined in "Condensation control in Australian buildings constructed with LYSAGHT® claddings" however building practitioners should use professional judgement as to the applicability of these details for individual projects.

5.3 INSULATION MATERIALS

Typical insulation materials are reflective foil laminates, insulation blankets or batts made from fibreglass, and boards made from polystyrene. Remember that the colour of cladding also has a marked effect (Table 5.1.1).

FOIL LAMINATES

Foil laminates reflect heat and can double-up as a vapour barrier to control condensation. Where they are used as a vapour barrier the joints between successive strips are overlapped about 150mm, and sealed with a tape impervious to moisture.

BLANKETS AND BATTS

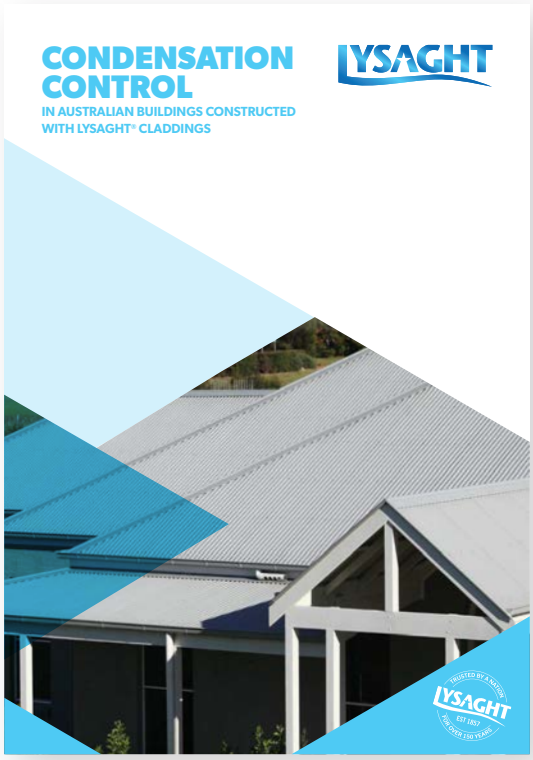
Blankets and batts minimise heat convection and are available with the laminate bonded to the fibreglass. They are also effective in reducing noise.

Insulation blankets must be protected from moisture, particularly around the edges of the roof and even more particularly at the bottom end of the cladding where rainwater run-off can be blown back under a low-pitched roof. If the blanket overhangs the bottom support, it may even come into contact with water in the gutter, where the insulation will absorb moisture and remain damp for extended periods, thus leading to deterioration of the coating on the underside of the roofing and reducing the effectiveness of the insulation.

5.4 INSULATION THICKNESS

Insulation blankets and batts can cause wide flat pan cladding to bow out between the supports, between fasteners along the support, or bow the pans. For insulation blankets and batts as well as more dense glass wool and rock wool, and thicker insulation, spacers are recommended.

Furthermore the cladding can bow when the blankets or batts are placed over taut safety wire. Taut safety wire prevents the insulation from draping between supports, thus compressing the insulation between the supports. This reduces the effectiveness of the insulation and also results in greater pressure placed under the cladding. Where the safety wire is taut then spacers are recommended to minimise these issues.



6.0 Roof drainage

6.1 MAXIMUM ROOF LENGTHS FOR DRAINAGE

Table 6.1.1:

Maximum roof lengths for drainage measured from ridge to gutter (m) Penetrations alter the flow of water on a roof. Thus, for design, you need to use an effective roof length (Figure 6.1.1).

	Peak Rainfall Intensity	Roof Slope					
		1 in 50* (1°)	1 in 30 (2°)	1 in 20 (3°)	1 in 12 (5°)	1 in 7.5 (7.5°)	1 in 6 (10°)
LONGLINE 305® (Not Tapered)	100	219	273	320	397	475	546
	150	146	182	213	265	317	364
	200	110	136	160	199	237	273
	250	88	109	128	159	190	218
	300	73	91	107	133	158	182
	400	55	68	80	100	119	136
	500	44	55	64	80	95	109
ENSEAM® 265mm cover	100			160	199	238	273
	150			107	133	158	182
	200			80	100	119	137
	250			64	80	95	109
	300			53	66	79	91
	400			40	50	59	68
	500			32	40	48	55
SNAPSEAM™ 265mm cover	100			160	199	238	273
	150			107	133	158	182
	200			80	100	119	137
	250			64	80	95	109
	300			53	66	79	91
	400			40	50	59	68
	500			32	40	48	55
IMPERIAL™ 325mm & 525mm cover	100	221	276	323	402	479	551
	150	148	184	215	268	320	367
	200	111	138	161	201	240	276
	250	89	110	129	161	192	220
	300	74	92	108	134	160	184
	400	55	69	81	101	120	138
	500	44	55	65	80	96	110
BAROQUE™ 275mm & 475mm cover Double Rib	100				27	32	37
	150				18	22	25
	200				14	16	19
	250				11	13	15
	300				9	11	12
	400				7	8	9
	500				5	6	7
BAROQUE™ 275mm & 475mm cover Single Rib	100				29	35	40
	150				20	23	27
	200				15	17	20
	250				12	14	16
	300				10	12	13
	400				7	9	10
	500				6	7	8

Notes:

- Some lengths in this table may exceed the maximum allowable transport length.
- Data are based on work of CSIRO and Lysaght.
- For peak rainfall intensities in your locality, see Table 6.1.2 unless noted otherwise.

For intermediate roof slope, use linear interpolation between values of the same category.

ENSEAM® only: For roof pitch ≤ 3°, capillary action of rainwater in the laps of panels is more likely to happen.

IMPERIAL™ only: For roof pitch ≤ 2°, capillary action of rainwater in the laps of panels is more likely to happen.

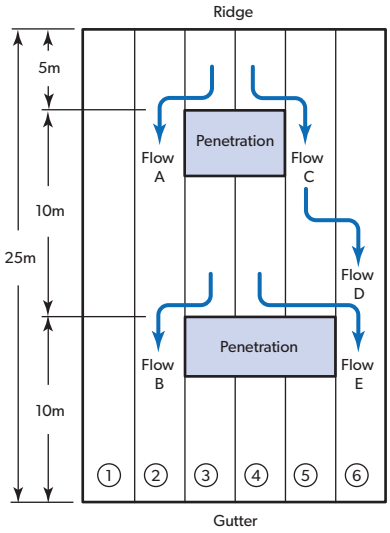
BAROQUE™ only: Minimum recommended slope is 5°.

Sheet lengths greater than 15m are not recommended due to thermal expansion and contraction.

Figure 6.1.1:

Example of calculating effective roof lengths where penetrations alter the flow of water on a roof.

Note: A suitably qualified engineer is recommended for calculating/checking roof design and flow design.



Valley	Effective Length
1	25m (Base Length)
2	Base Length + A + B 25 + 5 + 10 = 40m
6	Base Length + C + D + E 25 + 5 + 15 + 10 = 55m (Worst case used for design)

Table 6.1.2:

Design rainfall intensities.

	ARI once in 20 years mm/hr	ARI once in 100 years mm/hr
ACT		
Canberra	143	193
New South Wales		
Broken Hill	143	219
Sydney	200	262
Newcastle	226	316
Victoria		
Mildura	142	218
Melbourne	132	187
Ballarat	131	188
Queensland		
Brisbane	234	305
Rockhampton	229	300
Mackay	250	316
Mt. Isa	199	260
Townsville	235	300
Cairns	229	278
South Australia		
Mount Gambier	103	144
Adelaide	124	184
Western Australia		
Geraldton	138	193
Perth	130	172
Tasmania		
Hobart	85	116
Northern Territory		
Alice Springs	166	239
Darwin	233	274

Extract from NCC (2016)

7.0 General care, safety and handling

The following section should be considered a guide only. For comprehensive information, building professionals should consult the appropriate legislation, regulations, codes of practice and technical literature such as HB39 and Lysaght technical bulletins.

7.1 SAFETY

It is commonsense to work safely, protecting yourself and workmates from accidents on the site. Safety includes the practices you use; as well as personal protection of eyes and skin from sunburn, and hearing from noise. Some sunscreens contain titanium oxides. These have been shown to break down some paint compounds and these should be avoided.

Occupational health and safety laws enforce safe working conditions in most locations. Laws in every state require you to have fall protection which may include safety mesh, personal harnesses and perimeter guardrails. We recommend that you are fully aware of all local codes of safe practice and you adhere strictly to all laws that apply to your site.

7.2 CARE AND STORAGE BEFORE INSTALLATION

Rain or condensation is easily drawn between the surfaces of stacked sheets by capillary action, or they can be driven in by wind. This trapped moisture cannot evaporate easily, so it can cause deterioration of the coating which may lead to reduced life-expectancy or poor appearance.

If materials are not required for immediate use, stack them neatly and clear of the ground and minimise the duration of exposure if left for extended periods. If left in the open, protect them with waterproof covers.

If stacked or bundled product becomes wet, separate it without delay, wipe it with a clean cloth and stack it to dry thoroughly.

7.3 HANDLING CLADDING ON SITE

On large building projects you can reduce handling time by lifting bundles with a crane direct from the delivery truck onto the roof frame. Use a spreader bar for long sheets. For small to medium size projects, without mechanical handling facilities, you can unload sheets by hand and pass them up to the roof one at a time.

Handling safety - our product may be sharp and heavy.

It is recommended that heavy-duty cut-resistant gloves and appropriate manual handling techniques or a lifting plan be used when handling material.

Handle materials carefully to avoid damage: don't drag materials over rough surfaces or each other; carry tools, don't drag them; protect from swarf.

7.4 WALKING ON ROOFS

It is important that you walk on roofing carefully, to avoid damage to either the roofing or yourself.

If there will be heavy foot traffic or where an area is to be treated as non-trafficable on a roof, provide a temporary walkway or working platform with consideration of hand rails to minimise damage.

Always take particular care when walking on wet or newly laid sheets — particularly on steeply pitched roofs.

Always walk on or near the support lines this is usually the roof battens perpendicular to the ZENITH® panels. Walking in the pans, keep your weight evenly distributed over the soles of both feet to avoid concentrating your weight on either heels or toes. Always wear smooth soft-soled shoes; avoid ribbed soles that pick up and hold small stones, swarf and other objects.

Great care should be taken when moving near roof overhang. The overhang should be treated as a non-trafficable area. When walking near an overhang, walk over or as close as practical to the roofing supports (usually over fastener locations).

For ZENITH® pan-type roofing walk in the pans, over supports, when you walk parallel to the ribs between supports

Be careful when moving between supports. Do not walk in the pan immediately adjacent to flashings or translucent sheeting. Walk at least one pan away.

When you walk across the ribs between supports, walk over or close to the roofing supports. (Usually over fastener locations).

7.5 MARKING OUT, CUTTING AND DRILLING

MARKING OUT

A pencil of any colour may be used except black or so-called lead pencils. Don't use black pencils to mark roofing or walling because the graphite content can create an electric cell when wet and thus cause deterioration of the finish. You can also use a string line with chalk dust, or a fine, felt-tipped marker.

CUTTING

Where possible, you should minimise site-work by using sheets cut to length in the factory.

For cutting thin metal on site, we recommend that you use a power saw with a metal-cutting blade because it produces fewer damaging hot metal particles and leaves less resultant burr than does a carborundum disc.

Alternative cutting tools (electric shears and nibblers) are also suitable however extra care with the straightness of the cut may be required.

Cut materials over the ground and not over other materials where hot particles can fall and cause damage to finishes—especially COLORBOND® pre-painted steel finishes. It is best to have the exterior colour finish of a COLORBOND® pre-painted steel sheet facing down, however you must then protect the paint finish from scratching by your work supports.

If you have to cut materials near sheets already installed, mask them or direct the stream of hot particles away. Reciprocating nibblers are also widely used in the roofing trade, and they produce an excellent cut.
The resulting small, sharp scraps can rust and damage finishes; and they can cause personal injury. Take special care to collect these scraps.

SWARF

Sweep all metallic swarf and other debris from roof areas and gutters at the end of each day and at the completion of the installation. Failure to do so can lead to surface staining when the metal particles rust.

MAKING HOLES

Holes are often made by drilling or cutting by hole saw or jig saw. Mask the area around the hole to protect paint from damage by swarf.

7.6 GENERAL INSTALLATION PROCEDURE

CHECK FLATNESS, SLOPE AND OVERHANG

Before starting work ensure that:

- the supports for your cladding are truly in the same plane;
- the minimum roof slopes conform to Section 2.8 (Low roof pitches); and
- the overhangs of sheets from the top and bottom supports don't exceed recommendations, whilst also overhanging a nominal length into gutters.

Make any necessary adjustments before you start laying sheets, because they will be difficult or impossible to rectify later.

ORIENT SHEETS BEFORE LIFTING

Ensure that the sheets are orientated correctly – thus the outer/weather surface of the sheets is pointed outward/upward/away from the supports.

ROOFING

Consider which end of the building is best to start from.

It is much easier and safer to turn sheets on the ground than up on the roof. Before lifting sheets on to the roof, check that they are the correct way up and the overlapping side is towards the edge of the roof from which installation will start.

Place bundles of sheets over or near firm supports, not at mid span of roof members.

Industry practice is for the sheets to start laying from the end of the building that will be in the lee of the prevailing weather wherever possible. This is more important when the roofing profile is more vulnerable (shallow profile, simple nesting of the side-laps, longer spans, shallow slopes, etc.) and when the vulnerable roof profile is in exposed situations. Deeper/stiffer roofing profiles and roofing profiles that interlock at the side-lap have considerably less reliance on laying direction.

WALLING

Generally wall sheets can be installed either vertically or horizontally.

Vertical installation is the more common and the principles above for roofing can be applied.

Horizontal installation is carried out with the first sheet at the bottom with the overlap facing down. Following sheets are progressively installed up the wall.

BAROQUE™ is fixed at max 600mm centres for both roof and walls.

POSITION FIRST SHEET

With particular care, position the first sheet before fixing to ensure that it is correctly located in relation to other parts of the building.

Check that the sheet:

- is aligned with the end-wall (or its barge or fascia), bearing in mind the type of flashing or capping treatment to be used; and
- aligns correctly at its ends in relation to the gutter and ridge (or parapet or transverse wall).

Fix the sheet as described later in this chapter.

POSITION OTHER SHEETS

After fixing the first sheet in position, align the following sheets using:

- the long edge of the previous sheet; and
- a measurement from the end of the sheet to the fascia or purlin at the gutter. It is important that you keep the gutter-end of all sheets in a straight line.

Fix the sheet by either:

- fixing each sheet completely, before laying the next; or
- fix the sheet sufficiently to ensure it can't move, complete laying all sheets, then return to place all the intermediate fasteners later.

CHECK ALIGNMENT OCCASIONALLY

Occasionally check that the sheets are still parallel with the first sheet, by taking two measurements across the width of the fixed cladding (Figure 7.6.2).

At about half way through the job, perform a similar check but take the measurements from the finishing line to aim for the final sheet to be parallel with the end of the roof. If the measurements are not close enough, lay subsequent sheets very slightly out of parallel to gradually correct the error by:

- properly align and fix a lap, then
- fix the other edge of the sheet, placing the fasteners slightly closer or further from where they would normally be if there was no error. (Gradually correct the error by placing the fasteners in such a way as to slowly bring the sheets back into correct alignment).

Figure 7.6.1:

Sheet lay direction when prevailing weather is a consideration.

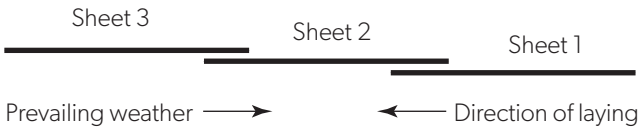
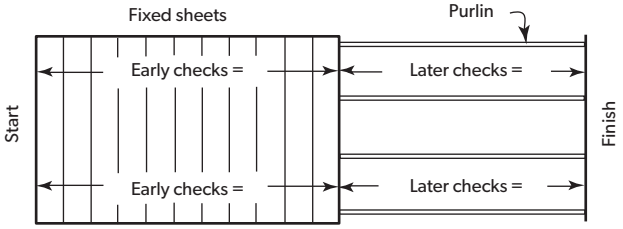


Figure 7.6.2:

Check alignment occasionally.



7.7 CLEAN UP

Swarf (metal scraps and/or abrasive particles resulting from cutting and drilling) left on the surfaces of materials will cause rust stains which can lead to reduced life of the material.

- Sweep or hose all metallic swarf and other debris from roof areas and gutters at the end of each day and at the completion of the installation. Failure to do so can lead to blockages of water flow or surface staining (such as when the metal particles rust).
- If swarf has become stuck on a finish, it can be removed. Take great care not to remove the paint or the metal coatings.
- For critical applications inspect the job two weeks after completion, when rain or condensation will have caused any remaining swarf to rust, and thus highlight affected areas.

7.8 WARN OTHER CONTRACTORS

Many stains arising from swarf do so, not from the work of roofing-installers, but from other contractors working on the job. Similarly, problems can arise from contact with incompatible materials, like copper piping or chemically treated timber. Acid cleaning of bricks can also be a problem. Remember to warn them to walk on pans, and over supports, not on the ribs. Architects and builders need to be aware of all this, and warn contractors accordingly.

7.9 STRIPPABLE COATINGS

To provide temporary protection during production, handling and transport, some COLORBOND® steel products are coated with a plastic. This coating peels off easily when new, but it has a relatively short life, especially in sunlight. If you don't remove this coating at the time of installation, you may find it very hard to remove later on.

Please dispose of the plastic in an environmentally responsible manner.

7.10 RECOMMENDED SEALANTS

Neutral-cure silicone sealants have been successfully used with the range of steel finishes on our roofing and walling; and on flashings, cappings, and gutters made from the same materials as the cladding.

Neutral-cure silicone sealants:

- have good adhesion to the clean surface of all our roofing and walling;
- are water resistant and non-corrosive;
- are resistant to extremes of heat and cold while retaining good flexibility;
- excellent gap fillers;
- provide high resistance to ultra-violet rays (sunlight); and
- have a long service life.
- they are NOT adhesives.

It is important that only neutral-cure silicone be used with sheet steel. Other silicone sealants, often have a vinegar or ammonia smell, and give off aggressive by-products during curing which are detrimental to sheet steel.

If in doubt, look for a message on the sealant package like: Suitable for use with galvanised and ZINCALUME® steel products.

CLEANING SURFACES

For effective bonding, all surfaces must be clean, dry and free from contaminants such as old sealant or oil.

Mineral turpentine is suitable for cleaning the surfaces but care must be taken to completely remove all residual solvent with a clean dry cloth. White spirits is an alternative.

Sealant must be applied on the same day as the surface is cleaned.

JOINT STRENGTH

Joints sealed with sealant should be mechanically fixed for strength. Spacing of the fixing will depend upon the type of joint to be sealed. Fasteners in joints of simple seams (flat sheet steel joints) should generally be no further apart than 50mm. Fasteners in joints with profiled roofing (e.g. side-lap joints) can be spaced further apart. The spacing of the fasteners shall be based on good and accepted industry practices to ensure suitable bonding of the sealant to the mating surfaces.

The sealant does not require significant adhesive strength in itself, but it must bond positively to all the surfaces it is to seal. To ensure complete sealant cure, the width of sealant in a lap should not exceed 25mm when compressed (Figure 7.10.1).

SEALED JOINTS

For sealed joints use screws or 4.8mm sealed blind rivets and neutral-cure silicone sealant branded as suitable for use with galvanised or ZINCALUME® steel.

APPLYING SEALANT

Always apply the bead of sealant in a continuous line along the centreline of the fastener holes. This ensures that, when compressed, the sealant positively seals the fastener.

Be careful not to entrap air when applying sealant. Especially, don't place a ring of sealant around fastener holes because entrapped air compresses during tightening of fasteners, and may blow a channel through the sealant, which could prevent the fastener from being sealed.

FASTENERS

Use solid or sealed fasteners (e.g. screws and blind pop rivets), otherwise you have to apply sealant to the hollow centre of open pop rivets.

To preserve the life of your cladding, is very important that fastener materials are compatible with the cladding (Section 2.14).

PROCEDURE

The preferred procedure for lap fabrication is:

1. Assemble, clamp and drill;
2. Separate components and remove drilling debris;
3. Clean joint surfaces as recommended above;
4. Apply bead(s) of sealant;
5. Relocate components and fix;
6. Externally seal each fastener if hollow blind rivets are used.

To prevent premature curing (which causes poor bonding), finish the joint as soon as practical after applying the beads of sealant. The manufacturer's specified sealant open times should be followed.

SEALANT CLEAN UP

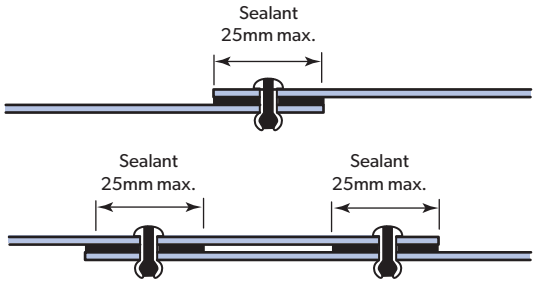
With practice you will be able to judge the size of beads thus avoiding squeeze-out and the subsequent need to clean up.

Uncured sealant can be removed with a clean, dry rag and any excess then removed with a cloth lightly dampened with mineral turpentine or white spirits. Excess cured sealant is best removed with a plastic spatula to avoid damage to the surface finish of the metal.

Avoid any unnecessary smearing of sealant on surfaces intended for painting as silicone can affect adhesion of paint. Smeared sealant may be treated by lightly abrading the area with a non-metallic scouring medium.

Figure 7.10.1:

Typical joints with sealant.



7.11 MAINTENANCE

Factors that most affect the long life of a roof (or wall) are original design, the environment of the installation, and the maintenance of the installation. Maintenance is probably the biggest factor.

Maintenance includes:

- Regular inspection for problems before they become major corrosion sites;
- Regular washing down, especially near coastal or industrial influences;
- Removal of leaves and other debris from gutters, downpipes, leaf-guards, slots, holes and other overflow devices;
- Keep walls free of soil, concrete and debris near the ground;
- Don't overspray pesticide.

MAINTENANCE OF COLORBOND® PRE-PAINTED STEEL

The paint system on COLORBOND® steel sheet is very durable. Simple maintenance of the finish enhances its life and maintains attractiveness for longer periods.

Where the paint finish is naturally washed by rainwater (roofs, for example) there is usually no additional maintenance needed. However areas to be washed include soffits, wall cladding under eaves, garage doors, and the underside of eave gutters.

Washing should be done at least every six months and more frequently in coastal areas where sea spray is prevalent, and in areas where high levels of industrial fallout occur. Avoid accumulation of salty deposits or industrial dirt.

Establish a regular routine for washing COLORBOND® pre-painted steel products. Often garage doors can be washed with clean water at the same time as your car is being washed. Guttering and eaves can be hosed down when windows are being cleaned. Walls can be hosed down (if water restrictions permit) while watering the garden.

Where regular maintenance doesn't remove all the dirt, wash the surface with a mild solution of pure soap or non-abrasive non-ionic kitchen detergent in warm water. Use a sponge, soft cloth or soft bristle nylon brush; be gentle to prevent shiny spots. Thoroughly rinse off the detergent with clean water.

Never use abrasive or solvent cleaners (like turps, petrol, kerosene and paint thinners) on COLORBOND® steel surfaces. For advice on grease, oil or deposits not removed by soap or detergent contact our Information Service.

8.0 Ends of sheets

This chapter describes how you can treat the ends of sheets to maximise weather resistance, environmental protection and vermin resistance.

8.1 TURN-UPS

At the high end of roofing, wind can drive water uphill, under the flashing or capping, into a building. To minimise this problem, you turn up the valleys (or pans) at the high end of roofing. (The process is called turning-up (or stop-ending).

All roofing on slopes below 1 in 2 (25°) should be turned-up.

During the turn-up operation, care should be exercised to prevent tearing or puncturing the steel sheets.

You can turn-up sheets before or after they are fixed on the roof. If you do the latter, you must have sufficient clearance for the turn-up tool at the top end of the sheets (about 50mm).

8.2 TURNING-DOWN

TURNING-DOWN TRAYS

When wide tray sheeting is used on roof slopes below 1 in 5 (10°) the end of the trays at the low end of the sheeting should be turned down slightly with a turn-down tool. At the low end of roofing, wind or capillary action can cause water to run back up the underside of the flat trays of the sheeting. The process is called turning-down (or lipping).

During the turn-down operation, care should be exercised to prevent tearing or puncturing the steel sheets.

Turning-down is usually done after the sheeting is fixed on the roof, provided there is no obstruction to the operation of the turn-down tool.

- Push the turn-down tool over the end of the tray, as far as it will go.
- Hold the tool hard against the end of the tray and push the handle to form a turn-down about 20°.

8.3 BLOCKING OFF RIB CAVITIES

Dust, insects, birds, rodents, bushfire embers and wind-driven rain and pollutants can enter a building through the cavities under ribs. To minimise these problems the cavities can be blocked off. The blocking off could be achieved by the use of infill strips, turn-down of ribs where possible or, where available, by rib stop-ends. Blocking off rib cavities may also assist with such problems in situations where roof slopes are installed at below the minimum recommended.

In severe environments blocking off of the ribs is recommended, especially with clip - fixed claddings, to protect the cladding fasteners and clips.

INFILL STRIPS

Closed-cell, foam-plastic infill strips are available to match our standard size claddings.

At the lower end of cladding, the strip is sandwiched under the roof cladding and on the lower side of the cladding to protect the fasteners/clips. Similarly, at the upper end, the strip is sandwiched between topside of the roofing and the underside of the flashing or capping.

Don't use infill strips that can absorb water because retained moisture can lead to deterioration of the sheet coating. Avoid using infill strips made from, or treated with, flammable materials, particularly in areas prone to bushfire.

Where roof pitches are below 1 in 5 (10°), you should incorporate infill strips to maximise resistance to water entry.

8.4 END-LAPPING

Because our roofing and walling is manufactured by continuous processes, sheet lengths can be supplied up to the limits of transport regulations which are frequently long enough to cover roofs without end-lapping the sheets.

If you contemplate using sheets that are shorter than the full span, and end-lap them, you need to consider:

- the roof slope, because it affects the amount of end-lap (see Table 8.4.1);
- the method of fixing of the cladding to its supports, because it affects the maximum length of sheet (see Section 8.5 - Expansion joints and Table 8.5.2).
- treat purlin spacings at laps and expansion joints as End Spans.

FIXING METHODS FOR END-LAPS

PIERCE-FIXED SHEETS:

Position the lap centrally over the support; and the fastening secures both the lap and the cladding.

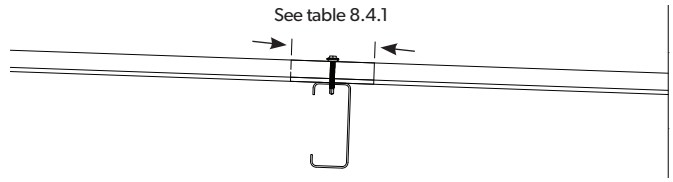
CONCEALED-FIXED SHEETS:

The lap should be positioned just clear, and on the high side of the support (Figure 8.4.1c). This will allow normal concealed fastening at the support and thus allow thermal movement to occur at the clip. The lap is secured with pierce fasteners through the pan/valley. For alternative lapping of concealed-fixed cladding, by fixing through the valley/pan directly into the support (similarly to that detailed for walling above) please contact your nearest Lysaght service centre for advice.

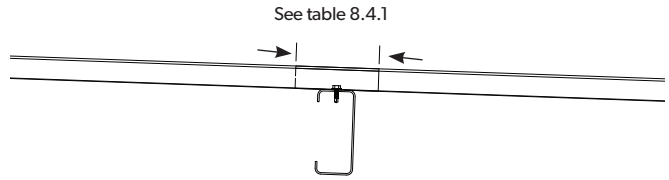
Figure 8.4.1:

Fixing at end-laps.

A) Pierce fix through crest (BAROQUE™)



B) Pierce fix through valley/pan (IMPERIAL™, LONGLINE 305®)



C) Concealed fixed (IMPERIAL™)

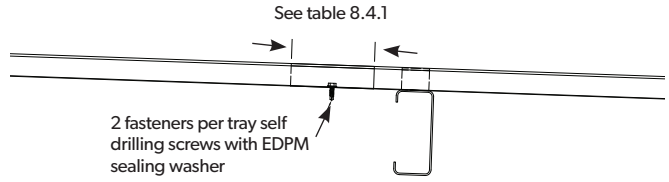


Table 8.4.1:

End-laps.

	End-lap minimum (mm)	End-lap maximum (mm)
Roof Slope		
Less than 1 in 4 (15°)	200	300
Greater than 1 in 4 (15°)	150	250
Walls	100	200

For LONGLINE 305® end-lapping the undersheet (lower sheet) ribs will have to be slightly squashed at the lap and for the length of the lap to allow the oversheet (upper sheet) to nest snugly. The rib closing tool may be suitable to squash the ribs. To make end-lapping easier, remove the down-turn of the under-lapping rib of the lower sheets for the length of the lap.

ORDER OF LAYING

Follow the laying sequence as per Figure 8.4.2.

SPACING OF SUPPORTS AT END-LAPS

For the maximum spacing between purlins, either side of an end-lap in a roof, use the spacing given for end spans.

END-LAPS IN PITCHES LESS THAN 15 DEGREES

End-laps in roofs of less than 1 in 4 (15°) slope should be sealed with a sealant.

Use two runs of sealant (Figure 8.4.3):

- one run of sealant at the low end of the lap (to prevent moisture being drawn in by capillary action);
- the other run at the high end (to prevent condensation from running down the underside of the top sheet and entering the lap).

When the sheets are lapped together and fixed, the compressed sealant should just appear at the end of the lap.

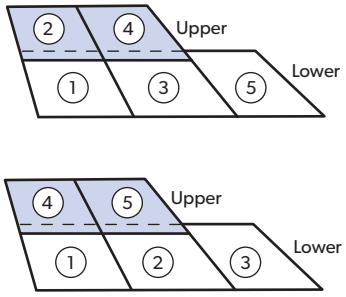
1. With the top sheet upside down, extrude a 3mm bead of sealant across the underside of this sheet about 25mm from the end.
2. Position the bottom sheet, then extrude a 3mm bead of sealant across the top of the sheet to encapsulate the cut end of the underlapping sheet.
3. Turn the top sheet over and fit it in place.

The side-lap between sheets of roofing has a cavity to prevent capillary action between adjacent sheet runs.

It is important that excess sealant extruded from an end-lap does not enter this cavity because, if it does, moisture that may have entered the side-lap will not be able to drain unimpeded down the roof slope.

Figure 8.4.2:

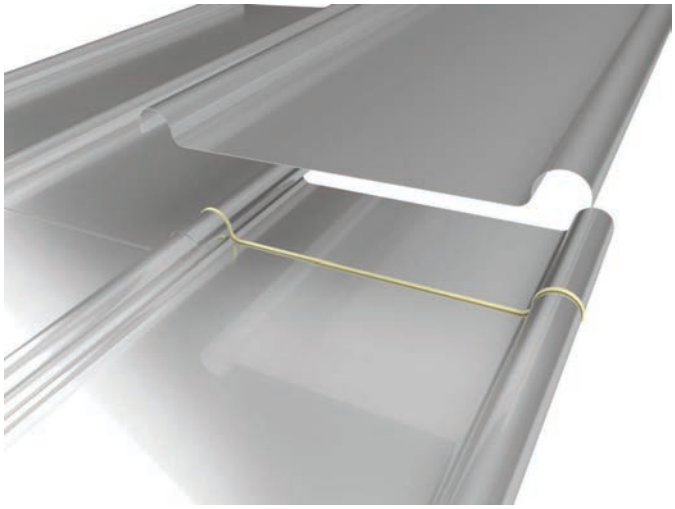
Laying sequence for end-lapped sheets.



LONGLINE 305®, IMPERIAL™, BAROQUE™

Figure 8.4.3:

Sealing end-laps on very low pitched roofs.



8.5 EXPANSION

BACKGROUND ON THERMAL EXPANSION

All metals expand and contract with changes in temperature. Although steel is by far the least affected of all the metals commonly used for roof and wall cladding, the changes in length experienced in very long runs of roofing are significant.

On a clear hot summer day, with no wind, the steel temperature in roof cladding can reach approximately 50°C for COLORBOND® steel in colour Surfmist®, 60°C for plain ZINCALUME® steel and more than 80°C for COLORBOND® steel in colour Night Sky®.

Examples of the thermal changes in lengths of steel cladding that would result from various temperature changes in the steel are shown in Table 8.5.1.

The actual expansion or contraction between the end of a sheet and the last support would only be a fraction of the figures shown because the movement in the length of fixed cladding would normally take place from the centre towards each end of the sheet. The movement at each end is thus only half the total expansion or contraction.

Transverse thermal expansion poses no problems in ribbed cladding because each rib absorbs some transverse movement.

Table 8.5.1:

Thermal expansion and contraction of steel cladding.

Sheet length (mm)	Expansion or contraction (mm)		
	10°C change	50°C change	75°C change
5000	0.6	3	4.5
10000	1.2	6	9
15000	1.8	9	13.5
20000	2.4	12	18
25000	3.0	15	22.5
30000	3.6	18	27

Table 8.5.2:

Maximum distance between top & bottom rows of fasteners on a sheet, before expansion joint is needed.

Fixing system	Maximum distance between top and bottom rows of fasteners (m)
Pierce-fixed through crests	24
Walling pierced-fixed in valleys/pans	15

2. CLIP-FIXED CLADDING

For clip-fixed claddings the thermal expansion effects are mitigated by the differential movement between the cladding and the clips (i.e. slippage). Thus for very long runs expansion joints are generally not required when the cladding is in a single length.

9.0 Flashings

FLASHING COVER

The minimum recommended cover of longitudinal flashings over cladding should be as follows: (as taken from HB39).

Pierce-fixed roof sheet	150mm min.
Concealed fixed roof sheet	Into full pan (2/3 pan covered)

9.1 TRANSVERSE FLASHINGS

FLASHING COVER

Lysaght are able to produce a wide range of custom flashings to suit your individual requirements. To increase weathertightness Lysaght recommends you maximise the overlap between flashings and claddings.

FIXING OF FLASHINGS

Longitudinal flashings shall be fastened at maximum 500mm centres. Transverse flashings shall be fastened in accordance with HB39-2015, as detailed below.

Profile (min.)	Recommended Fixing Space
LONGLINE 305®, IMPERIAL™, BAROQUE™	Every rib
ENSEAM®, BAROQUE™	Max 900mm c/c

The above fastener spacing relates to the stitching of flashings to sheeting. It does not constitute the minimum number of fasteners required to fix the sheeting to purlins.

NOTCHING

Flashings can be notched to the rib profile with tinsnips (Figure 9.1.1). The procedure is sometimes known as scribing. After the cladding is fixed and the turn-ups finished, proceed as follows.

- Place the flashing with the turned-down edge resting on the ribs.
- Mark out the notching using a template positioned over each rib.
- Cut the notches with tinsnips.

This procedure is also used for hip cappings.

FASTENERS FOR TRANSVERSE FLASHINGS

You must properly fix both flashings and the ends of all sheets.

Where the cladding is pierce-fixed through crests, and the position of the purlin allows it, the fasteners used to fix the sheets, may also fix the flashings.

On all other installations, pierce-fix your flashing to the ribs or crests of the sheets.

Figure 9.1.1:

Using a template to mark out for notching with tinsnips.

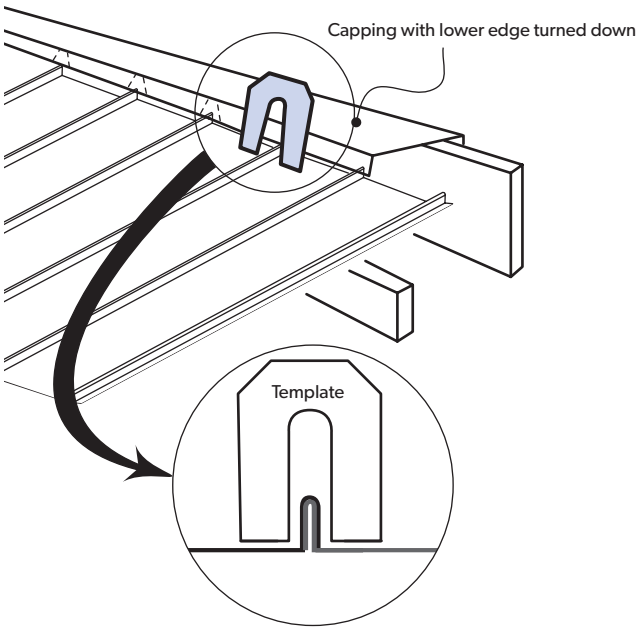
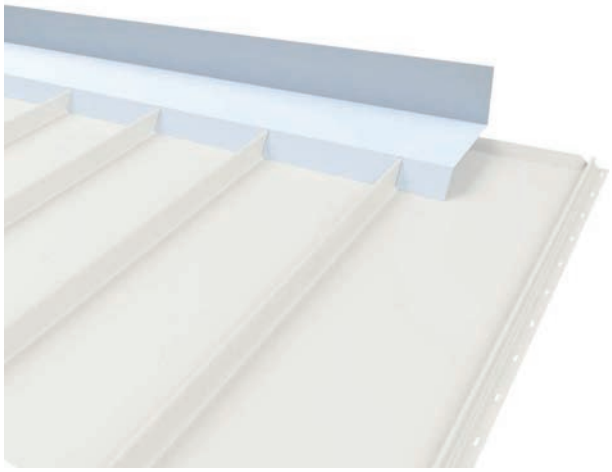


Figure 9.1.2:



10.0 LONGLINE 305® roof and wall cladding

LONGLINE 305® cladding is a concealed fixed roof cladding with bold ribs and wide pans. It is ideal for medium to large commercial projects where special architectural effects are desired. It has also been popular in industrial and residential applications.

The unique locking system fixes the cladding to the clip so no fasteners pass through the roofing. Concealed fixing means there are no penetrations so weathertightness is maximised and a high rainfall capacity is achieved.

LONGLINE 305® cladding can also be fluted or tapered allowing fanned and rounded plan roof shapes to be clad with ribs radiating from a central point.

10.1 MATERIAL SPECIFICATIONS

Coverage (mm)	305
Base Metal Thickness (mm)	0.70
Total Coated Thickness[1] (mm)	0.75
Rib Height (mm)	48
Sheet Length (mm)	
Minimum	1200
Maximum	30000
Mass / Unit Length (kg/m)	
ZINCALUME® steel	2.96
COLORBOND® steel[1]	2.99
Mass / Unit Area (kg/m²)	
ZINCALUME® steel	9.70
COLORBOND® steel[1]	9.81
Minimum Yield Strength	300 (G300)
Coating Class **(See Base Material for detail)**	AM125 - ZINCALUME® steel AM100 - COLORBOND® steel AM100 - COLORBOND® METALLIC steel AM150 - COLORBOND® ULTRA steel
Tolerance	Sheet length: +0mm / -15mm Standard and fluted cover width: +4mm / -4mm Tapered cover width: +5mm / -5mm
Thermal Expansion	2.9mm average per 5m @ 50°C change

Notes:
1. Based on standard, single sided COLORBOND® steel. For other painted steel options please contact your Lysaght representative.

MINIMUM ROOF PITCH

The minimum recommended roof pitch for LONGLINE 305® cladding is 1 degree.

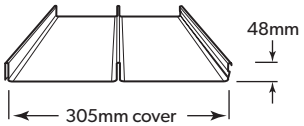
INSULATION

Care needs to be taken when installing insulation with LONGLINE 305® roof sheeting. The screws may need to be increased depending on the thickness and density of the insulation. When the screw is properly tightened into metal there should be a minimum of three (3) threads protruding past the support being fixed in to. For timber the screw must have a min embedment of 25mm into the timber.

For insulation, the use of roof spacing system is recommended to help maintain Rw values as well as minimising any bulging in the profile caused by the insulation. Refer to oil canning section for potential visual impacts of insulation on the product.

Figure 10.1.1:

LONGLINE 305® profile.



FASTENING LONGLINE 305® CLADDING TO SUPPORTS

LONGLINE 305® cladding is concealed-fixed to supports. This means that clips are screwed to the supports, and no fastening passes through the sheeting.

There are two types of fixing clips - a top finishing clip and a start/finishing clip to fasten the first and last sheets in a roof area.

Table 10.1.1:

Fasteners Without Insulation.

	Fix to Steel (Total 2.0mm) Single & lapped steel thickness ≥0.55 up to 1.0mm BMT	**Fix to Steel Single steel thickness >1.0mm BMT up to 3.0mm BMT**
Clip Fixed	10-16x16, Metal Teks, WH or 10-16x22, Metal Teks, WH	10-16x16, Metal Teks. WH or 10-16x22, Metal Teks, WH
	Fix to Steel (Total 3.8mm) Lapped thicknesses of >1.00 BMT up to 1.9mm BMT	**Fix to Timber Hardwood J1-J3**
Clip Fixed	10-16x16, Metal Teks, WH or 10-16x22, Metal Teks, WH	10-12x25, Type 17, WH
	Fix to Timber Softwood J4	
Clip Fixed	10-12x35, Type 17, WH	

Notes:
1. For other steel thicknesses not specified please seek advice from screw manufacturer
2. WH = Wafer Head
3. Use one screw per clip
4. As above or equivalent fastener

MAXIMUM SUPPORT SPACINGS[1]

Type of Span	**0.70mm BMT**
Roofs	
Single span	1800
End Span	2000
Internal Span	2500
Unstiffened eaves overhang	150
Stiffened eaves overhang	450
Walls	
Single span	2000
End span	2700
Internal span	2700
Overhang	450

1. Refer Section 2.5 - Support Spacing and Overhang for loading parameters applicable to MAXIMUM SUPPORT SPACINGS. For Projects outside these loading parameters designers should reference LIMIT STATE WIND CAPACITIES tables to determine appropriate support spacings.

LONGLINE 305®: LIMIT STATE WIND PRESSURE CAPACITIES (KPA) 0.70MM BMT

Span Type	Limit State	Span (mm)						
		900	1200	1500	1800	2100	2400	2700
Single	Serviceability	2.60	2.10	1.70	1.35	1.10	0.95	0.80
	Strength*	3.60	3.25	2.85	2.70	2.40	2.20	1.95
End	Serviceability	1.45	1.45	1.40	1.35	1.30	1.25	1.15
	Strength*	4.20	3.80	3.45	3.15	2.75	2.45	2.25
Internal	Serviceability	2.05	1.90	1.80	1.65	1.55	1.45	1.30
	Strength*	5.20	4.90	4.55	4.15	3.65	3.05	2.50

*Support must be ≥1mm BMT. Capacity is based on tests with no insulation under the sheeting.

For maximum roof lengths for drainage see Page 17 Table 6.1.1

Table 10.1.2:

Guide to estimate fasteners and clips required for typical installation.

FASTENER & CLIP REQUIREMENT GUIDE (PER M²)

Cladding Profile	No. of fasteners (clips) per sheet width	Sheet Cover Width	Maximum Support Spacings (mm)					
			450*	600*	900	1200	1500	1800
LONGLINE 305® (Not Tapered)	1 (1 clip)	305	-	-	4	3	2	2
		305	-	-	4	3	2	2

* Typical residential framing spacings.

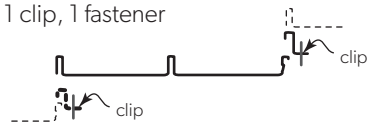


Table 10.1.3:

Guide to fastener layout and sheet coverage.

SHEET COVERAGE

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	10	14	17	20	23	27	30	33	37	40	43	46	50	53	56	60	63	66	99	132	164

WIDTH COVERED BY 'X' NUMBERS OF SHEETS (M)

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.1	3.4	3.7	4.0	4.3	4.6	4.9	5.2	5.5	5.8	6.1

10.2 TAPERED ROOFING

LONGLINE 305® PRODUCTS

The LONGLINE 305® cladding product is available in cover widths of:

- LONGLINE 305® - Wide flat pans, with a uniform cover width of 305mm
- Fluted LONGLINE 305® – Flat panned profile with subtle "concertina" type with longitudinal pan stiffeners with a uniform cover width of 300mm
- Tapered LONGLINE 305® - "Concertina" type stiffeners running longitudinally in the pans varying from a subtle definition to a bold definition. Cover width varying from a wide end of 305mm, down to a narrow end of as low as 145mm.

With combinations of fluted and tapered sheets, and/or with spring curving, striking or special architectural effects can be achieved.

The tapered LONGLINE 305® results in a fan effect on roofs. Alternating the arrangement of tapered sheets or the combination of tapers/fluted or standard LONGLINE 305® sheets will result in various patterns and textures being achieved.

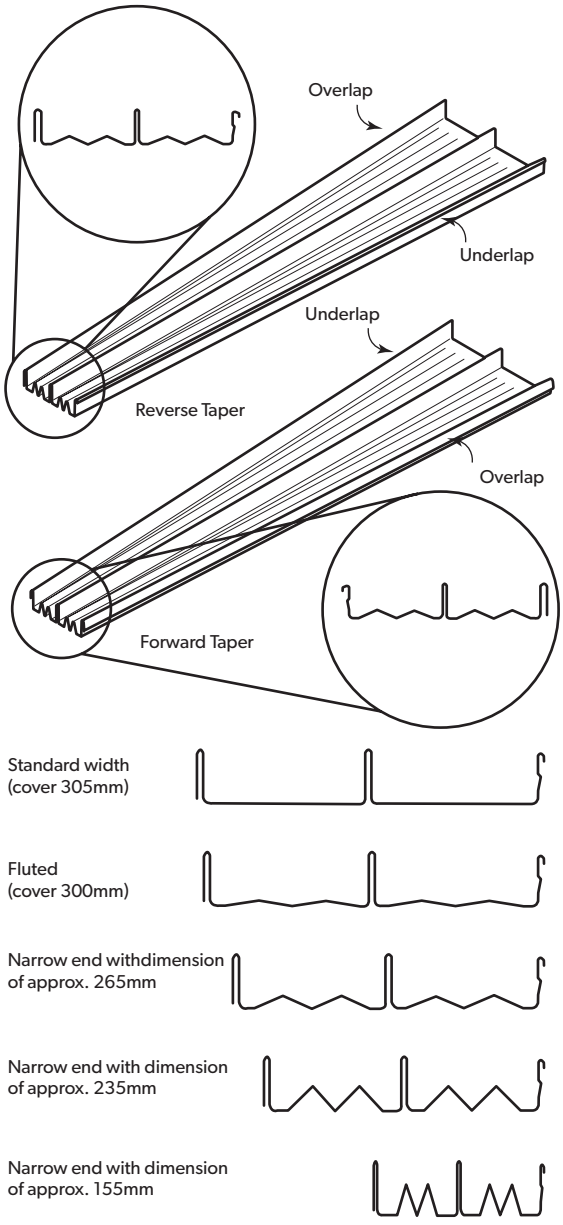
All tapers are linear tapers. The tapers are manufactured in the standard mode (termed on the production line as FORWARD taper) or in the non-standard mode (termed on the production line as REVERSE taper).

The normal manufacture is "FORWARD" and unless specified the FORWARD taper will be produced.

The orientation of installation of the sheets will govern as to which end of the roof that laying can commence. On some projects the choice of laying direction is important and thus the selection of the correct direction of taper (Forward or Reverse) is vital.

Figure 10.2.1:

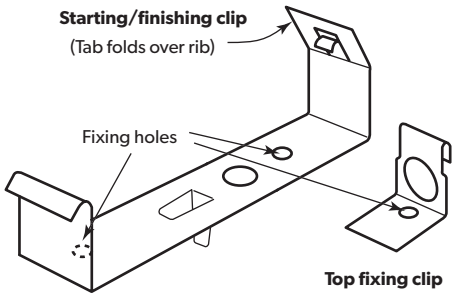
Tapered LONGLINE 305®.



FASTENING SHEETS TO SUPPORTS

LONGLINE 305® is concealed-fixed to supports. This means that clips are screwed to the supports, and no fastening passes through the sheeting.

There are two types of fixing clips - a top finishing clip and a start/finishing clip to fasten the first and last sheets in a roof area.



END LAPPING

LONGLINE 305® is available in very long lengths and thus end-lapping of sheets is not commonly needed. However if sheets need to be end-lapped then the under-sheet ribs have to be slightly squashed at the lap, and for the length of the lap, to allow the over-sheet to nest snugly. The rib closing tool may be suitable to squash the ribs.

Note:
As an alternative, to the starting/finishing clip , the top fixing clip is often used in this situation. The female rib of the first sheet will need to be squashed in a similar manner to the male rib to allow the top fixing clip to be installed. The rib can be squashed using the rib closing tool.

10.3 TYPICAL INSTALLATION DETAILS

INSTALLING LONGLINE 305® ROOFS

For LONGLINE 305® (standard width, fluted or tapered) use the same general procedure described in Section 7.6 (General installation procedure). However, at the start of installing LONGLINE 305®, a row of clips is fixed to the supports before the first sheet is located over them and locked in position.

PREPARATION

Before starting, check that the supports on which your sheeting will rest are in the same plane; that the pitch and overhangs conform to the minimum specifications.

ORIENT SHEETS BEFORE LIFTING

Consider which end of the building is best to start from. So that side-laps are protected, we recommend that you start laying sheets from the end of the building that will be in the lee of the worst anticipated or prevailing weather.

It is much easier and safer to turn sheets on the ground than up on the roof. Before lifting sheets on to the roof, check that they are the correct way up and the overlapping side is towards the edge of the roof from which installation will start.

Place bundles of sheets over or near firm supports, not at mid span of roof members.

PREPARE CLIPS

Cut all starting/finishing clips and discard the unwanted pieces. (Figure 10.3.1).

FIX THE FIRST ROW OF CLIPS

With particular care, determine the location of the first sheet and mark the edge of the sheet on the purlins.

Fix the first starting clip on the purlin. Using a string line (or the first sheet as a straight edge) fix the other starting clips for the first sheet on each purlin.

PLACE THE FIRST SHEET

1. Locate the first sheet over the fixed starting clips (Figure 10.3.2).
2. Using a measurement from the gutter-end of the sheet to the fascia or purlin, position the sheet so that it overhangs the desired amount into the gutter.
   When setting the first sheet, remember that it is important you keep the gutter-end of all sheets at a constant distance from the edge of the gutter or fascia.
3. Bend the tab of all clips over the rib (Figure 10.3.3).

FIX THE NEXT (AND SUBSEQUENT) CLIPS AND SHEETS

1. Using the rib closing tool, squash the male rib of the first (previous) sheet at each purlin where the top fixing clips will fit (Figure 10.3.4).
2. Place top fixing clips over each squashed male rib and fix to the purlins (Figure 10.3.5). With a felt-tipped pen, make a small mark in the pan to enable you to locate the clips in the later locking operation with the button punch (Figure 10.3.6).
3. Place the next sheet over the edge of the preceding sheet (Figure 10.3.5).
   Accurately position the sheet so that it overhangs the desired amount into the gutter.
4. Fully engage the sheet with the clips, using foot pressure on the ribs over each clip. You can do this by walking along the full length of the sheet with one foot in the tray next to the overlapping rib and the other foot applying pressure to the top of the interlocking ribs at regular intervals.

Figure 10.3.1:

LONGLINE 305® clips.

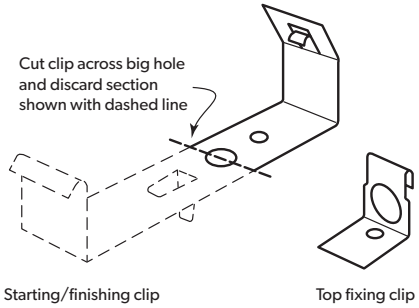


Figure 10.3.2:

Placing first sheet.

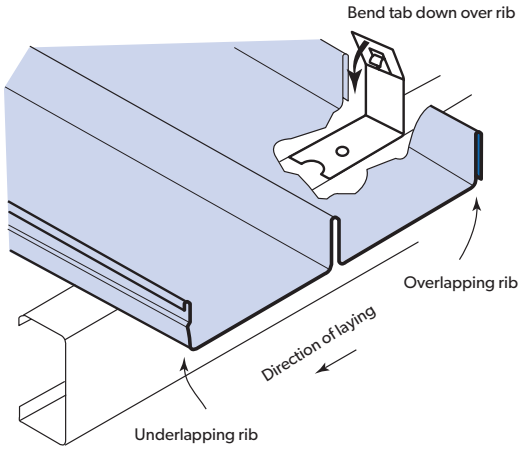


Figure 10.3.3:

Place top fixing clips.

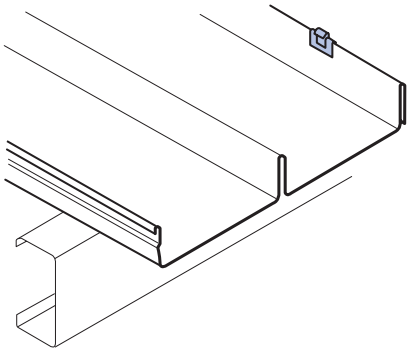
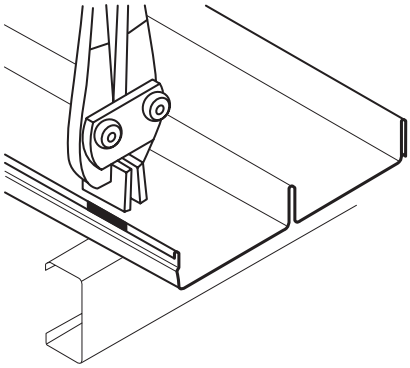


Figure 10.3.4:

Flatten rib for top fixing clips.



CHECK ALIGNMENT PERIODICALLY

Check that sheets are still parallel with the first sheet.

PLACE THE LAST SHEET

Assess how the last sheet will fit in relation to the fascia.

Fix a cut starting/finishing clip to the purlins.

Place the last sheet over the finishing clips, and bend the tab of all clips over the rib. (Similar to the steps used in the first sheet. Figures 10.3.2 & 10.3.3).

LOCK ALL RIBS

All lapped ribs must be locked along their length, by button-punching at the clips, and if necessary between the clips (typically at 900mm centre to centre. Figure 10.3.6). Punching to a string line guide stretched across the sheeting is recommended as random punching mars the appearance of the finished work.

You must button-punch through the centre of the hole in each top fixing clip – you locate the clip with the pen mark made previously. Failure to correctly locate the button punch with the centre of the hole in the clip may result in "fractured" button punches allowing water ingress. When operating the punching tool, stand on the pan of the overlapping sheet to ensure that the sheets are fully engaged.

Contact your nearest Service Centre for advice on button-punching.

ENDS OF SHEETS

Wind can drive water uphill under the flashings or cappings. At the low end of a roof, wind or capillary action can cause water to run back up the underside of sheeting. To reduce these problems, turn the pans up at the top of sheets, and turn them down at the bottom using a turn-up/turn-down tool.

TURNING-UP

Flush turn-ups are usually used on LONGLINE 305®. Cut off a portion of the female rib for at least 50mm. For a flush turn-up, you also need to cut the crown of the centre rib for at least 50mm.

Holding the end of the tool against the end of the sheet, pull the handle up 90°. If turning-up flush, fold the protruding ears flush against the turn-up tool with a rubber mallet (Figure 10.3.7).

You need an extra 50mm in sheet length for flush turn-ups.

TURNING-DOWN

All roofing on slopes below 1 in 5 (10°) must be turned-down (also called lipped).

Turning-down is usually done after the sheeting is fixed on the roof, provided there is no obstruction to the operation of the turn-down tool.

- Push the turn-down tool over the end of the tray, as far as it will go.
- Hold the tool hard against the end of the tray and push the handle to form a turn-down of about 20 degrees (Figure 10.3.9).

END-LAPPING

LONGLINE 305® is available in very long lengths and thus end-lapping of sheets is not commonly needed. However if sheets need to be end-lapped then the under-sheet ribs have to be slightly squashed at the lap, and for the length of the lap, to allow the over-sheet to nest snugly. The rib closing tool may be suitable to squash the ribs.

Figure 10.3.5:

Placing subsequent sheets.

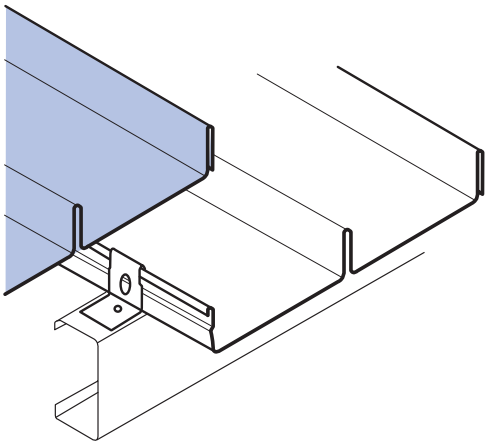


Figure 10.3.6:

Lock all ribs with button punch.

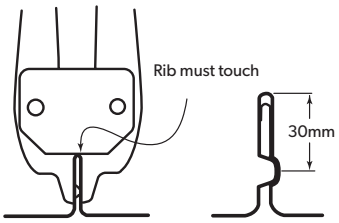


Figure 10.3.7:

LONGLINE 305® turn-up procedure.

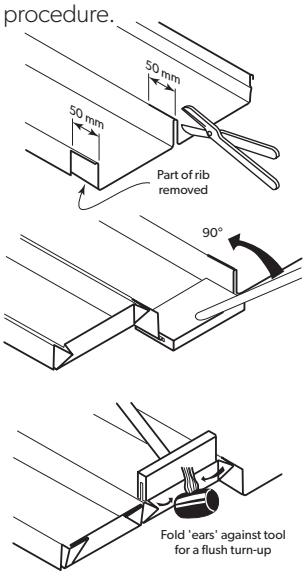


Figure 10.3.8:

Turn-up and turn-down tools.

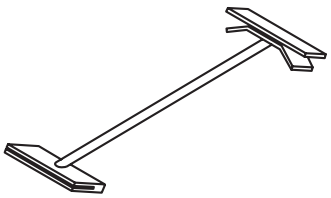
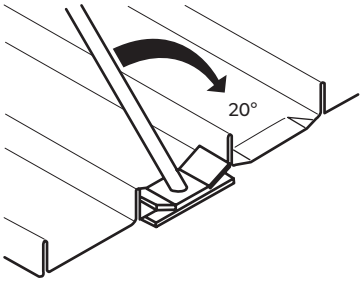


Figure 10.3.9:

LONGLINE 305® turn-down procedure.



ALTERNATIVE START/FINISH WITH SHEERLINE® GUTTER AS FASCIA

The following installation is an alternative approach used on some commercial and residential roofs.

PREPARATION

Before starting, check that the supports on which your sheeting will rest are in the same plane; that the pitch and overhangs conform to the minimum specifications.

Two types of clips are used in the concealed fastening of LONGLINE 305®. A starting/finishing clip (Figure 10.3.10) used to fasten the first and last sheets in a roof area and a top fastener clip.

INSTALLATION

Consider which end of the building is best to start from.

1. Lay and fix wire mesh to the supports in accordance with the appropriate building requirements.
2. Place the glass wool insulation.
3. Position the starting/finishing clips on each support by placing onto the support nearest the gutter.
4. Where SHEERLINE® gutter is to be fitted as a longitudinal fascia the turned down tab under the starting/finishing clip is used to position the overhang of the clips. On timber purlins a nail is driven through the hole in the tab into the purlins. (Figure 10.3.10).
5. Position the first sheet by locating the female rib under the tab on the upstand of the starting/finishing clips after locating the sheet longitudinally for gutter overhang etc. Then secure the sheet by folding the pre-bent clip upstands down over the female rib. (Figure 10.3.11). If the tray turn-up at the high end of the sheeting is to be flush-stop ended, this should be done before positioning the sheets and allow an extra 50mm on the sheet length.
6. Where SHEERLINE® gutter is to be fitted as a longitudinal fascia the tab under the starting/finishing clip is used to determine the clip overhang. The pre-bent upper half of the clip upstand is then folded down over the male rib after the last sheet has been positioned.

Note: As an alternative, a starting/finishing clip may be used. The rib can be crushed using the rib closing tool.

INSTALLING LONGLINE 305® WALLS

In walling applications, horizontal pressure will need to be applied locally to the sheets to engage the ribs. Use body pressure (torso, hand or foot) or use a rubber mallet if required. Care should be exercised due to the potential instability of the temporary worker access equipment.

To prevent LONGLINE 305® from sliding downwards through the fixing clips due to deadload of sheet, pierce fix through pans of each sheet (1, #10-16x 16 Metal Teks with EPDM washer per pan or 2, 4.8mm diameter rivets per pan) under the flashing or capping, along the top of the sheets.

Figure 10.3.10:

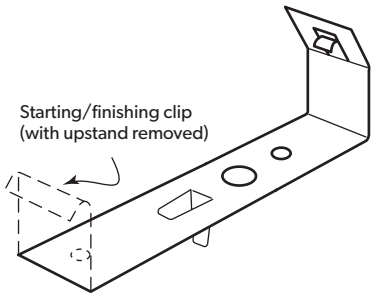


Figure 10.3.11:

Starting/Finishing clip used a shown at start of roof when gutter required as fascia (use a blind rivet or wafer head screw to fasten the return leg of the SHEERLINE® gutter.

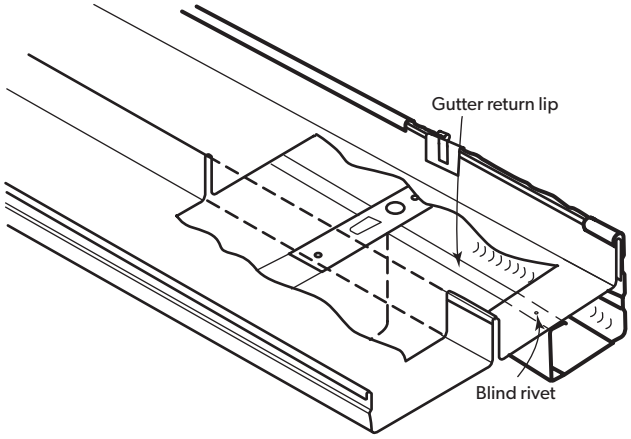
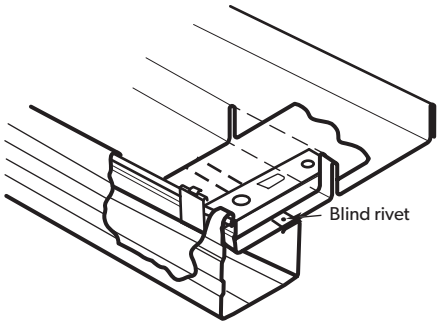


Figure 10.3.12:

Starting/finishing clip used as shown at finish of roof when gutter required as fascia.



10.4 TYPICAL CONSTRUCTION DETAILS LONGLINE 305®

The construction details presented here represent potential detailing solutions to common construction situations. These details may not be suitable for all projects / situations and users should use professional judgement in determining suitability of the details for their particular project whilst referencing AS 1562.1 and SA HB39. The full suite of ZENITH® constructions details are available for download from https://bimcontent.com/lysaght/ in both REVIT and PDF format.

10.4.1 LONGLINE 305® TYPICAL ROOF DETAILS

Figure 10.4.1.1:

Typical Roof Cladding Setout - Unsupported LONGLINE 305® - Plan View - L04-09

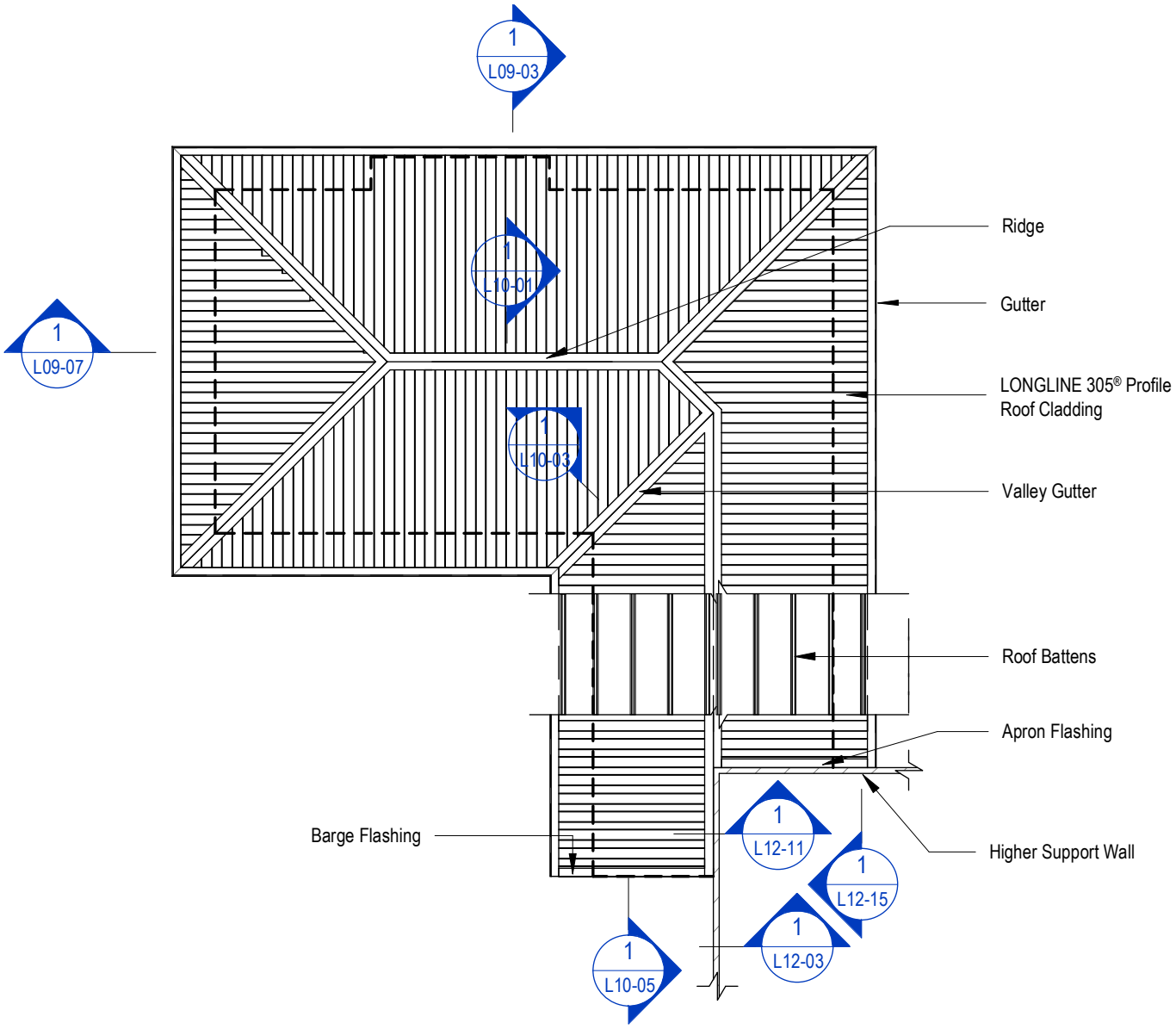


Figure 10.4.1.2:

Top of Wall Eave Detail - Zero Overhang - Unsupported LONGLINE 305® - Vertical Fix - L09-03

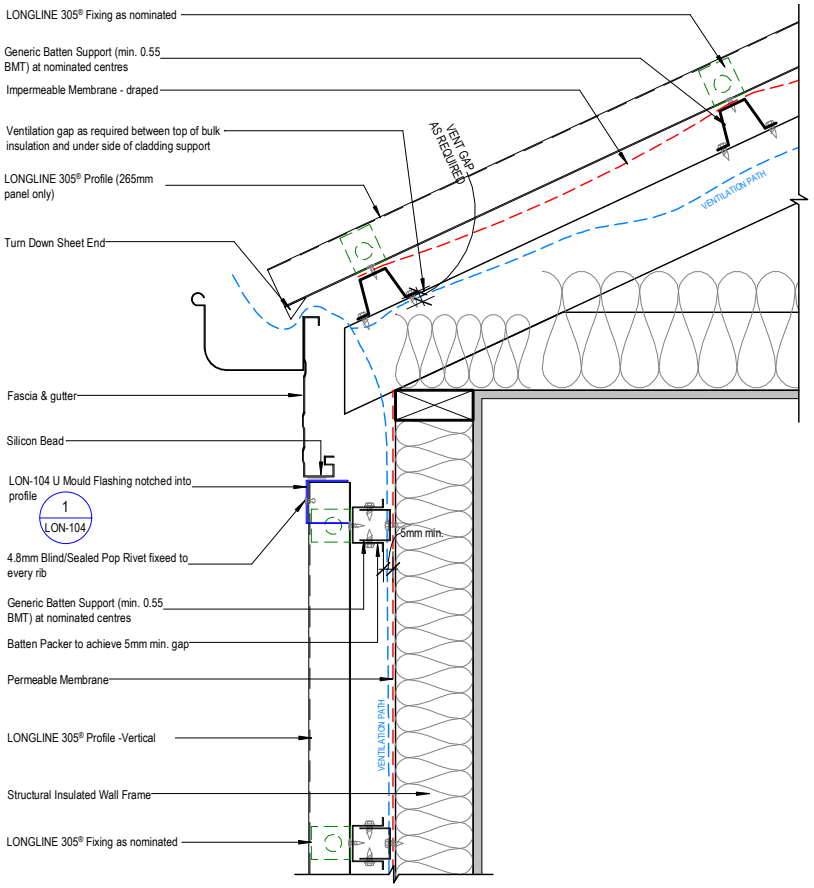


Figure 10.4.1.3:

Top of Wall Eave Detail - Overhang - Unsupported LONGLINE 305® - Vertical Fix - L09-07

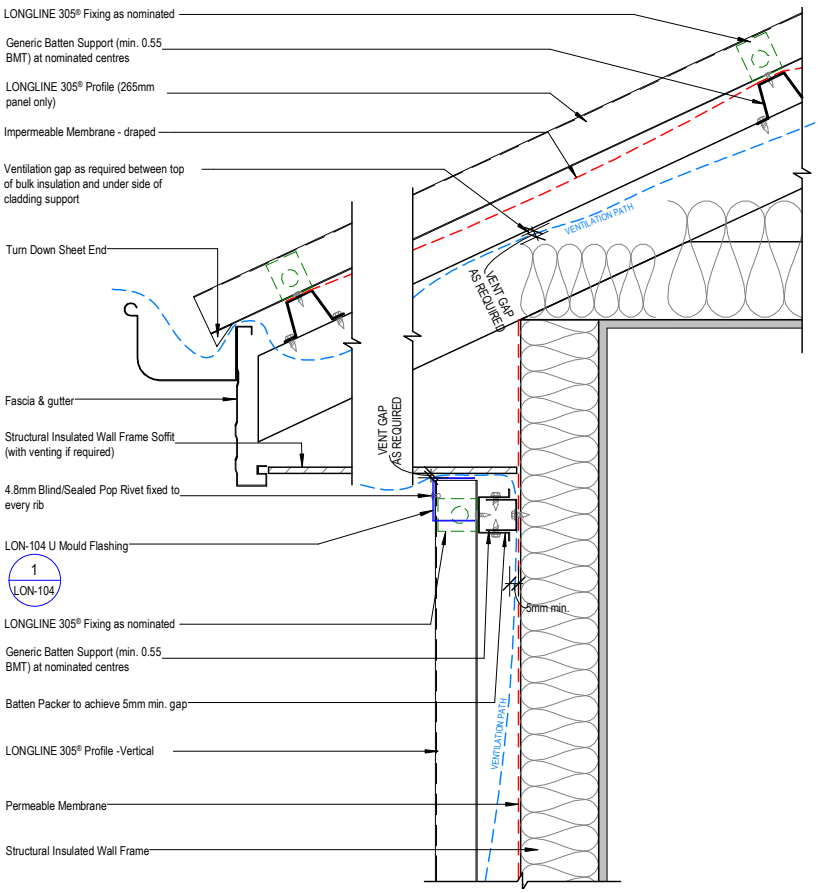


Figure 10.4.1.4:

Ridge Detail - Unsupported LONGLINE 305® Panel - L10-01

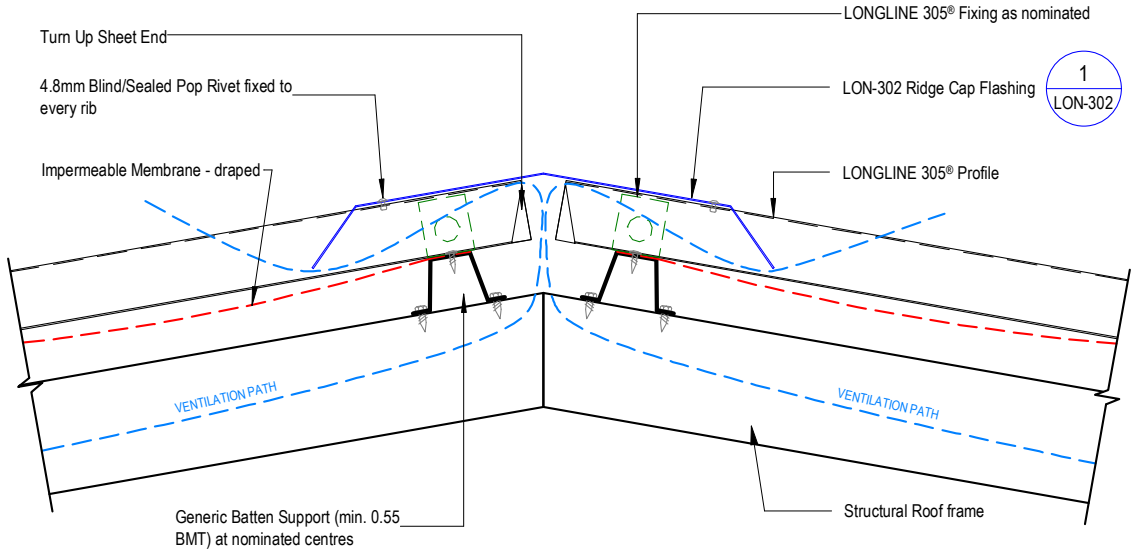


Figure 10.4.1.5:

Valley Detail - Unsupported LONGLINE 305® Panel - L10-03

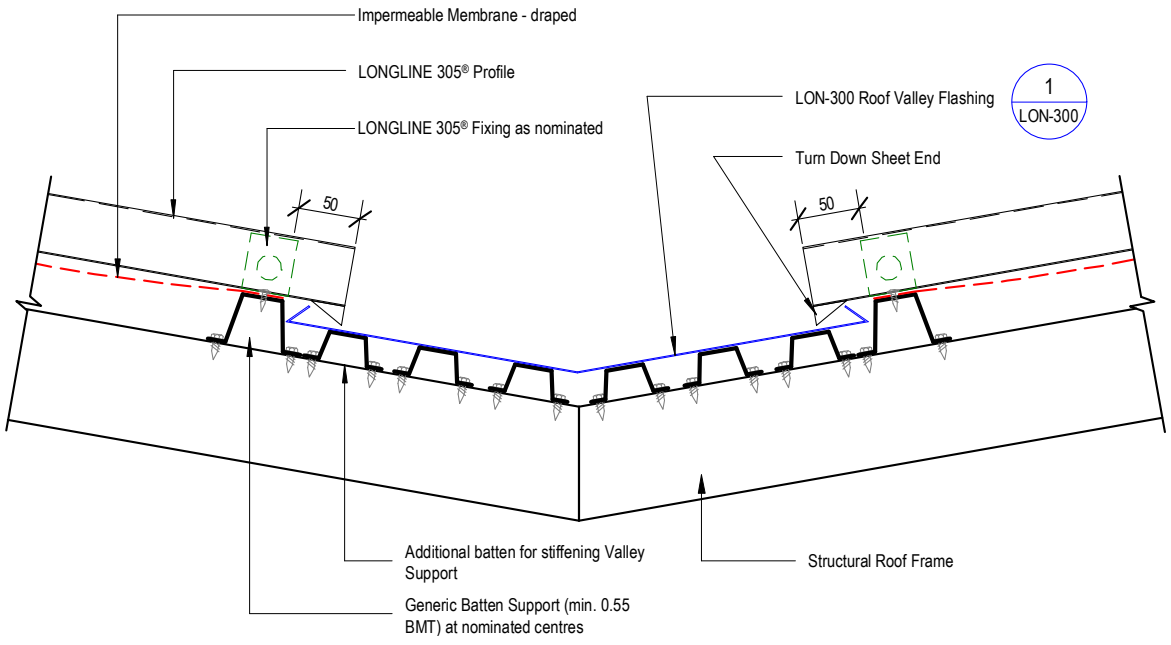


Figure 10.4.1.6:

Gable Detail - Unsupported LONGLINE 305® Roof and Wall - Vertical Fix - L10-05

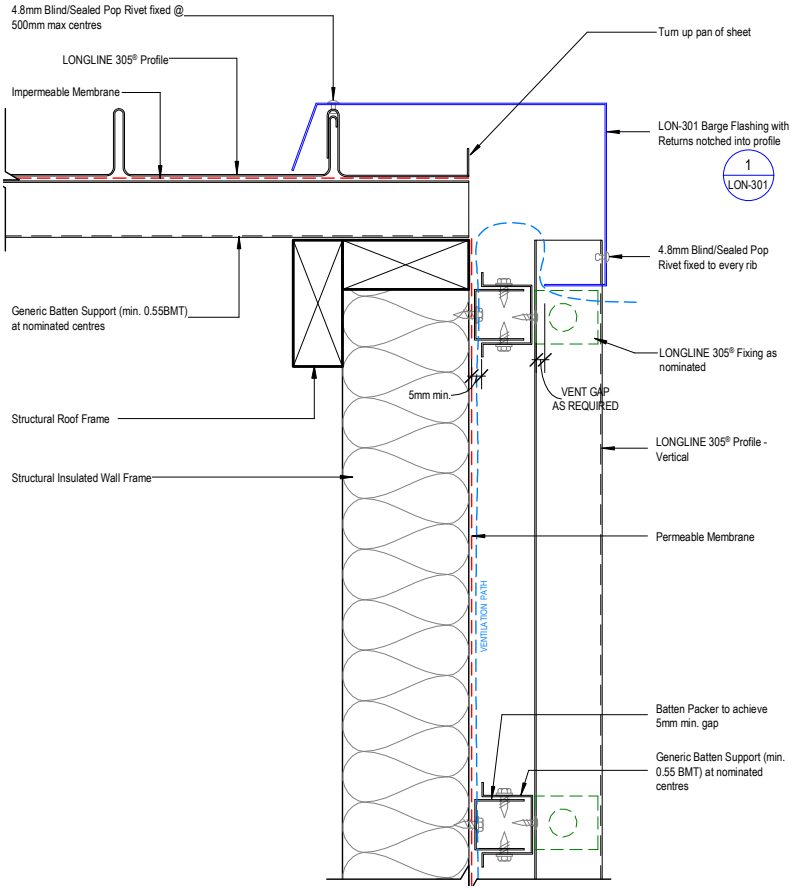


Figure 10.4.1.7:

Parapet Wall Detail - Unsupported LONGLINE 305® Panel - Vertical Fix - L12-03

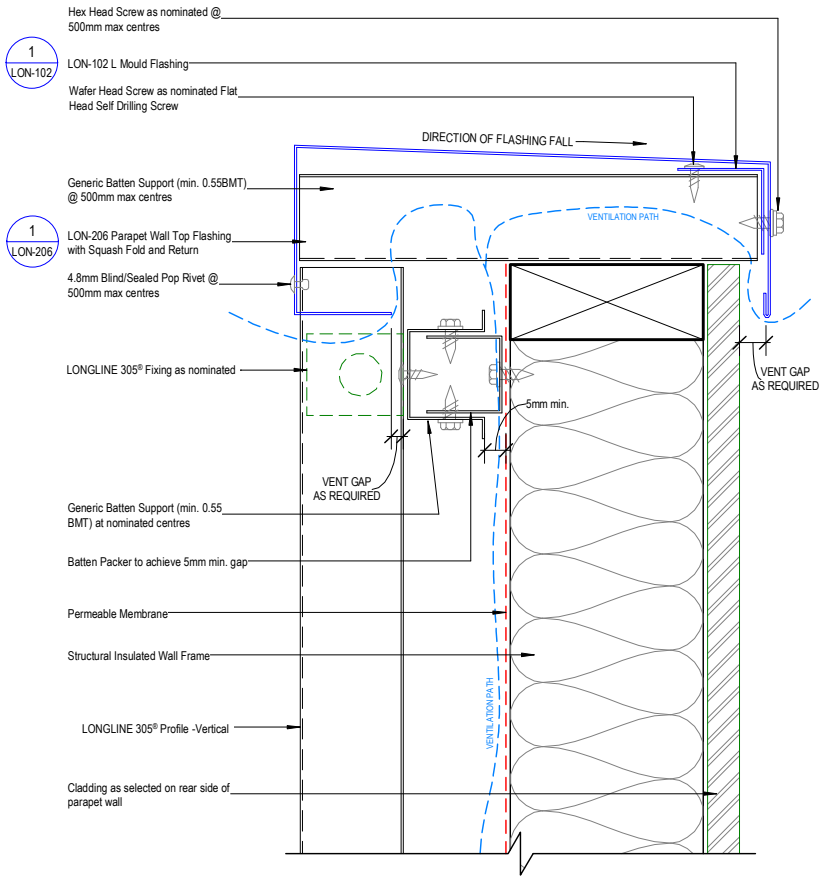


Figure 10.4.1.8:

LONGLINE 305® Vertical Fix Wall to LONGLINE 305® Roof - Unsupported - Side View - L12-11

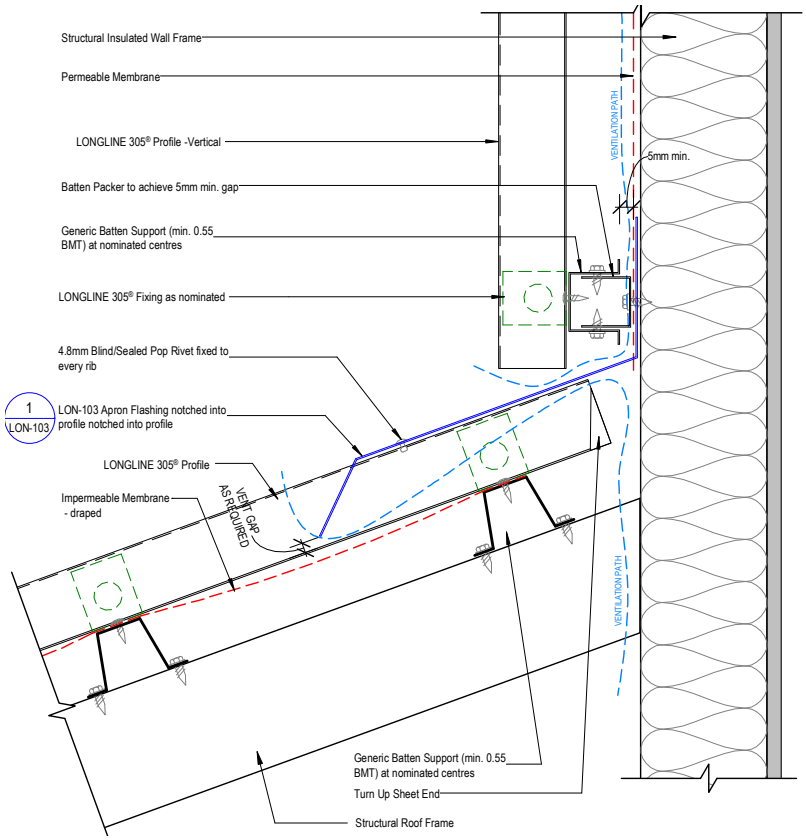
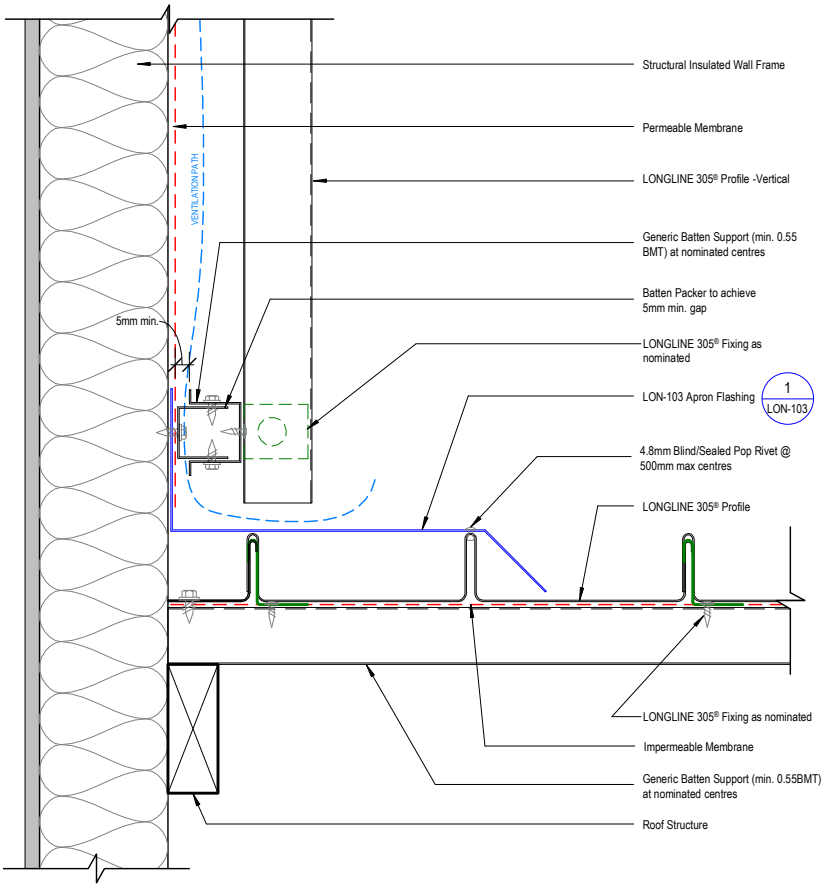


Figure 10.4.1.9:

LONGLINE 305® Vertical Fix Wall to LONGLINE 305® Roof - Unsupported - End View - L12-15



10.4.2 LONGLINE 305® TYPICAL WALL DETAILS - HORIZONTAL FIX

Figure 10.4.2.1:

Typical Wall Cladding Setout - Unsupported LONGLINE 305® Panel - Horizontal Fix - Plan View - L04-01

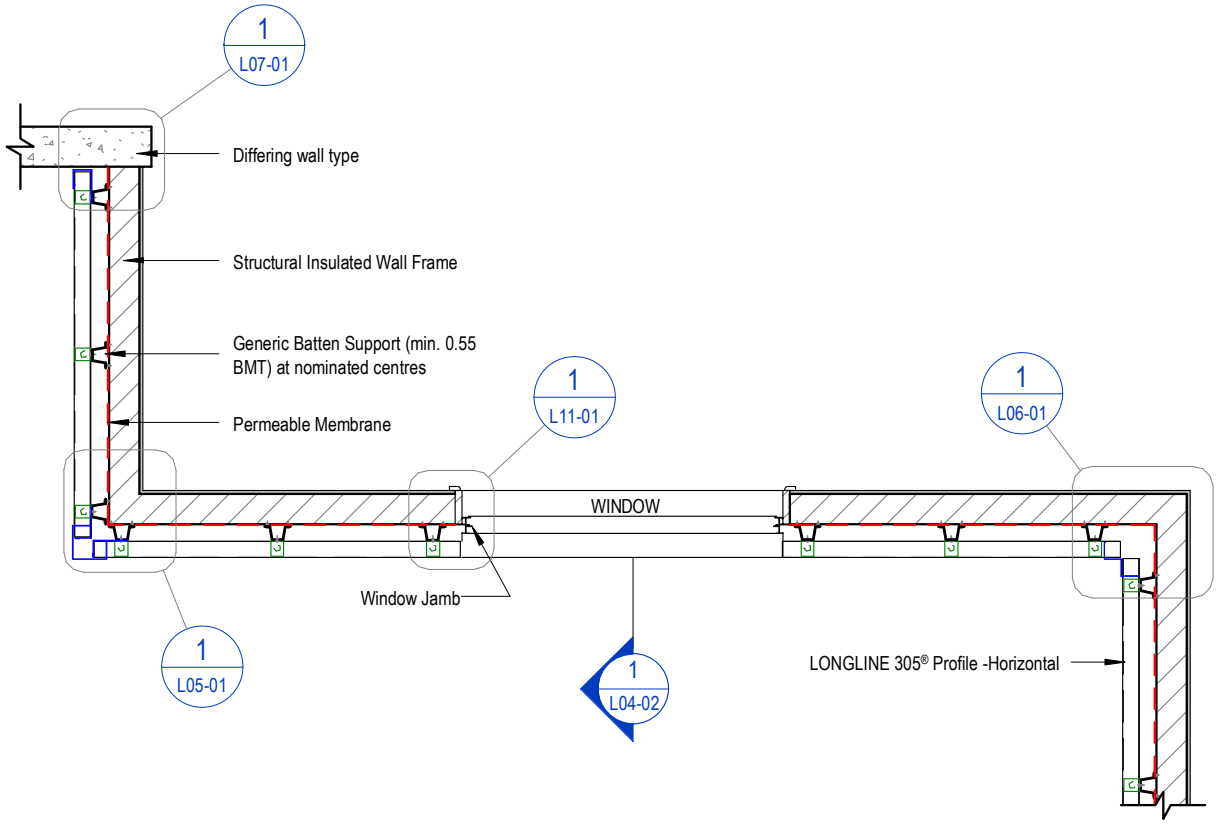


Figure 10.4.2.2:

Typical Wall Cladding Setout - Unsupported LONGLINE 305® - Horizontal Fix - Sectional View - L04-02

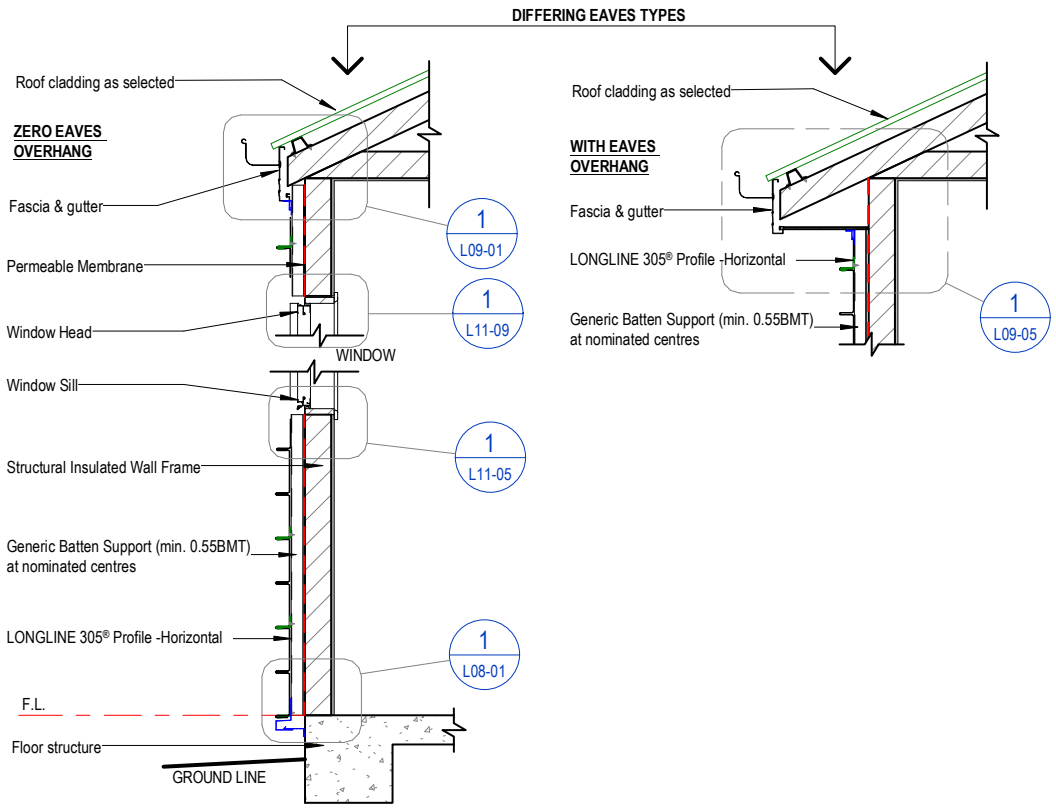


Figure 10.4.2.3:

External Corner - Unsupported LONGLINE 305® Panel - Horizontal Fix - L05-01

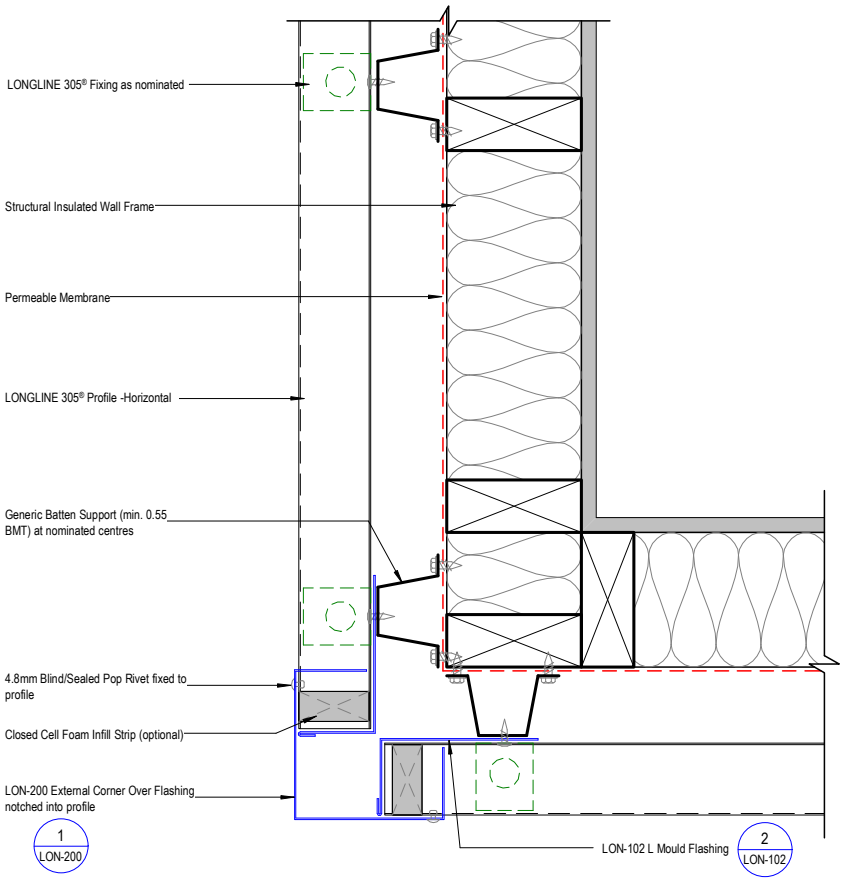


Figure 10.4.2.4:

Internal Corner - Unsupported LONGLINE 305® - Horizontal Fix - L06-01

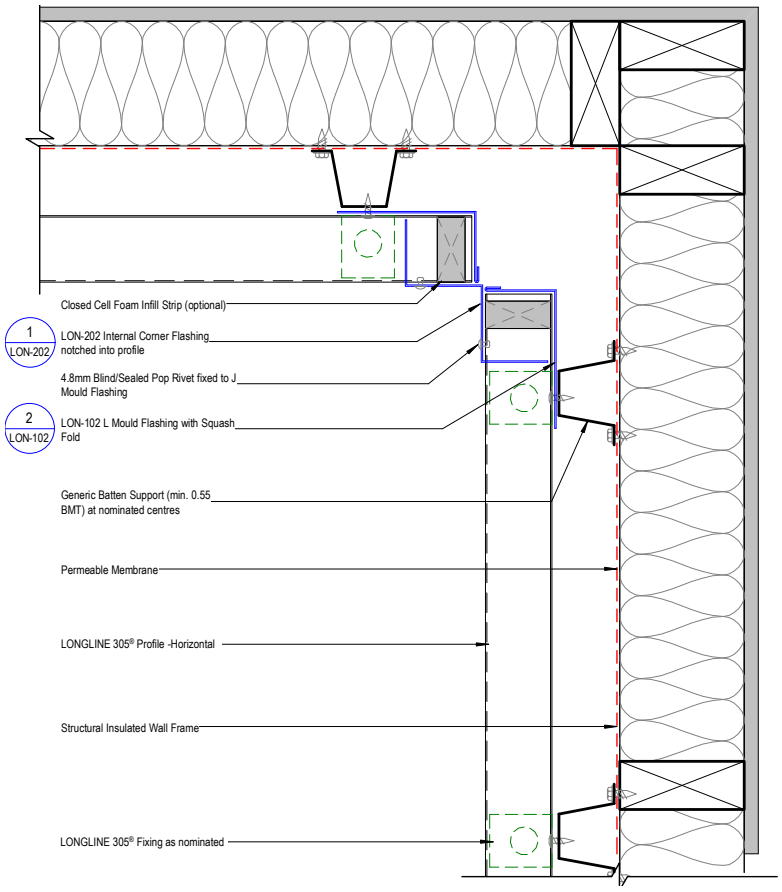


Figure 10.4.2.5:

Wall Closure Detail - Unsupported LONGLINE 305® Panel - Horizontal Fix - L07-01

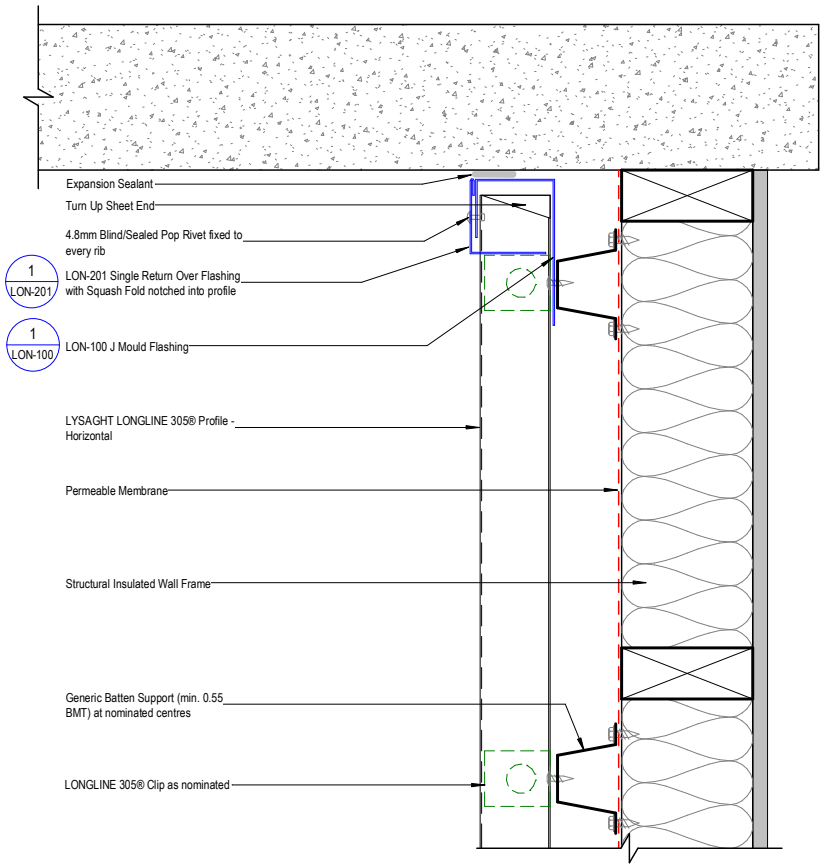


Figure 10.4.2.6:

Window Jamb Detail - Unsupported LONGLINE 305® - Horizontal Fix - L11-01

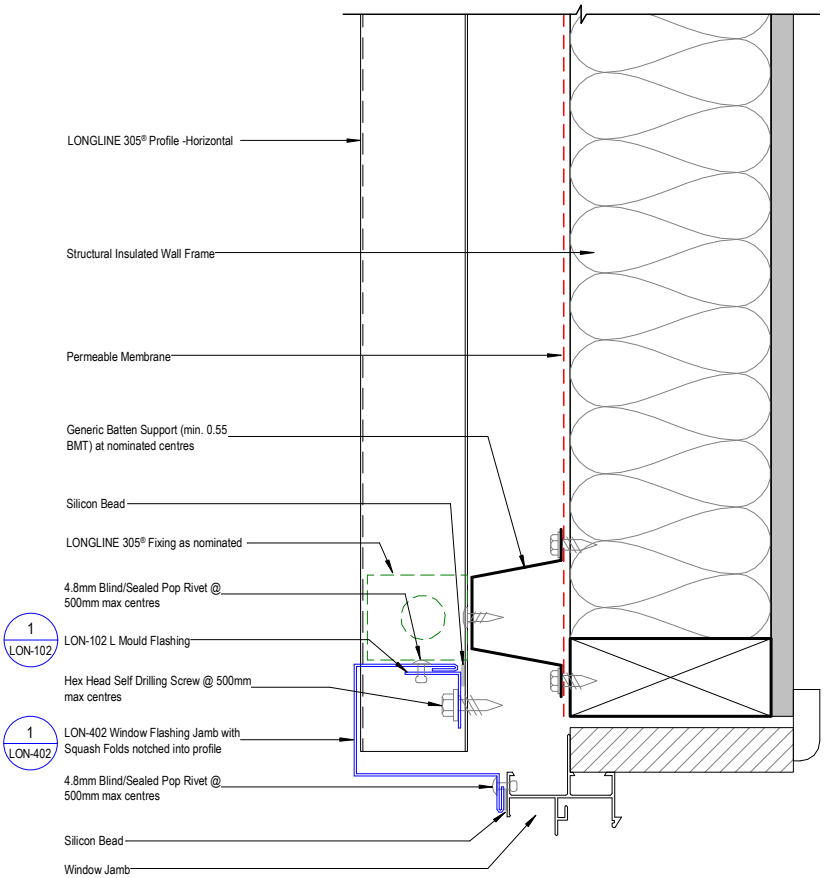


Figure 10.4.2.7:

Wall Base Detail - Unsupported LONGLINE 305® Panel - Horizontal Fix - L08-01

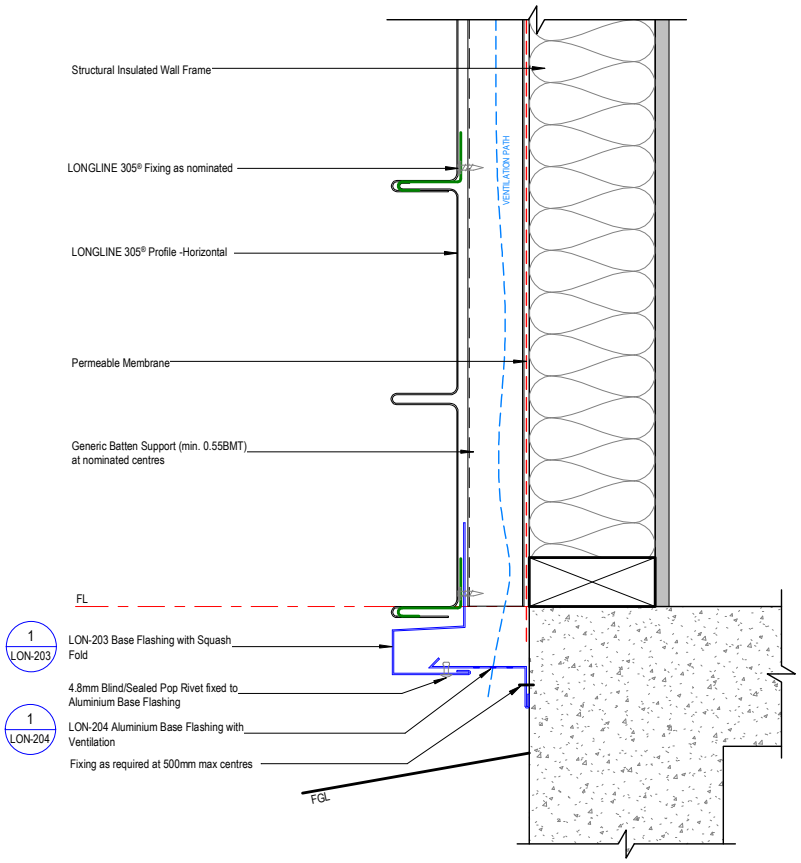


Figure 10.4.2.8:

Top of Wall Eave Detail - Zero Overhang - Unsupported LONGLINE 305® - Horizontal Fix - L09-01

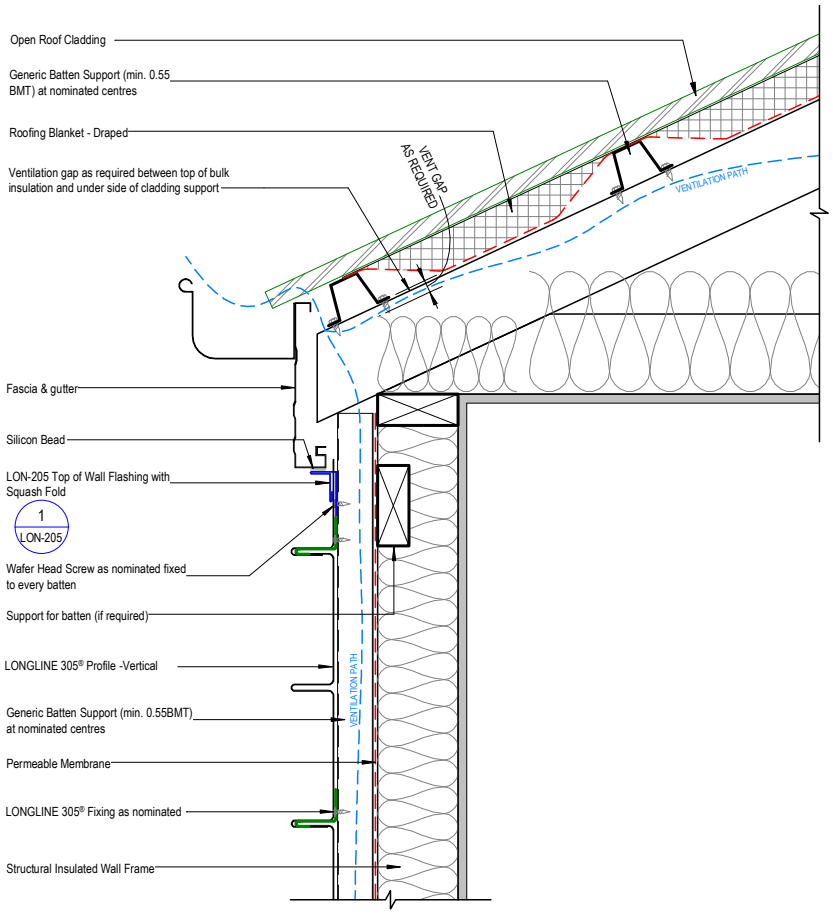


Figure 10.4.2.9:

Top of Wall Eave Detail - Overhang - Unsupported LONGLINE 305® - Horizontal Fix - L09-05

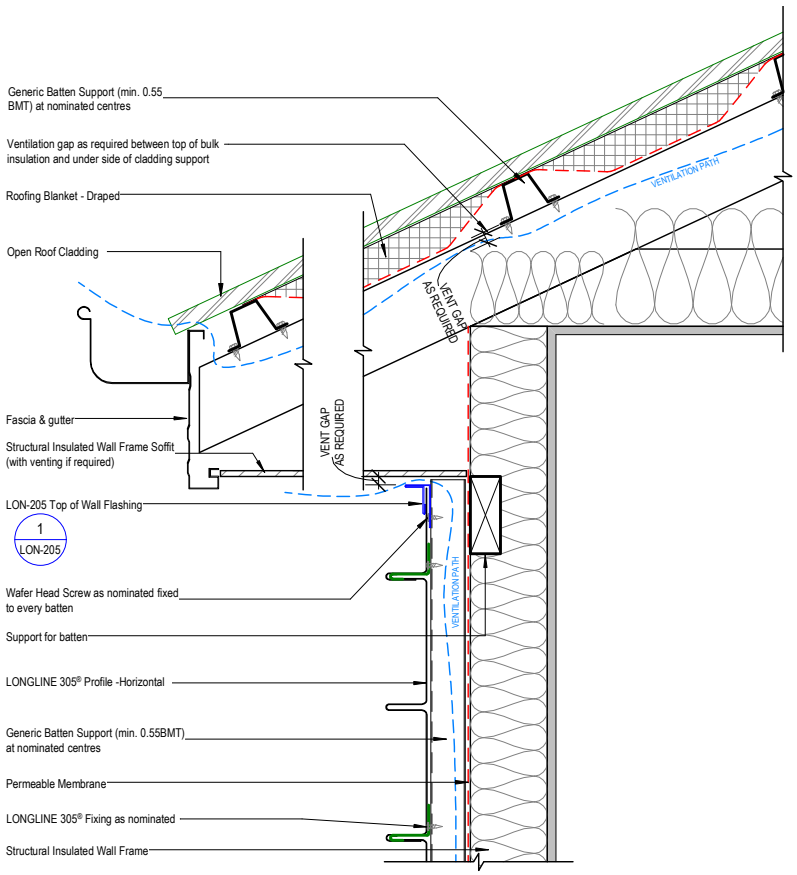


Figure 10.4.2.10:

Window Sill Detail - Unsupported LONGLINE 305® Panel - Horizontal Fix - L11-05

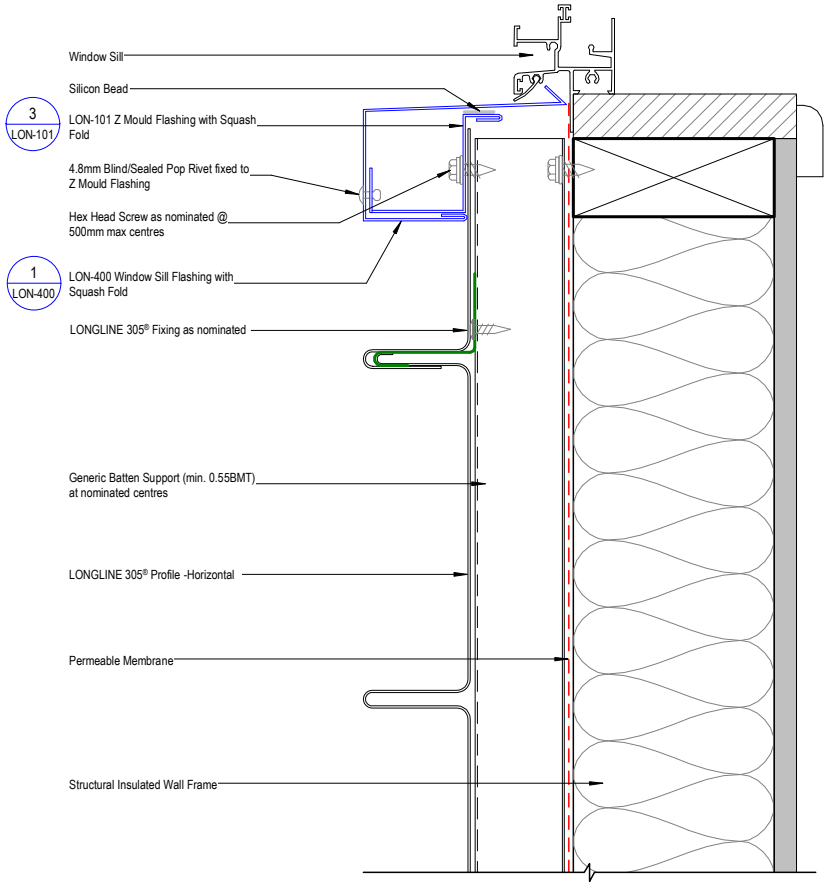
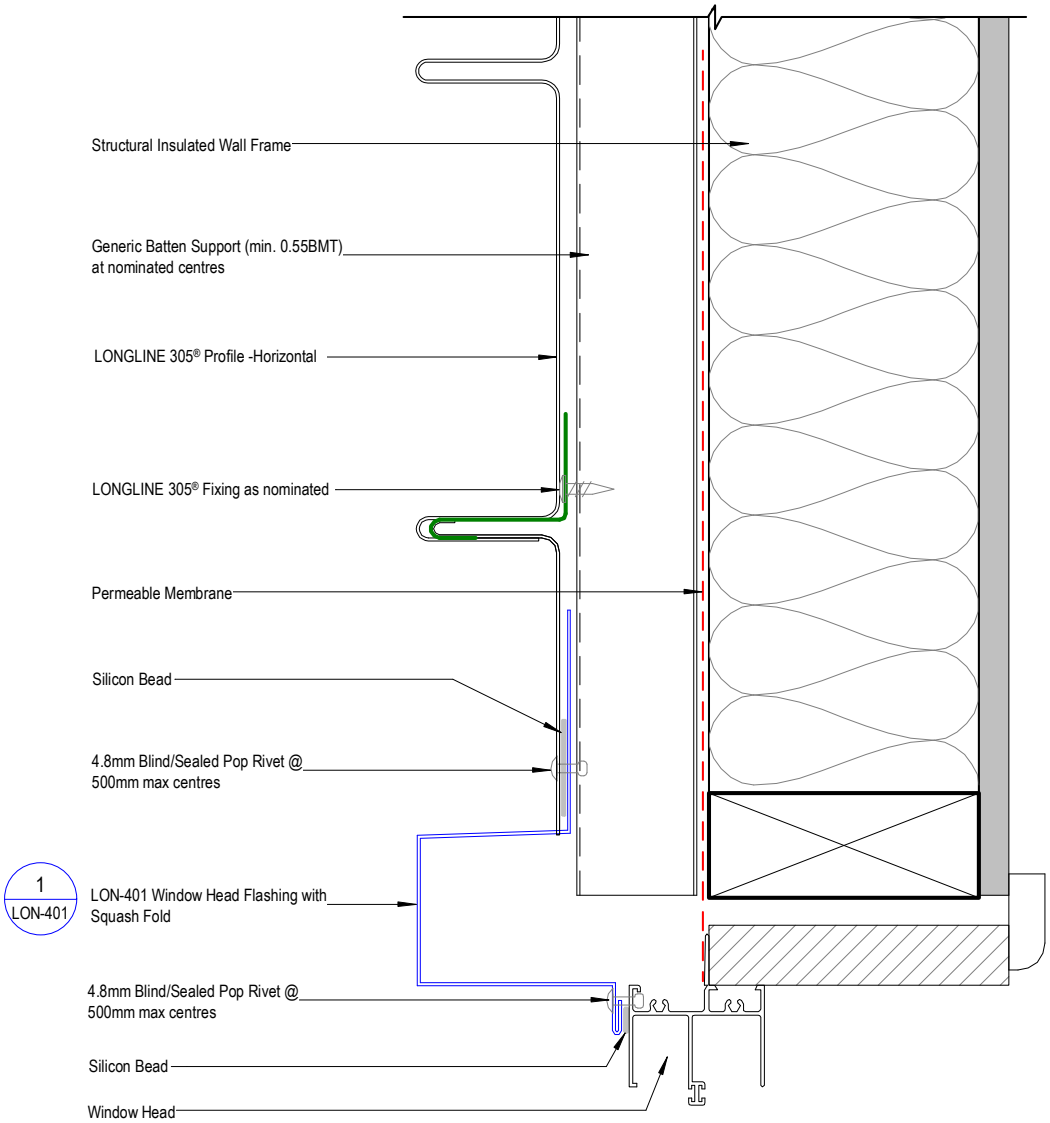


Figure 10.4.2.11:

Window Head Detail - Unsupported LONGLINE 305® Panel - Horizontal Fix - L11-09



10.4.3 LONGLINE 305® TYPICAL WALL DETAILS -VERTICAL FIX

Figure 10.4.3.1:

Typical Wall Cladding Setout - Unsupported LONGLINE 305® Vertical Fix - Plan View - L04-05

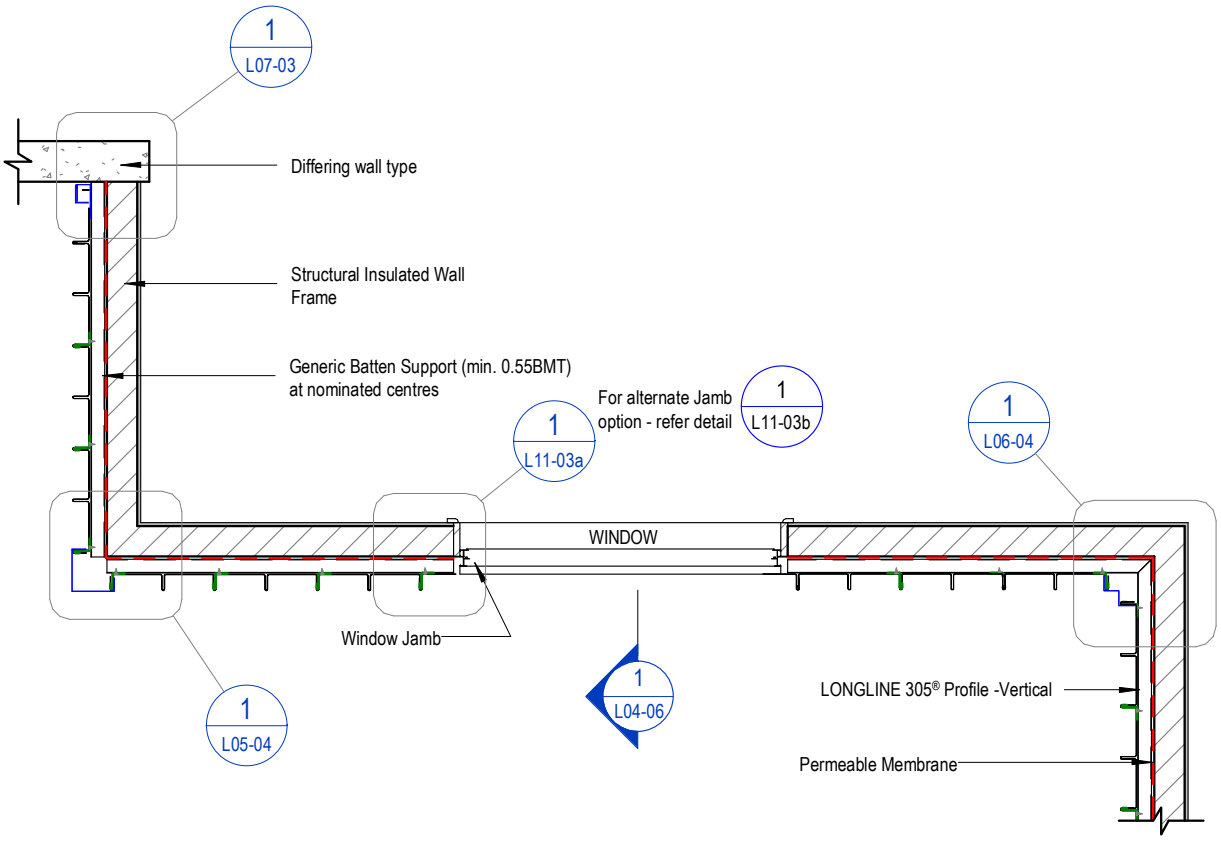


Figure 10.4.3.2:

Typical Wall Cladding Setout - Unsupported LONGLINE 305® - Vertical Fix - Sectional View - L04-06

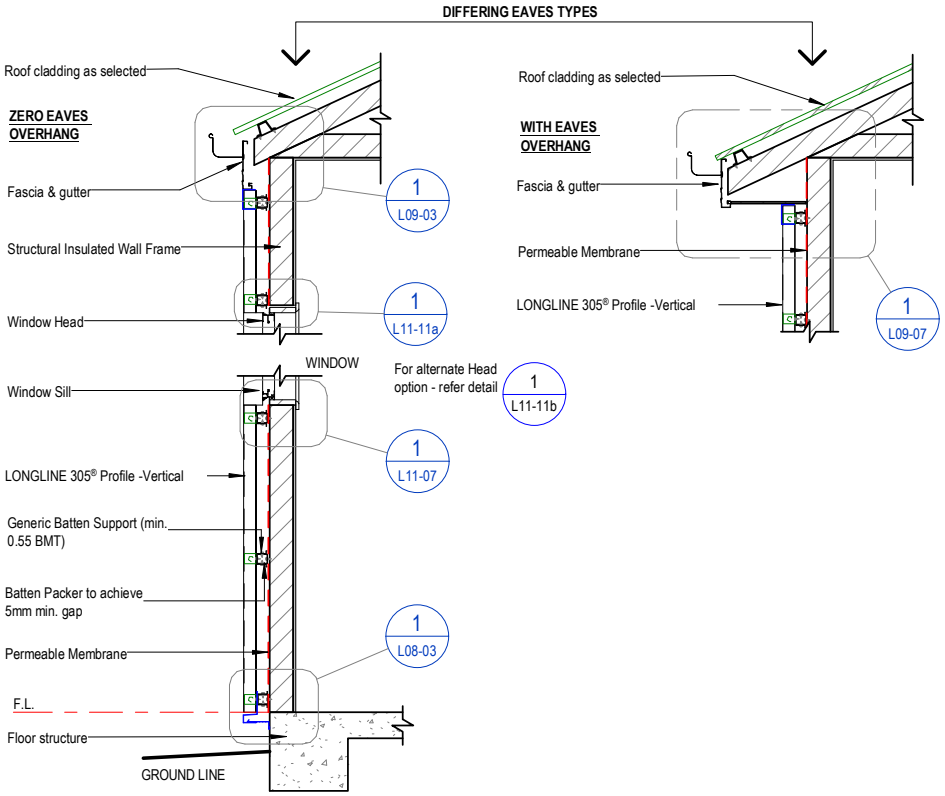


Figure 10.4.3.3:

External Corner Detail - Unsupported LONGLINE 305® Panel - L05-04

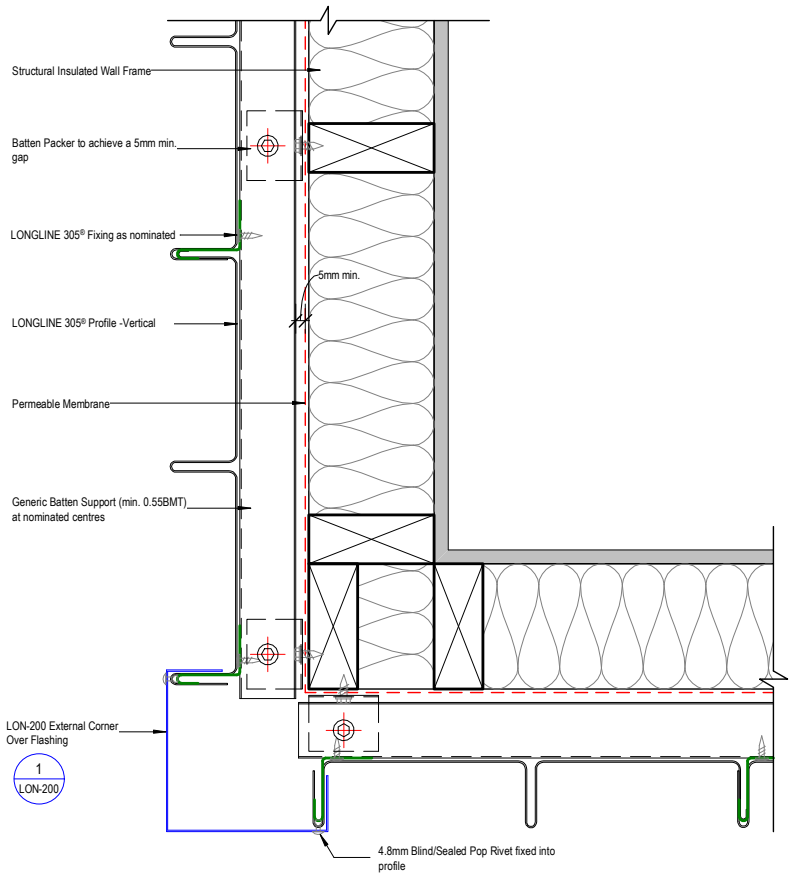


Figure 10.4.3.4:

Internal Corner Detail - Unsupported LONGLINE 305® - Vertical Fix - L06-04

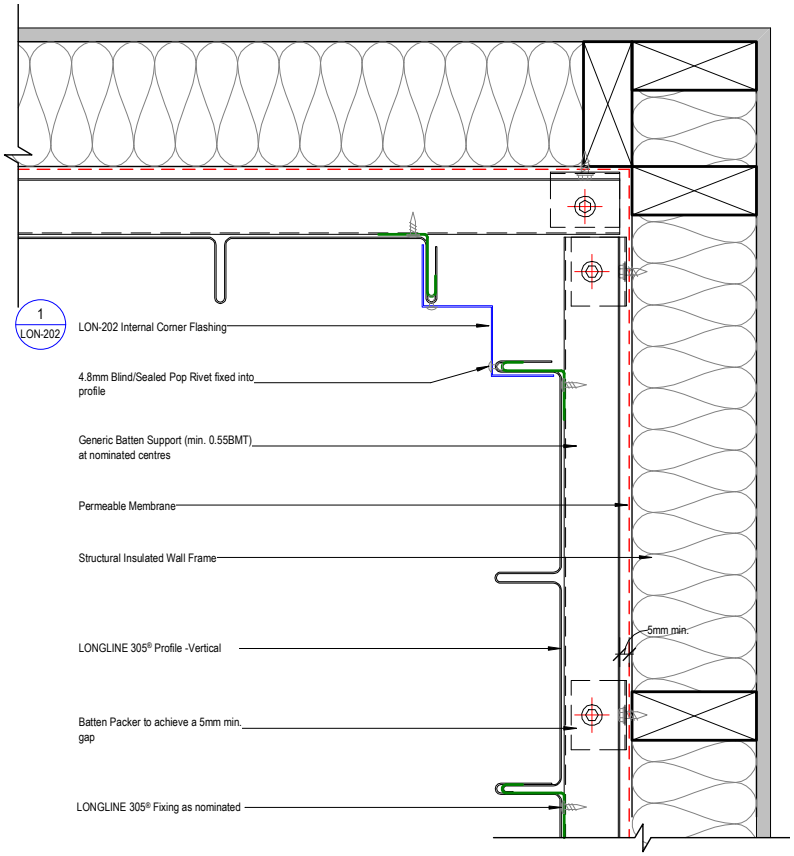


Figure 10.4.3.5:

Wall Closure Detail - Unsupported LONGLINE 305® Panel - Vertical Fix - L07-03

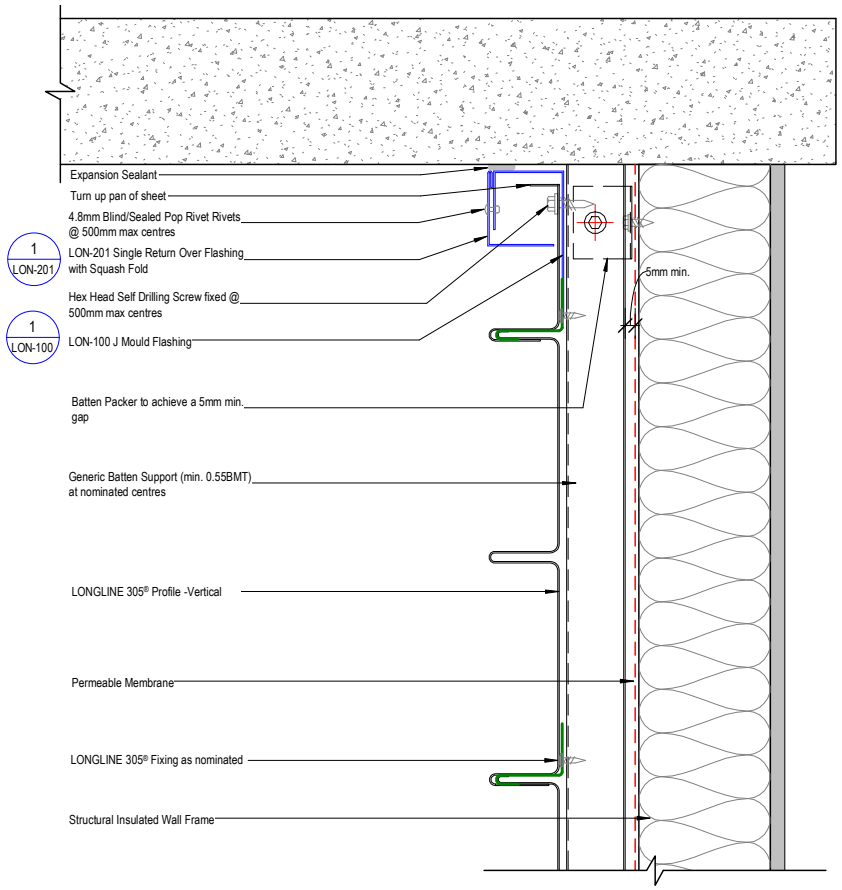


Figure 10.4.3.6:

Window Jamb Detail - Unsupported LONGLINE 305® Panel - Vertical Fix Option 1 - L11-03a

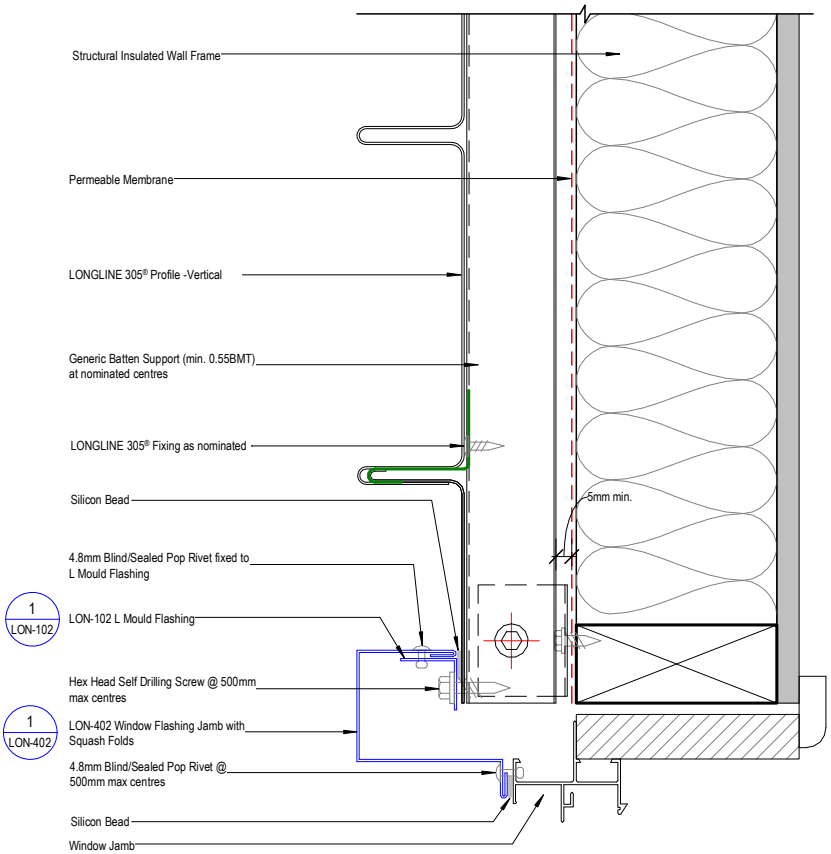


Figure 10.4.3.7:

Window Jamb Detail - Unsupported LONGLINE 305® Panel - Vertical Fix Option 2 - L11-03b

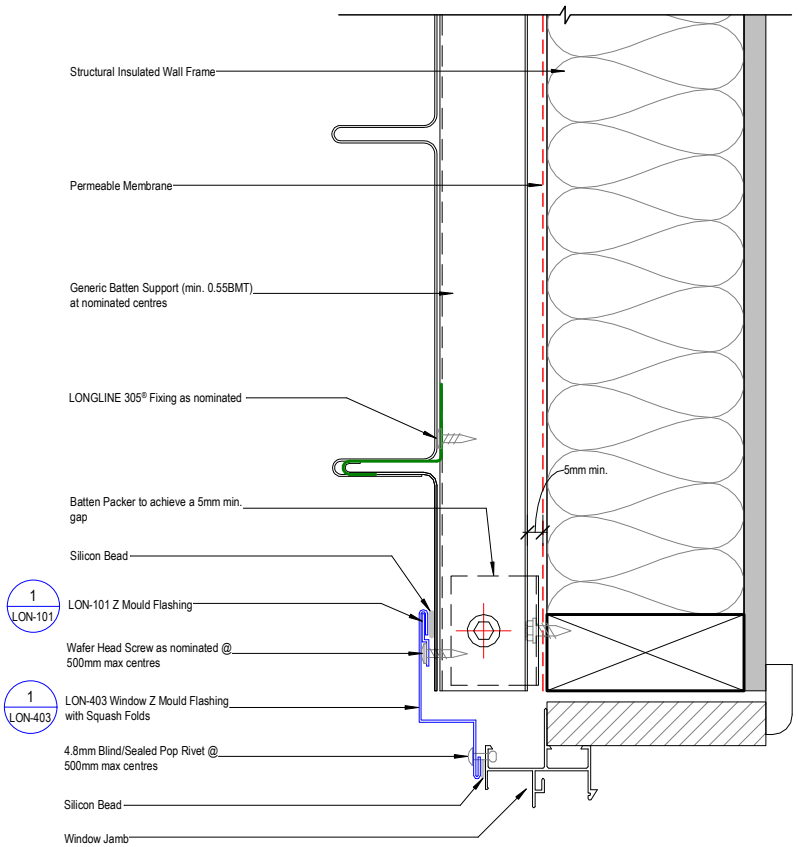


Figure 10.4.3.8:

Wall Base Detail - Unsupported LONGLINE 305® Panel - Vertical Fix - L08-03

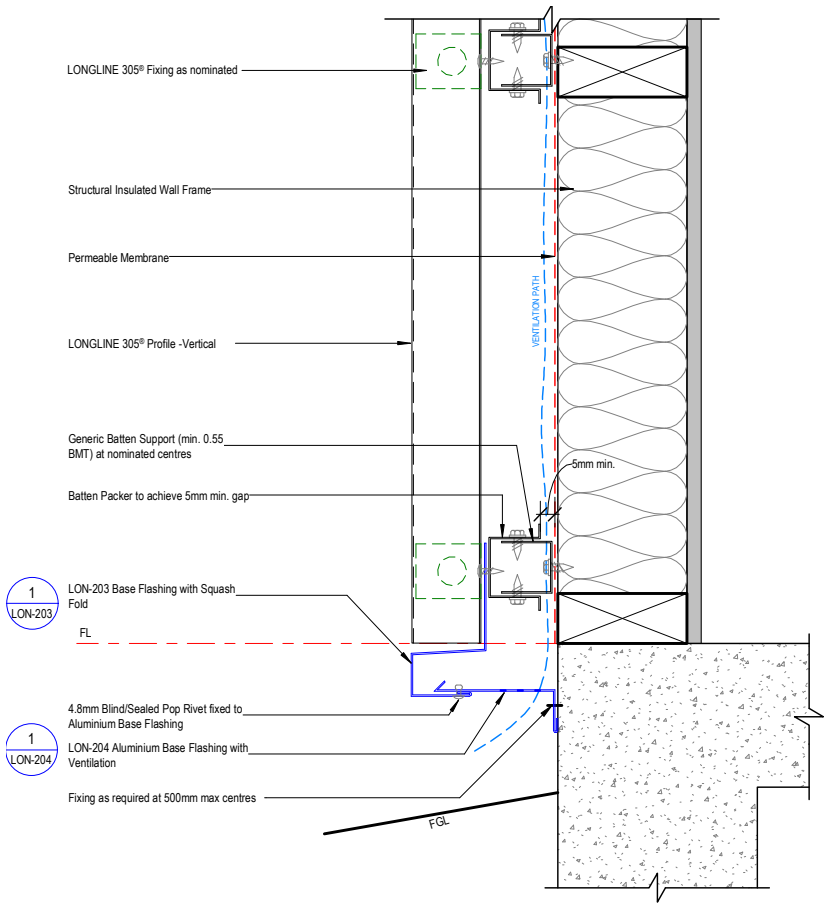


Figure 10.4.3.9:

Top of Wall Eave Detail - Zero Overhang - Unsupported LONGLINE 305® - Vertical Fix - L09-03

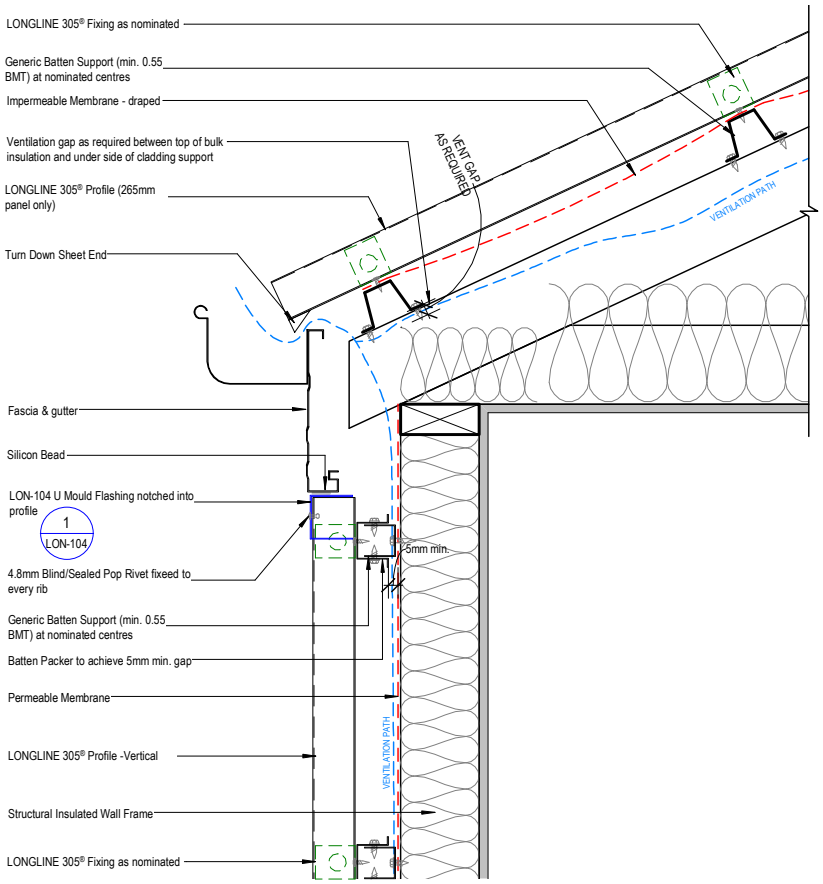


Figure 10.4.3.10:

Top of Wall Eave Detail - Overhang - Unsupported LONGLINE 305® - Vertical Fix - L09-07

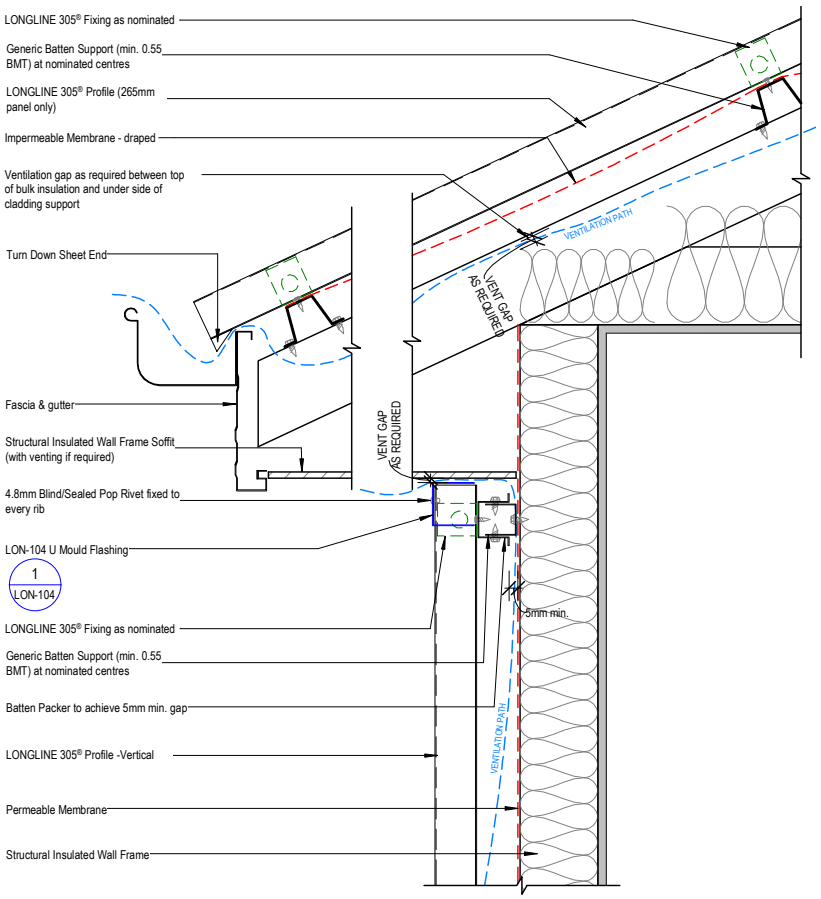


Figure 10.4.3.11:

Window Sill Detail - Unsupported LONGLINE 305® - Vertical Fix - L11-07

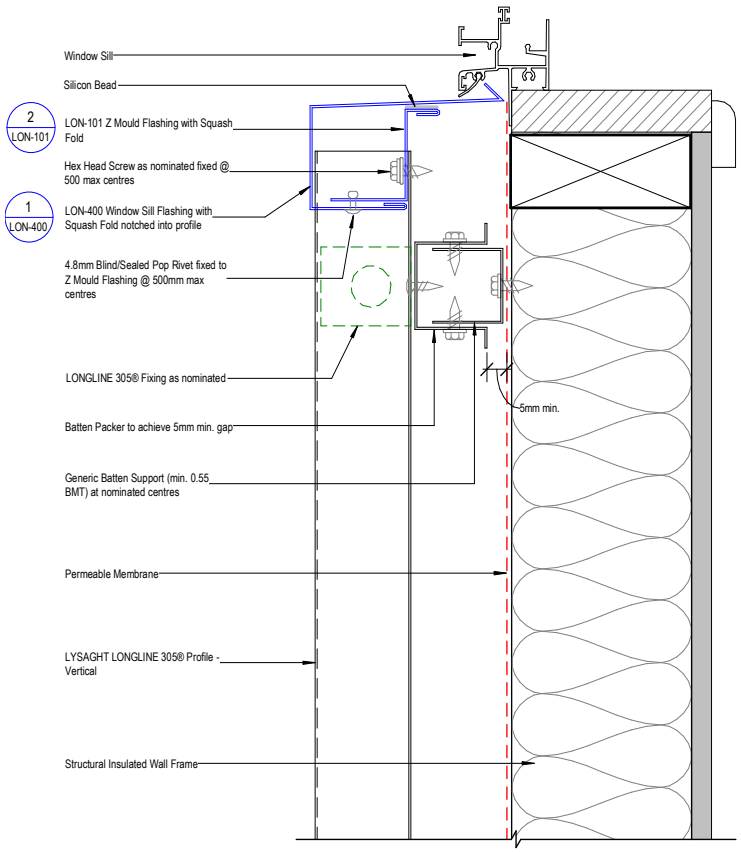


Figure 10.4.3.12:

Window Head Detail - Unsupported LONGLINE 305® Panel- Vertical Fix Option 1 - L11-11a

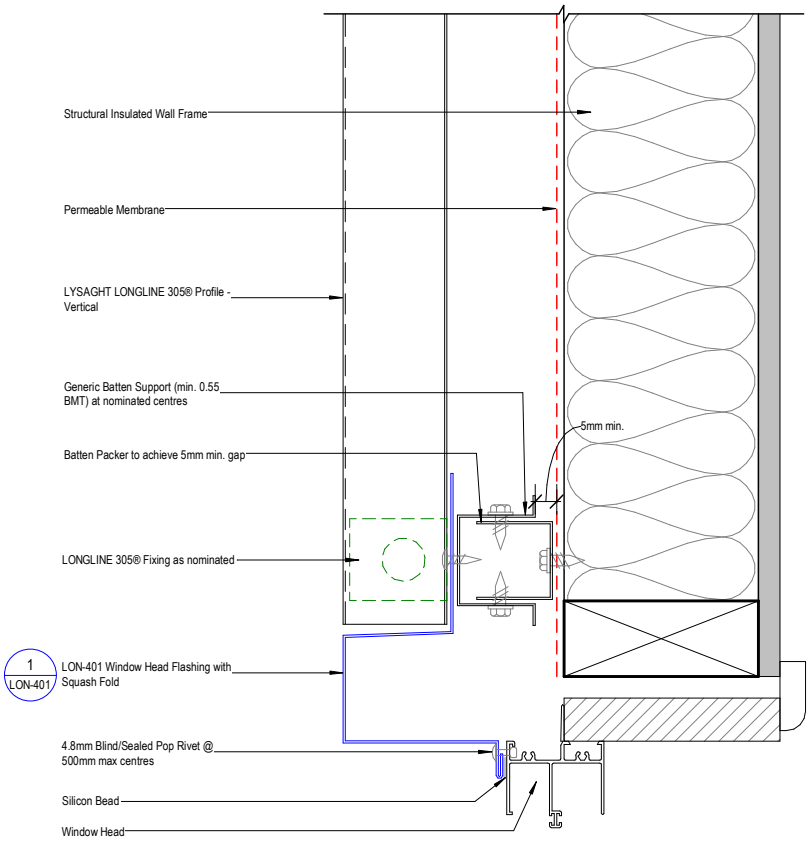
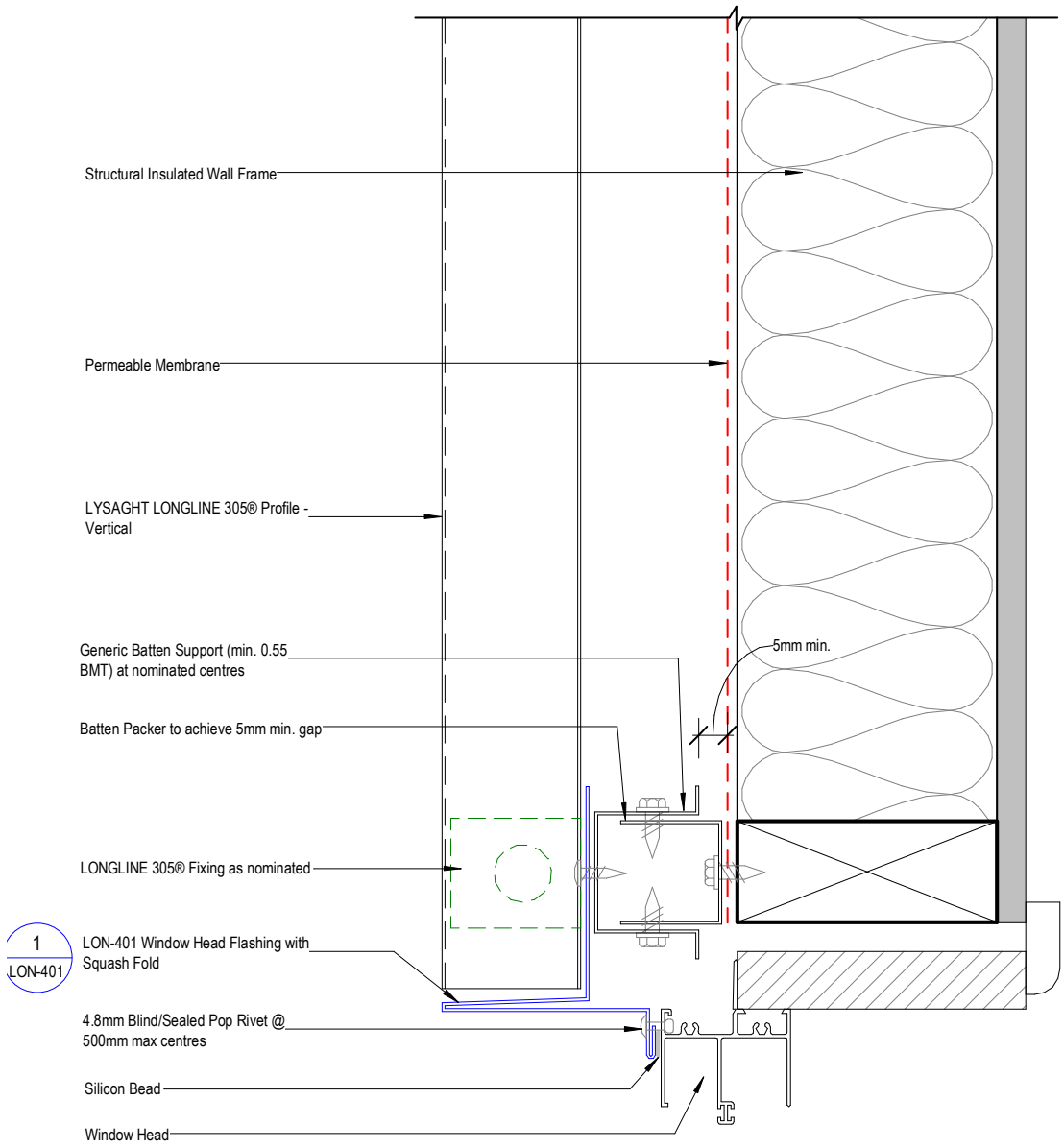


Figure 10.4.3.13:

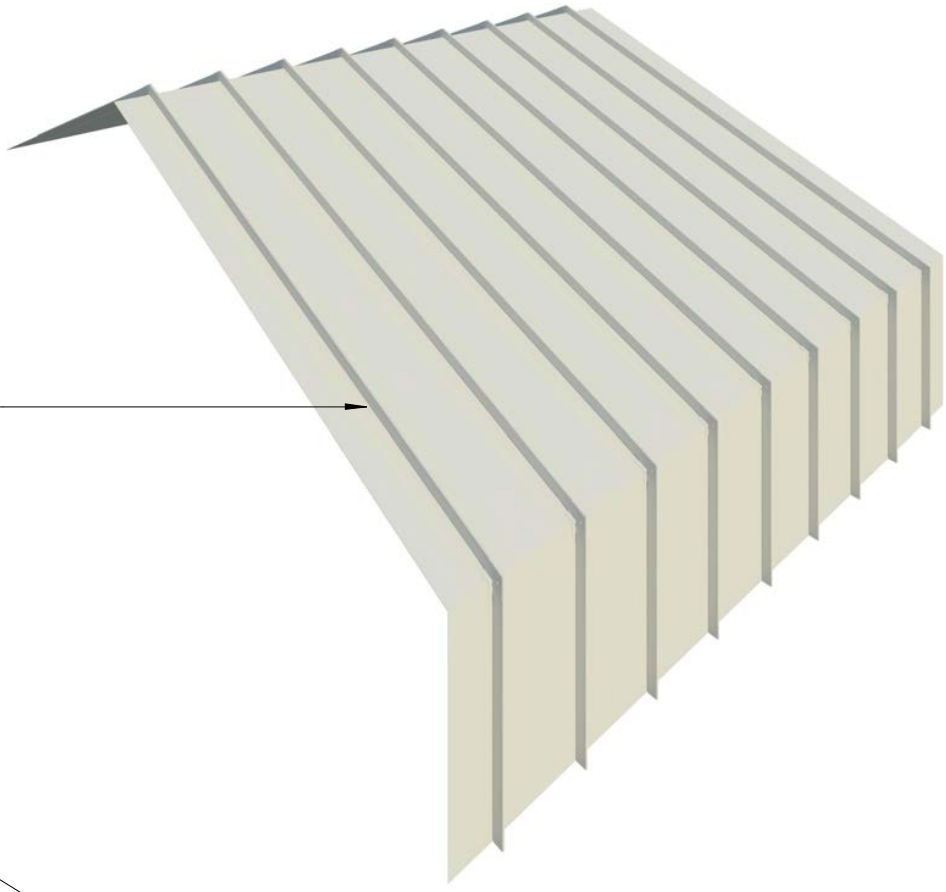
Window Head Detail - Unsupported LONGLINE 305® Panel- Vertical Fix Option 2 - L11-11b



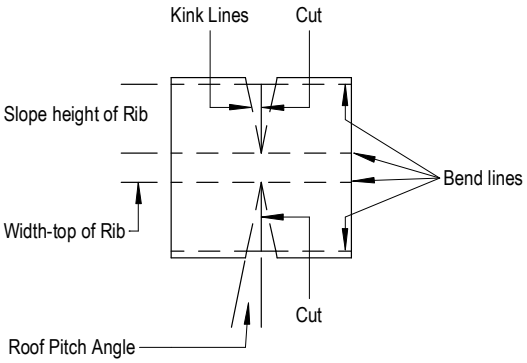
10.4.4 LONGLINE 305® MANSARD ROOF / WALL

Figure 10.4.4.1:

LONGLINE 305® Mansard Roof - L12-21



Continuous sheeting. Mansard roof with trays bent and the cut ribs waterproofed with sealed rib caps.



A L12-21 - Development of Cap
1 : 1

A
L12-21
Development Cap



Apply recommended sealant inside ends and along bottom of cap. Place in postiton over opened rib and fasten with four 4mm blind rivets.

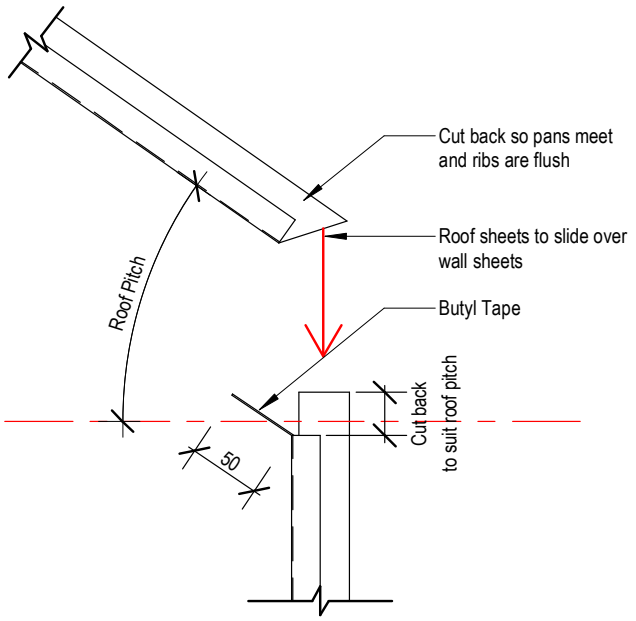
Figure 10.4.4.2:

LONGLINE 305® Mansard Roof to Wall Connection - L12-22

STEP 1

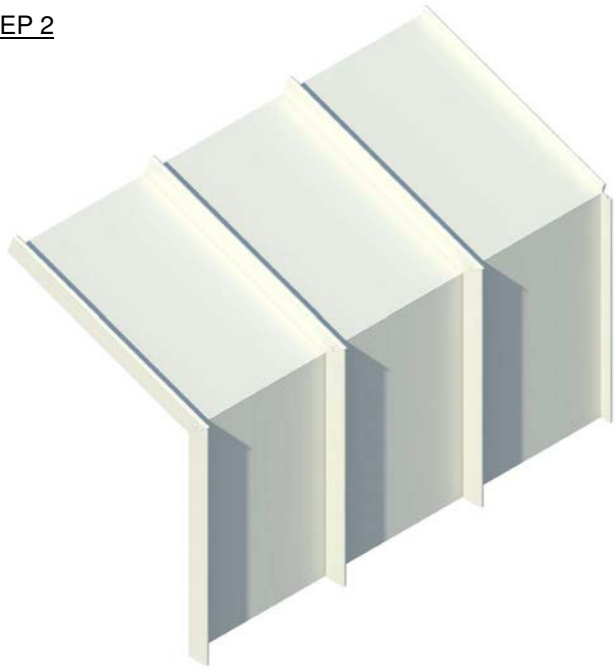


3D VIEW

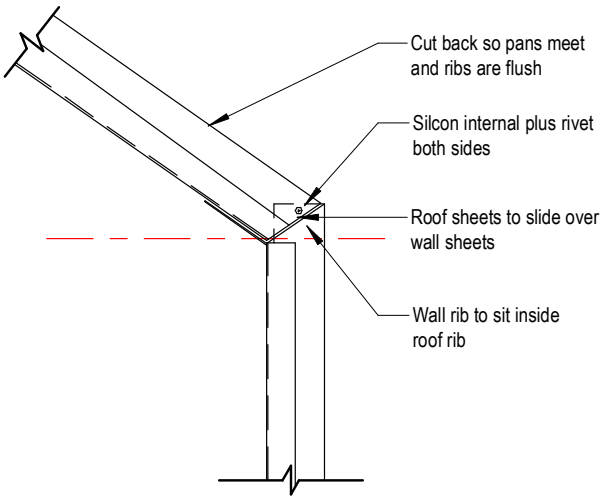


SECTION

STEP 2



3D VIEW

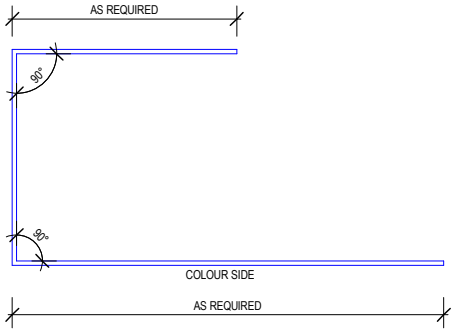


SECTION

10.4.5 LONGLINE 305® TYPICAL FLASHINGS

Figure 10.4.5.1:

LON-100 - J Mould Flashings



LON-100 - J Mould Flashing with Squash Fold

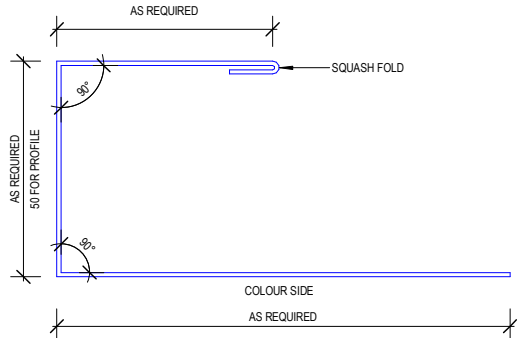
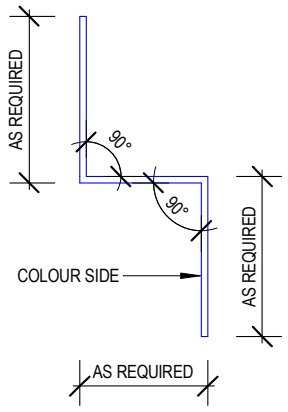


Figure 10.4.5.2:

LON-101 - Z Mould Flashings



LON-1010 - Z Mould Flashing with 1 Squash Fold

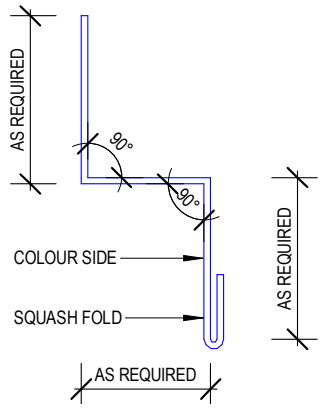
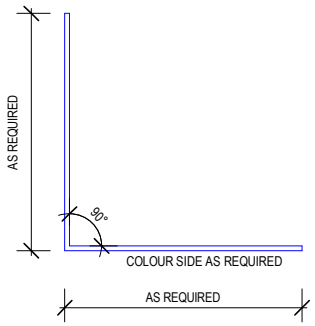
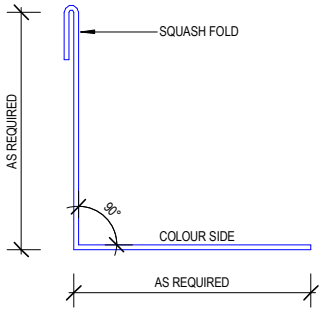


Figure 10.4.5.3:

LON-102 - L Mould Flashings



LON-102 - L Mould Flashing with 1 Squash Fold



LON-102 - L Mould Flashing with Squash Folds

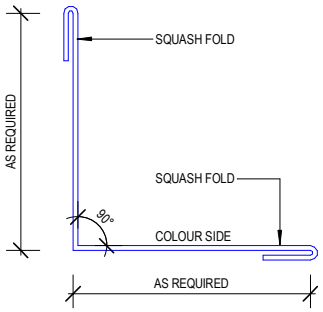
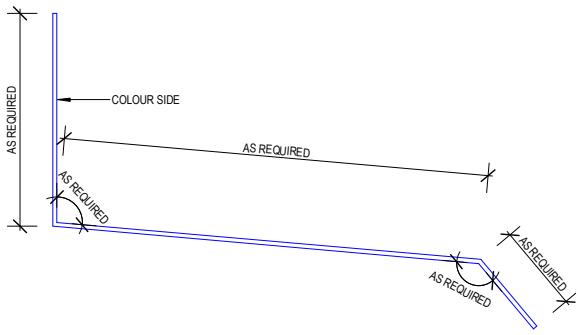


Figure 10.4.5.4:

LON-103 - Apron Flashings



LON-103 - Apron Flashing with Squash Fold

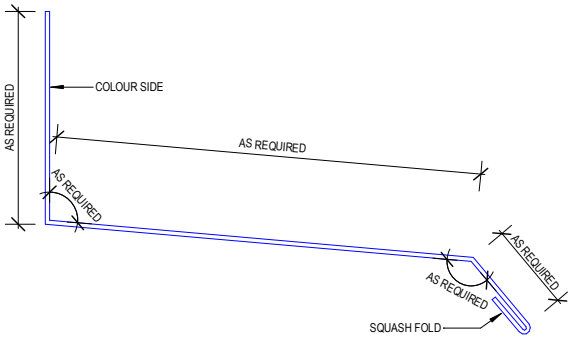


Figure 10.4.5.5:

LON-104 - U Mould Flashing

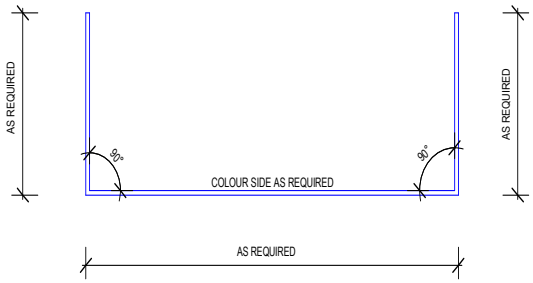


Figure 10.4.5.6:

LON-200 - External Corner Flashing

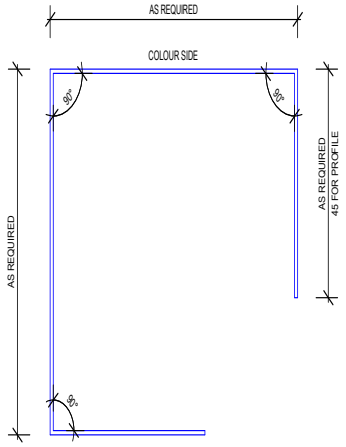


Figure 10.4.5.7:

LON-201 - Single Return Flashing

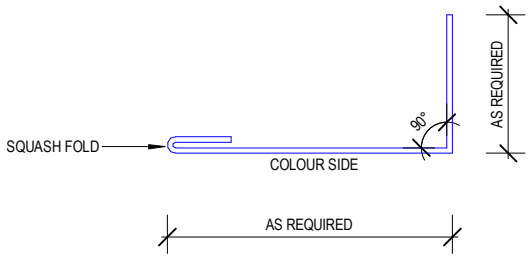


Figure 10.4.5.8:

LON-202 - Internal Corner Flashing

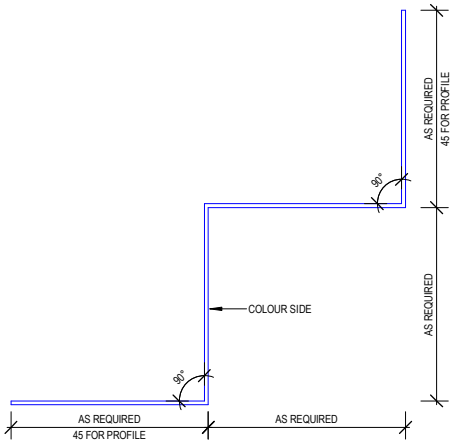
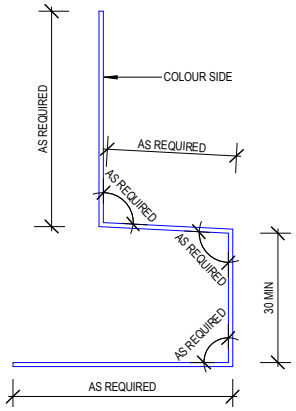


Figure 10.4.5.9:

LON-203 - Base Flashings



LON-203 - Base Flashing with Squash Fold

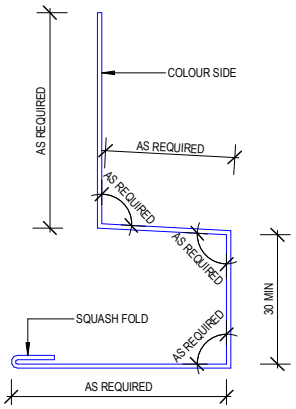


Figure 10.4.5.10:

LON-204 - Aluminium Base Flashing with Ventilation

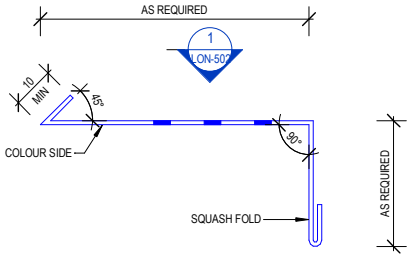


Figure 10.4.5.11:

LON-205 - Top of Wall Flashing

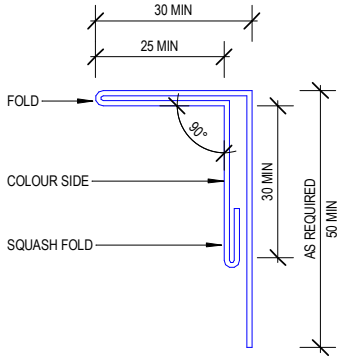
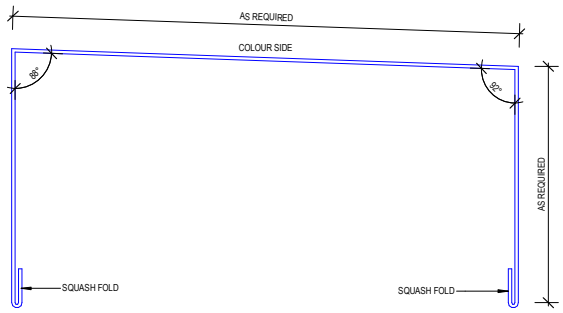


Figure 10.4.5.12:

LON-206 - Parapet Top Flashing with Squash Fold



LON-206 - Parapet Top Flashing with return and Squash Fold

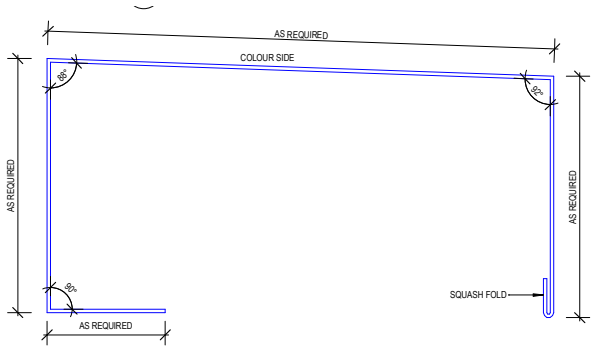


Figure 10.4.5.13:

LON-300 - Roof Valley Flashing

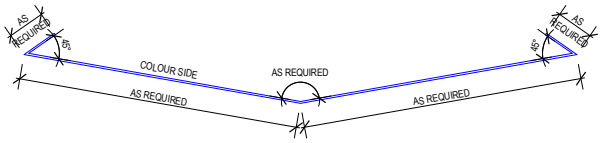
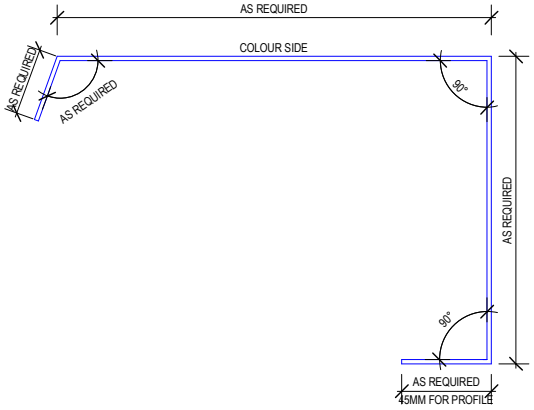


Figure 10.4.5.14:

LON-301 - Barge Flashing with returns



LON-301 - Barge Flashing with return and Squash Fold

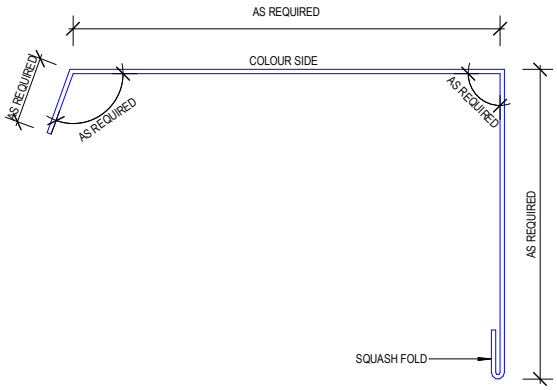


Figure 10.4.5.15:

LON-300 - Ridge Cap Flashing

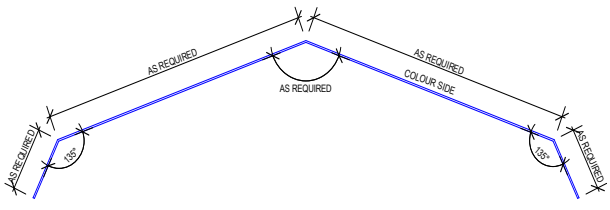


Figure 10.4.5.16:

LON-400 - Window Sill Flashing with Squash Fold

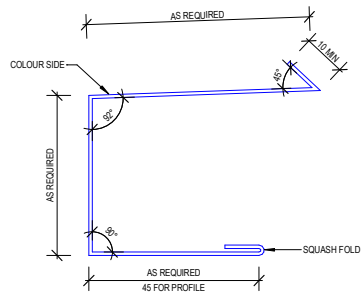


Figure 10.4.5.17:

LON-401 - Window Head Flashing with Squash Fold

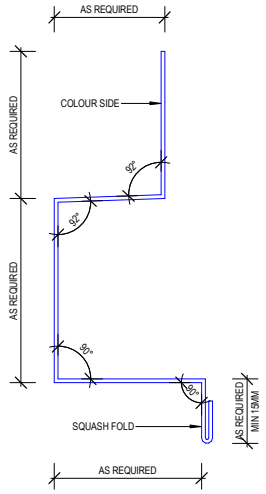


Figure 10.4.5.18:

LON-402 - Window Jamb Flashing with Squash Folds

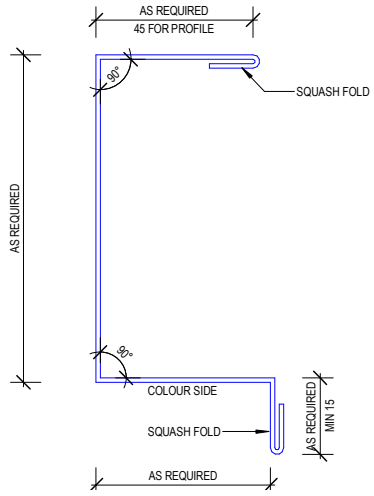
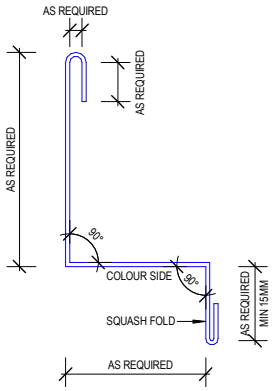


Figure 10.4.5.19:

LON-403 - Window Z Flashing with Squash Folds



LON-403 - Window Z Flashing with return and Squash Folds

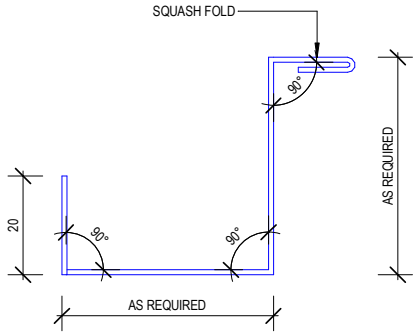


Figure 10.4.5.20:

LON-502 - Perforation Detail

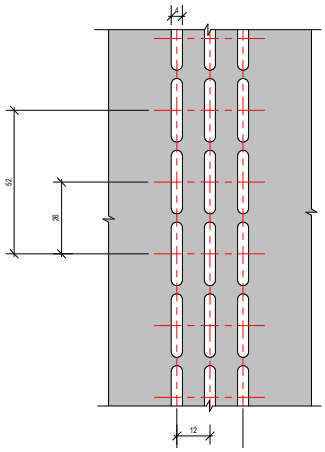
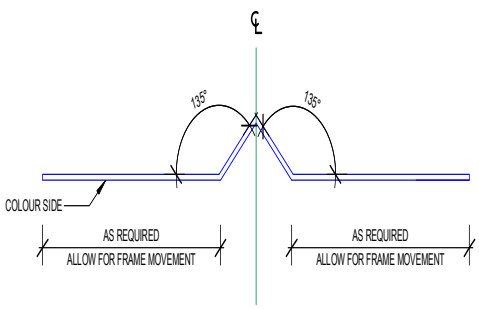


Figure 10.4.5.21:

LON-503 - Corrosion resistant flashing



11.0 ENSEAM® roof and wall cladding

ENSEAM® architectural cladding is a concealed fixed flat panel cladding system. ENSEAM® is structurally sound for direct fixed to steel battens and can also be fixed onto conventional supporting substrate such as plywood or fibre cement panels.

The wide flat profile gives a modern architecturally designed premium finish.

11.1 MATERIAL SPECIFICATIONS

Coverage (mm)	265			465		
Base Metal Thickness (BMT) (mm)	0.55	0.7*	0.75*	0.55	0.7*	0.75*
Total Coated Thickness[1] (TCT) (mm)	0.6	0.75	0.8	0.6	0.75	0.8
Rib Height (mm)	38					
Sheet Length[2] (mm)						
Minimum	500					
Maximum	8,000 [2]					
Mass / Unit Length (kg/m)						
ZINCALUME® steel	1.83	2.25	2.41	2.67	N/A	3.61
COLORBOND® steel[1]	1.96	2.29	2.44	2.73	N/A	3.68
Mass / Unit Area (kg/m²)						
ZINCALUME® steel	6.91	8.50	9.09	5.75	N/A	7.77
COLORBOND® steel[1]	7.02	8.65	9.21	5.88	N/A	7.90
Minimum Yield Strength	300 (G300)					
Coating Class (See Base Material for detail)	AM125 - ZINCALUME® steel AM100 - COLORBOND® steel AM100 - COLORBOND® METALLIC steel AM150 - COLORBOND® ULTRA steel					
Tolerance	Sheet length: ±3mm Cover width: ±2mm					
Thermal Expansion	2.9mm average per 5m @ 50°C change					

Notes:

1. Based on single sided COLORBOND® steel. For other painted steel options please contact your Lysaght representative.
2. To assist minimising the effects of oil canning in ENSEAM® cladding, it is recommended to keep panel length under 8m. Longer lengths may be available subject to minimum order quantity.

*Please check with your local branch for availability.

MINIMUM ROOF PITCH

The minimum recommended roof pitch for ENSEAM® cladding is 3 degree.

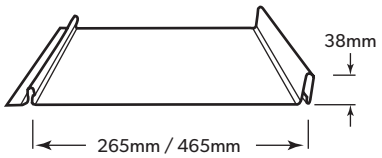
INSULATION

Care needs to be taken when installing insulation with ENSEAM® roof sheeting. The screws may need to be increased depending on the thickness and density of the insulation. When the screw is properly tightened into metal there should be a minimum of three (3) threads protruding past the support being fixed in to. For timber the screw must have a min embedment of 25mm into the timber.

For insulation, the use of roof spacing system is recommended to help maintain Rw values as well as minimising any bulging in the profile caused by the insulation. Refer to oil canning section for potential visual impacts of insulation on the product.

Figure 11.1.1:

ENSEAM® profile.



FASTENING ENSEAM® CLADDING TO SUPPORTS

ENSEAM® is concealed pierce-fixed to batten supports. This means that fastener screws pass through the sheeting at the concealed underlap edge. You can place screws through the slotted holes or directly through the sheet**.

Table 11.1.1:

Fastener Specification - Non-Cyclonic

Fixing	**Application**
Fixing to steel	10g-16x16 wafer head metal screw with minimum class 3 coating
Fixing to plywood	10g-12x25 wafer head type 17 metal screw with minimum class 3 coating
Fixing to timber battens	10g-12x25 wafer head type 17 metal screw with minimum class 3 coating

MAXIMUM BATTEN / SUPPORT SPACINGS [1]

Type of Span	**265mm cover**			**465mm cover**		
	0.55mm BMT	**0.70mm* BMT**	**0.75mm* BMT**	**0.55mm BMT**	**0.70* BMT**	**0.75mm* BMT**
Roofs				Must be fixed to 19mm thick F11 structural CD ply with screw fixing at 450mm c/c and batten / support spacings at maximum 600mm centres		
Single span	600	700	700			
End Span	600	700	700			
Internal Span	600	700	700			
Unstiffened eaves overhang	50	50	50	50	N/A	50
Walls						
Single span	900	1000	1000	450	N/A	550
End span	900	1000	1000	450	N/A	550
Internal span	1200	1300	1300	450	N/A	550
Overhang	100	100	100	100	N/A	100

1. Refer Section 2.5 - Support Spacing and Overhang for loading parameters applicable to MAXIMUM SUPPORT SPACINGS. For Projects outside these loading parameters designers should reference LIMIT STATE WIND CAPACITIES tables to determine appropriate support spacings.

*Please check with your local branch for availability.

** When fixing directly through the sheet, it is good practice to pre-drill a larger hole/slot to allow for thermal movement of the sheet

ENSEAM®: LIMIT STATE WIND PRESSURE CAPACITIES (KPA)

Cover width	Support Requirement	Design pressure (kPa)		Application
		Serviceability	Strength	
265mm x 0.55mm BMT 265mm x 0.70 mm BMT 265mm x 0.75 mm BMT	Steel batten: 40mm x 0.55mm BMT G550 Batten spacing: 600mm (max) Batten span: 1200mm (max)	0.97	3.88	Roofing & Walling
	19mm F11 CD Structural Grade plywood for roofing applications 15mm F11 CD Structural Grade plywood for walling applications Maximum support spacing 600mm Fastener spacing: 450mm	0.97	3.88	Roofing & Walling
266mm - 464mm x 0.55 BMT 266mm - 464mm x 0.70 BMT 266mm - 464mm x 0.75 BMT	Steel batten 40mm x 0.55mm BMT G550 Batten spacing : 450mm (max) Batten span: 1200mm (max)	0.36	3.00	Walling
	19mm F11 CKD Structural Grade plywood for roofing applications 15mm F11 CKD Structural Grade plywood for walling applications Maximum support spacing 600mm Fastener spacing: 450mm	0.36	3.00	Roofing & Walling
465mm x 0.55mm BMT 465mm x 0.70 mm BMT 465mm x 0.75 mm BMT	Steel batten 40mm x 0.55mm BMT G550 Batten spacing : 450mm (max) Batten span: 1200mm (max)	0.36	3.00	Walling
	19mm F11 CKD Structural Grade plywood for roofing applications 15mm F11 CKD Structural Grade plywood for walling applications Maximum support spacing 600mm Fastener spacing: 450mm	0.36	3.00	Roofing & Walling

Minimum support / purlin thickness must be 1mm BMT, G550

For maximum roof lengths for drainage see Page 17 Table 6.1.1

Table 11.1.2

Guide to fastener layout and sheet coverage.

SHEET COVERAGE

265MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	12	16	19	23	27	31	34	38	42	46	50	53	57	61	65	68	72	76	114	151	189

465MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	7	9	11	13	16	18	20	22	24	26	28	31	33	35	37	39	41	44	65	87	108

WIDTH COVERED BY 'X' NUMBERS OF SHEETS (M)

265MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	0.795	1.06	1.325	1.59	1.855	2.12	2.385	2.65	2.915	3.18	3.445	3.71	4.0	4.24	4.505	4.77	5.0	5.3

465MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	1.395	1.86	2.325	2.79	3.255	3.72	4.185	4.65	5.115	5.58	6.045	6.51	7.0	7.44	7.905	8.37	8.8	9.3

Screw calculation:
1.7 screws per lm of cladding for 265 roof / wall cladding
2.3 screws per lm of cladding for 465mm wall cladding

END LAPPING

Do not end lap ENSEAM® cladding.

ENDS OF SHEETS

It is usual to allow roof sheets to overhang into gutters by about 50mm.

LAYING PROCEDURE

ENSEAM® is designed to be installed in conjunction with a heavy duty building membrane as an additional weather-proofing measure. Impermeable Membranes are preferred for roofing applications with Permeable membranes preferred for walling applications. For greater detail on membrane selection and design of ventilation and drainage pathways refer to CONDENSATION CONTROL IN AUSTRALIAN BUILDINGS CONSTRUCTED WITH LYSAGHT® CLADDINGS

This building membrane / blanket should be installed in accordance with the manufactures recommendations, sealed at the top, free from ripples and puckers, lapped and taped at joins. All laps in the building membrane / blanket must be made with 150mm lap, sealed with double sided tape between the faces of the building membrane and taped with sisal tape on the outside face.

For maximum weather-tightness, start laying sheets from the end of the building that will be in the lee of the worst-anticipated or prevailing weather. Lay sheets toward prevailing weather. Also, it is much easier and safer to turn sheets on the ground than up on the roof. Before lifting sheets on to the roof, check that they are the correct way up and the overlapping side is towards the edge of the roof from which installation will start. Place bundles of sheets over or near firm supports, not at mid span of roof member.

1. Position the first sheet to align with the building edge.
2. Screw fix the under lap edge to battens or ply as shown in Figure 11.2.1 and Figure 11.2.2 taking care to place the screws to the centre of the slotted holes to allow for expansion and contraction.
3. Align and engage the next sheet as shown in Figure 11.2.3 and then screw fix as per Step 2 .
4. Repeat for the roof/wall run.
5. Complete flashings and detailing as per details 11.2.4 to 11.2.14 and architectural directions.

11.2 TYPICAL ENSEAM® INSTALLATION DETAILS

Figure 11.2.1:

Non-cyclonic fixing to steel batten.

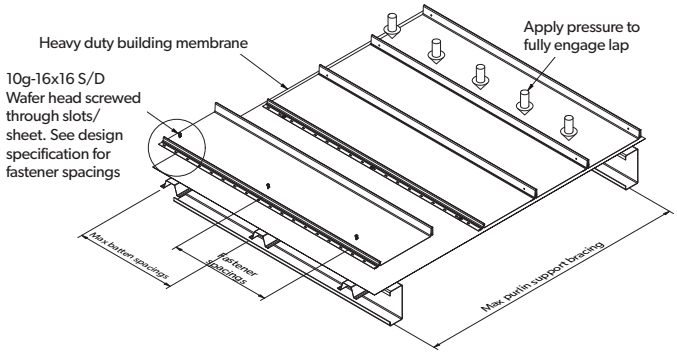


Figure 11.2.2-1:

Fixing to plywood detail

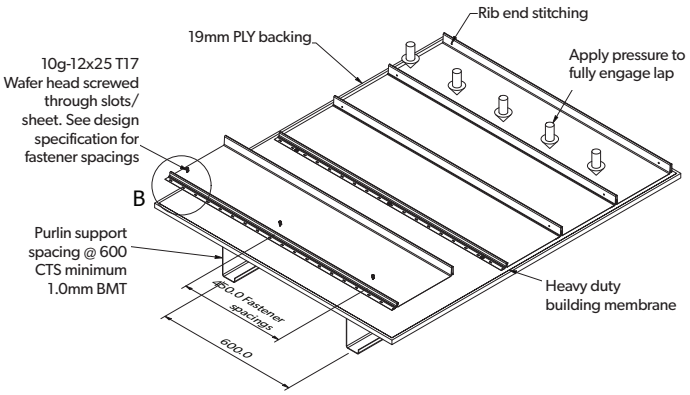


Figure 11.2.2.2:

Fixing to plywood detail

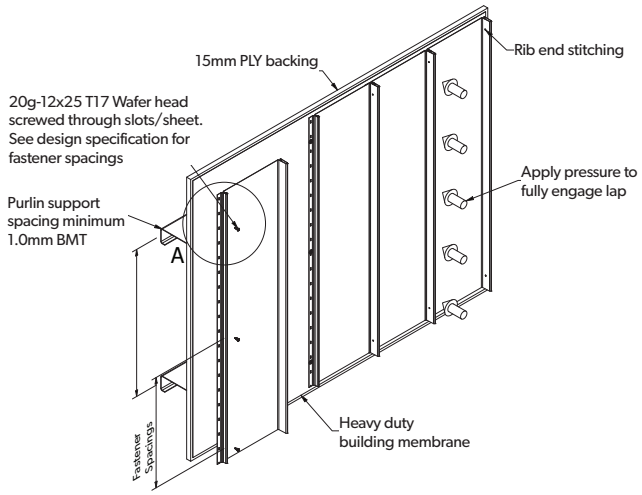


Figure 11.2.2.3:

Fixing to plywood detail

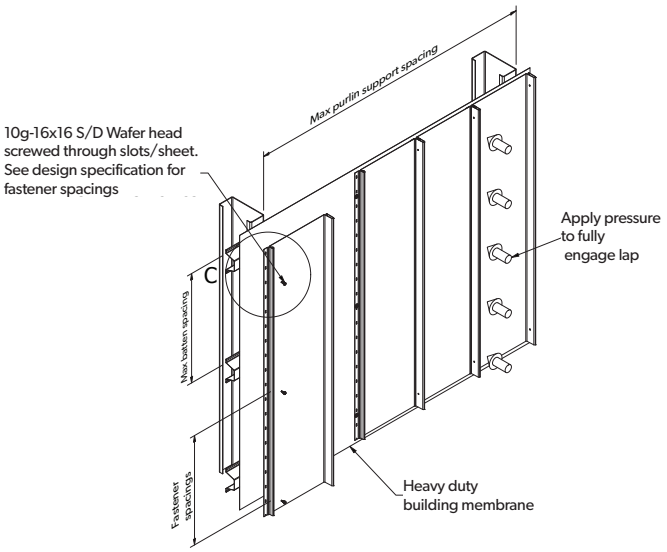
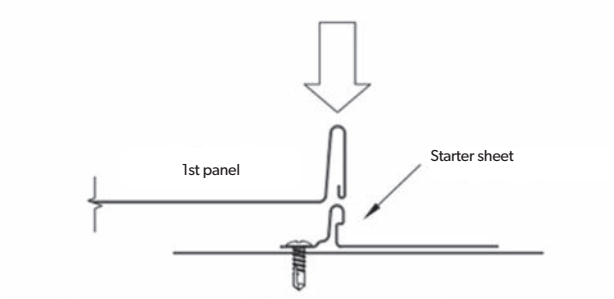


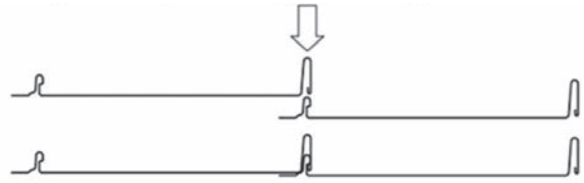
Figure 11.2.3:

Standard lap engagement procedure.

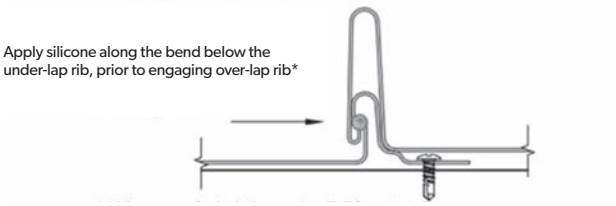


8/ST over-lap rib fixing details (see Fig 11.2.8 and 11.2.9 for barge details).

Engage under-lap and over-lap ribs by applying vertical pressure along the over-lap rib either by hand or using a rubber mullet.



Apply silicone along the bend below the under-lap rib, prior to engaging over-lap rib*



When roof pitch is under 7.5° or total combined sheet length is over 5m

Figure 11.2.4:

Foam Infill detail.

80mm x 40mm closed cell foam infill cut to size and shape on site as required under ridge, hip or corner flashing

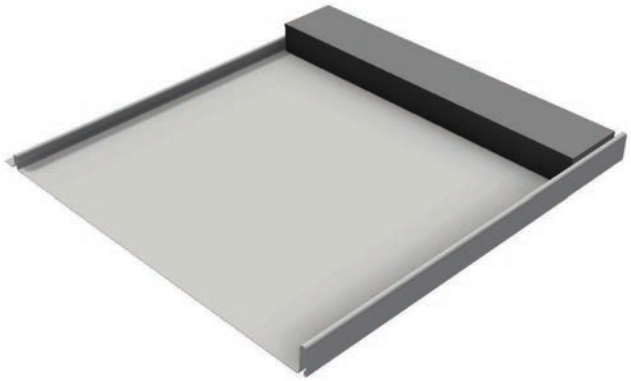
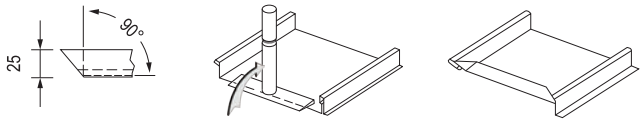


Figure 11.2.5:

Pan turn-up & turn-down details.

TYPICAL STOP END DETAIL
Stop end procedure:
1. Place plan into the panel stop end tool, the front edge of the tool must rest between the rib.
2. While maintaining pressure against the panel, rotate the stop end tool as close to 90° as possible.
3. Inspect completed bend.



Stop end detail | Panel stop end tool | Panel with stop end

TYPICAL TURN DOWN DETAIL
1. Panels requiring field hemmed ends should be fabricated 25mm longer than the finished panel length. Valley heavy duty building membrane conditions must be field cut to the appropriate angle.
2. Cut back panel joints 25mm.
3. Place protruding pan into the panel hemming tool, the front edge of the tool must rest against the notched joint legs on both sides.
4. While maintaining pressure against the panel joints, rotate the hemming tool as close to 90° as possible.

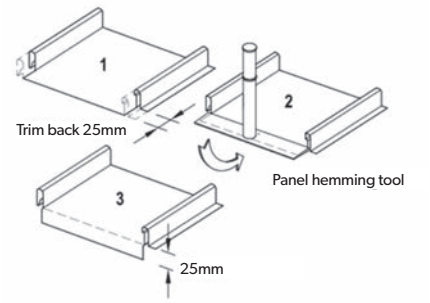
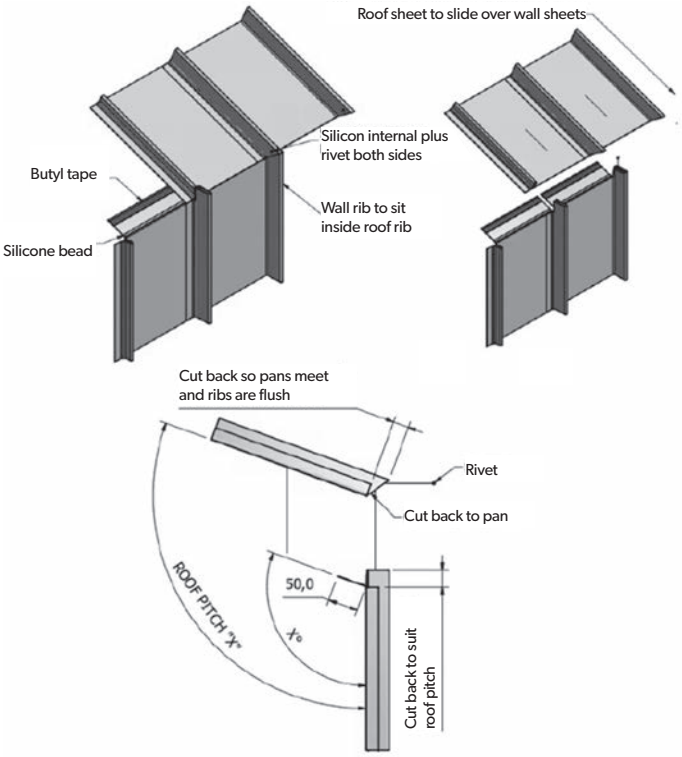


Figure 11.2.6:

Wall to roof detail.



11.3 TYPICAL CONSTRUCTION DETAILS ENSEAM®

The construction details presented here represent potential detailing solutions to common construction situations. These details may not be suitable for all projects / situations and users should use professional judgement in determining suitability of the details for their particular project whilst referencing AS 1562.1 and SA HB39. The full suite of ZENITH® constructions details are available for download from https://bimcontent.com/lysaght/ in both REVIT and PDF format.

11.3.1 ENSEAM® TYPICAL ROOF DETAILS

Figure 11.3.1.1:

Typical Roof Cladding Setout - Unsupported ENSEAM® - Plan View - E04-09

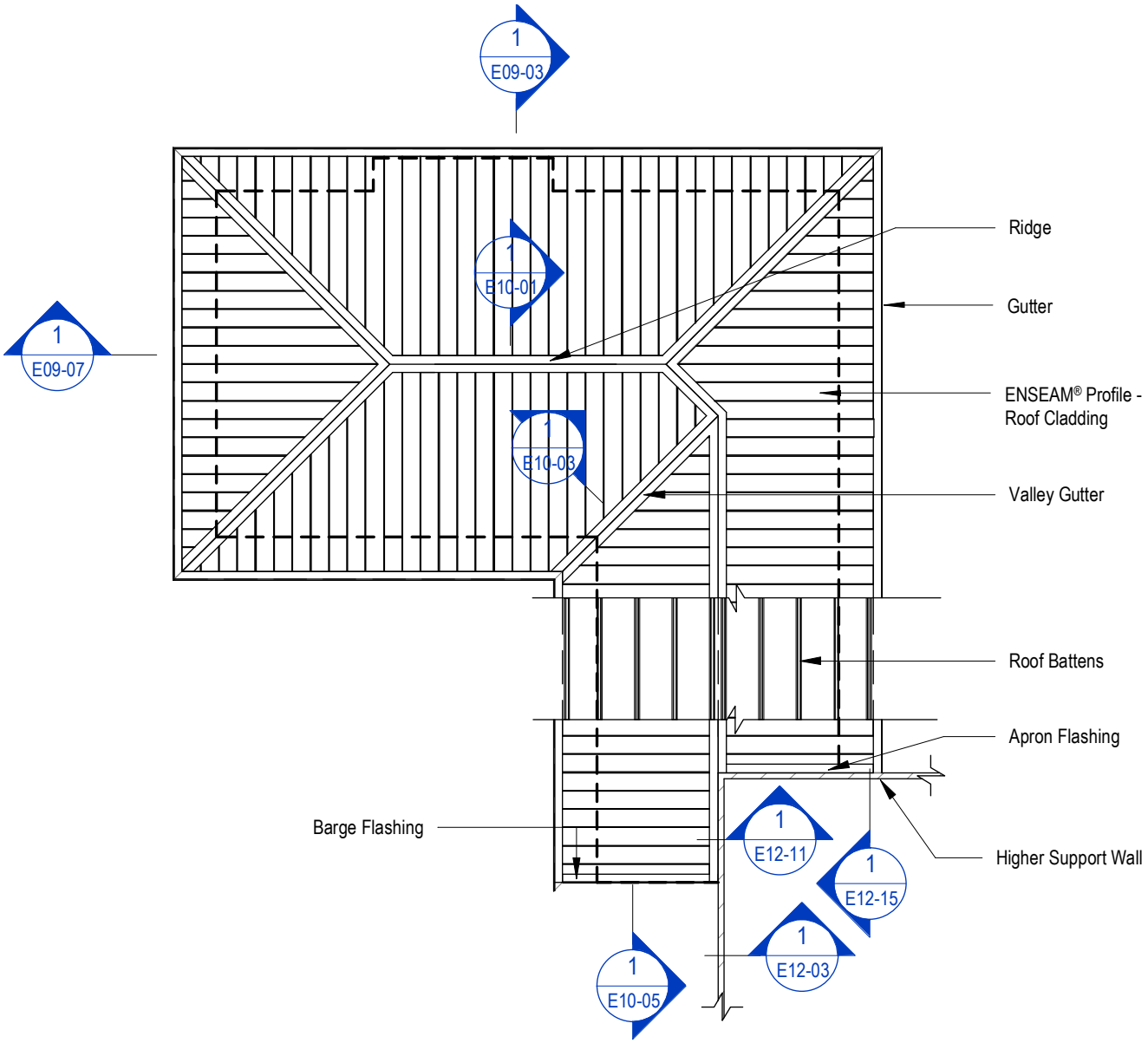


Figure 11.3.1.2:

Top of Wall Eave Detail - Zero Overhang - Unsupported ENSEAM® - Vertical Fix - E09-03

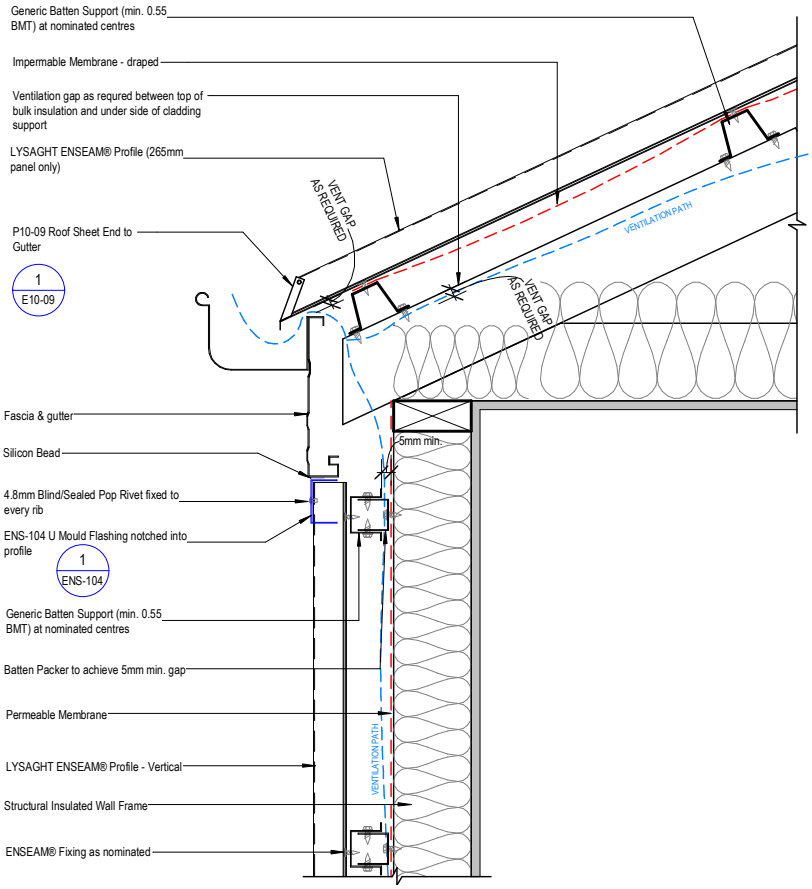


Figure 11.3.1.3:

Top of Wall Eave Detail - Overhang - Unsupported ENSEAM® - Vertical Fix - E09-07

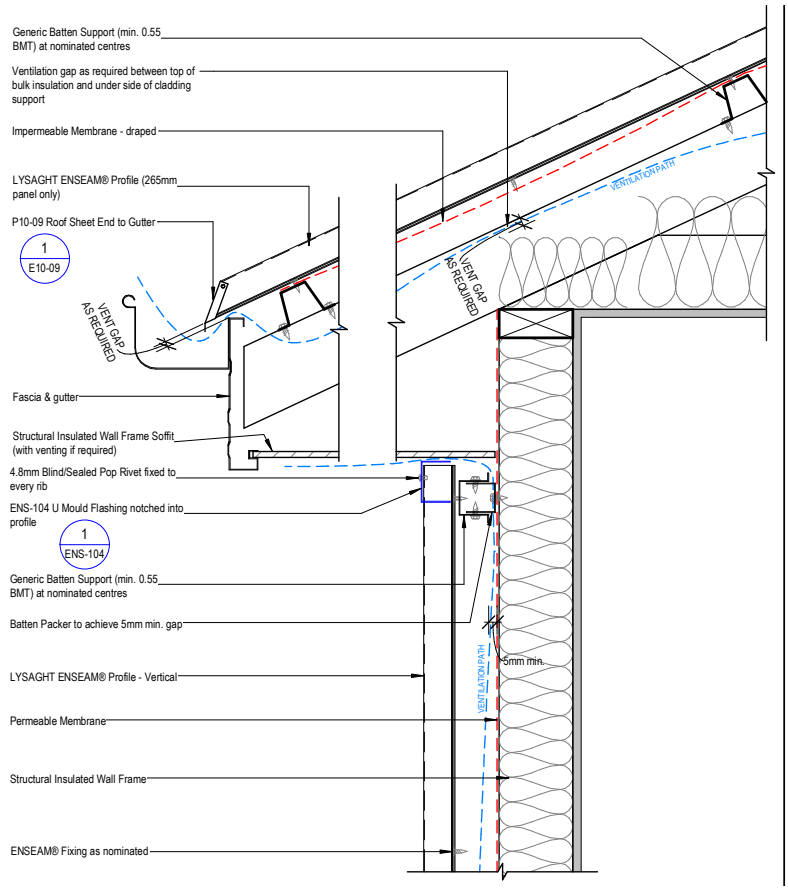


Figure 11.3.1.4:

Ridge Detail - Unsupported ENSEAM® Panel - E10-01

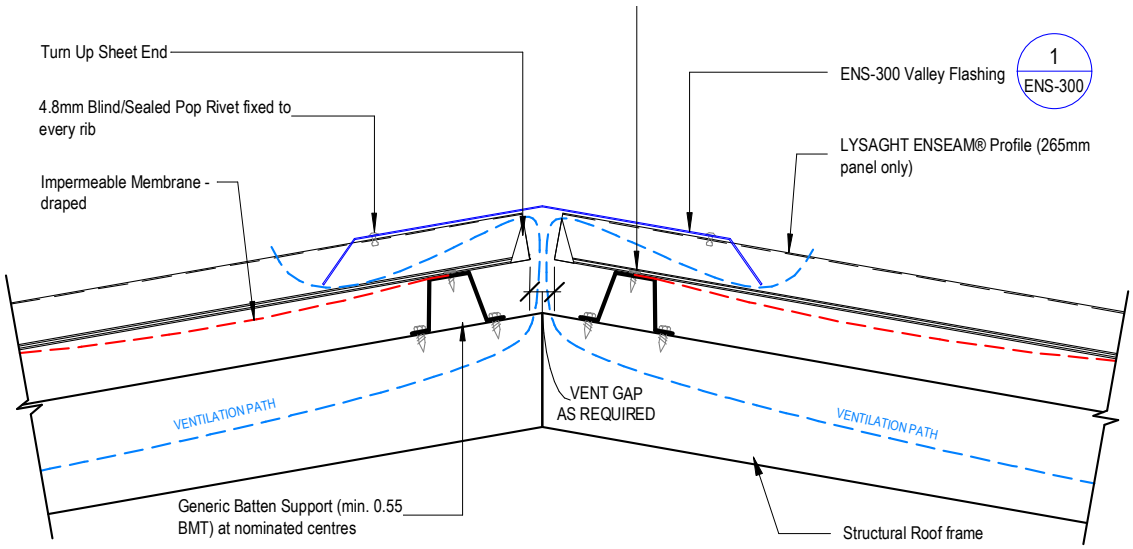


Figure 11.3.1.5:

Valley Detail - Unsupported ENSEAM® Panel - E10-03

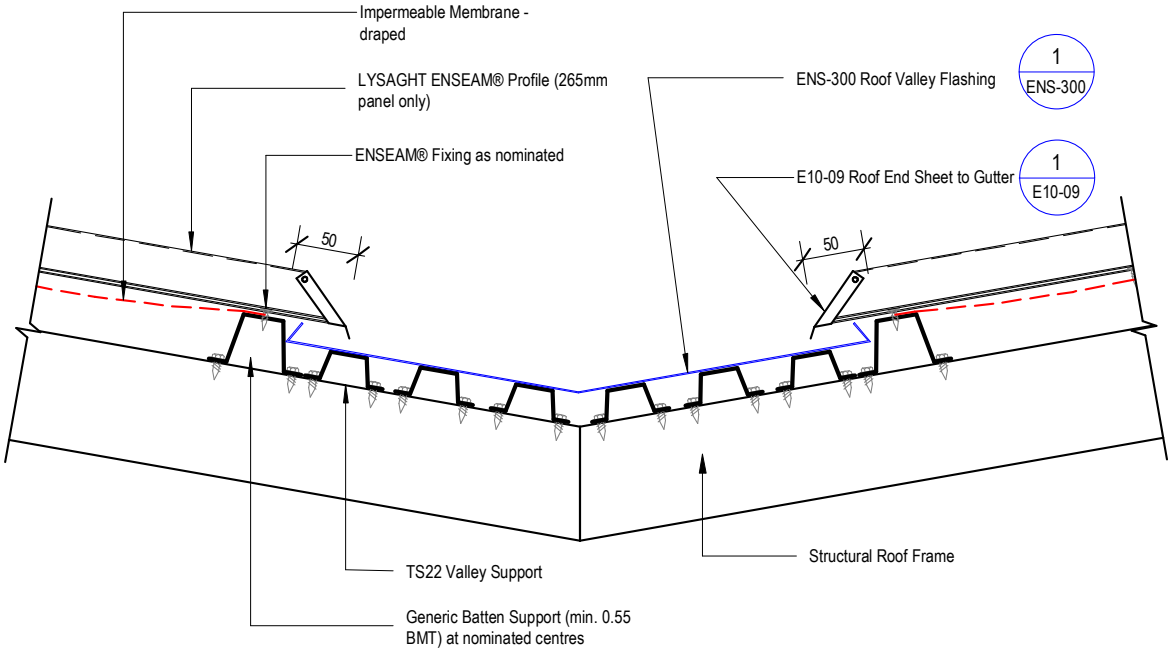


Figure 11.3.1.6:

Gable Detail - Unsupported ENSEAM® Roof and Wall - Vertical Fix - E10-05

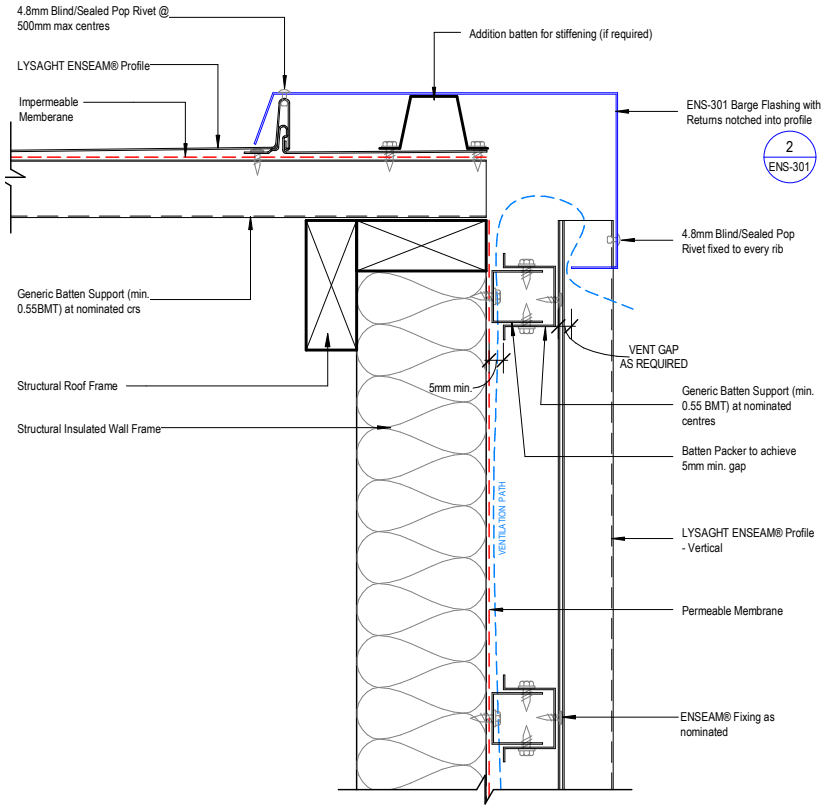


Figure 11.3.1.7:

Parapet Wall Detail - Unsupported ENSEAM® Panel - Vertical Fix - E12-03

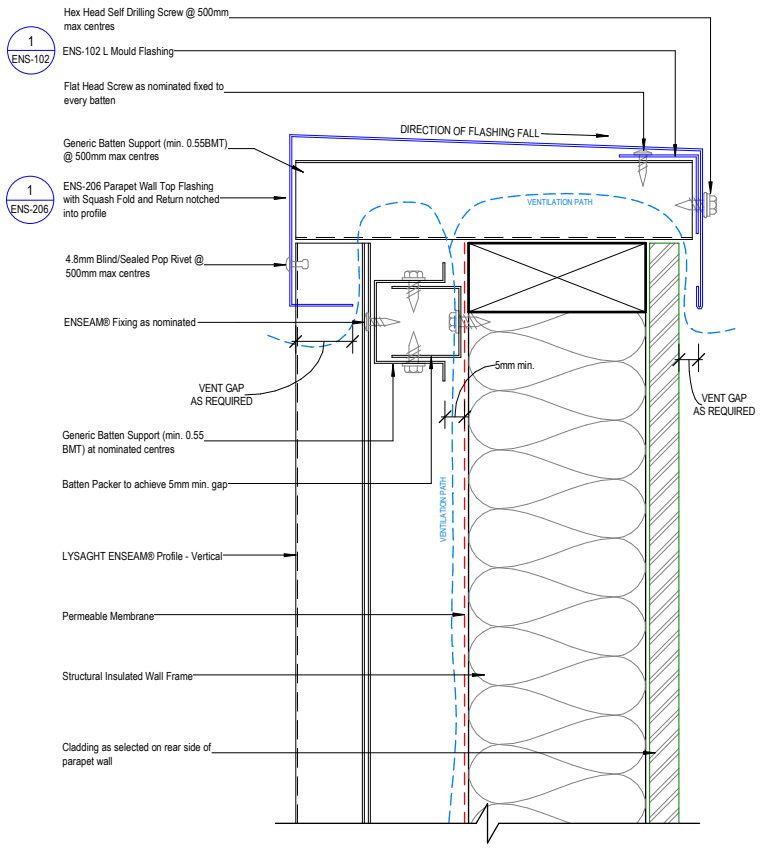


Figure 11.3.1.8:

ENSEAM® Vertical Fix wall to ENSEAM® roof - Unsupported - Side View - E12-11

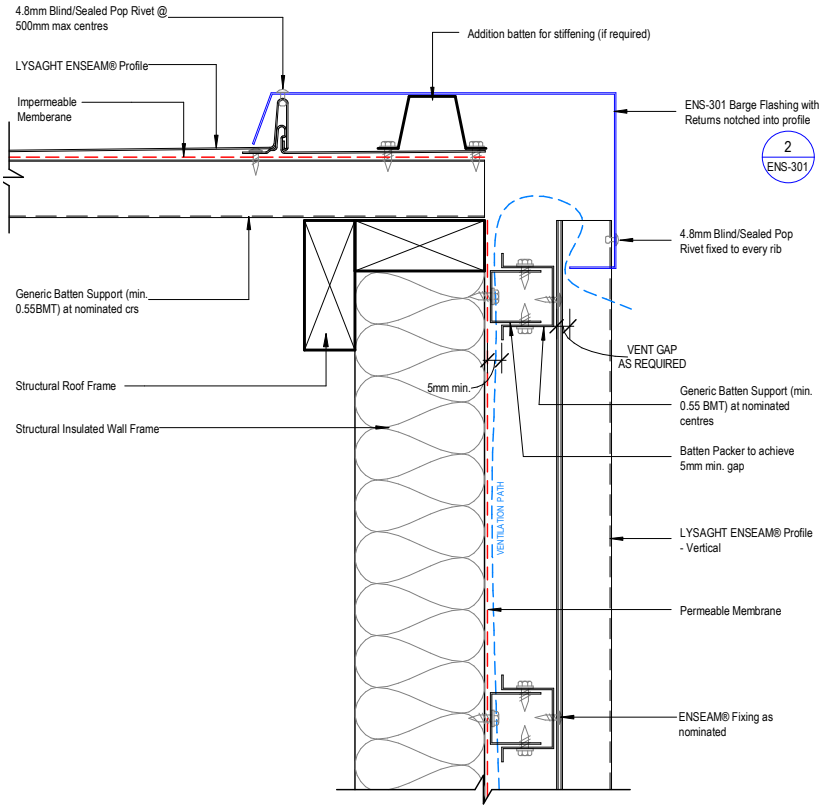
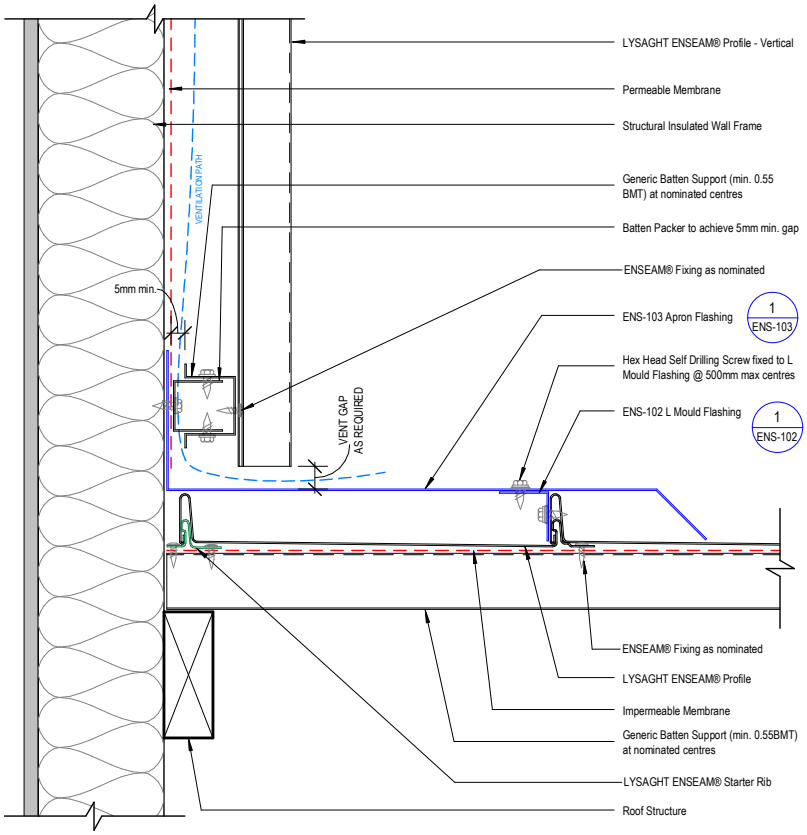


Figure 11.3.1.9:

ENSEAM® Vertical Fix Wall to ENSEAM® Roof - Unsupported - End View - E12-15



11.3.2 ENSEAM® TYPICAL WALL DETAILS - HORIZONTAL FIX

Figure 11.3.2.1:

Typical Wall Cladding Setout - Unsupported ENSEAM® Panel Horizontal Fix - Plan View - E04-01

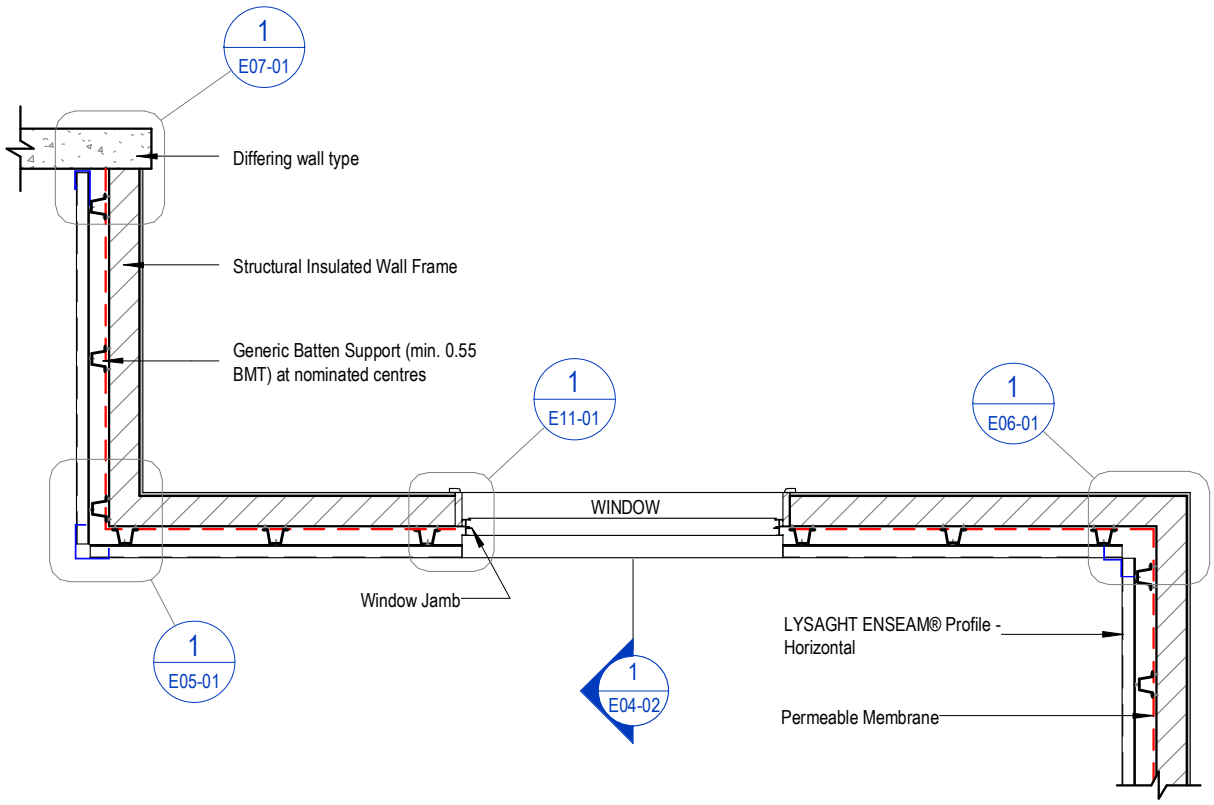


Figure 11.3.2.2:

Typical Wall Cladding Setout - Unsupported ENSEAM® - Horizontal Fix - Sectional View - E04-02

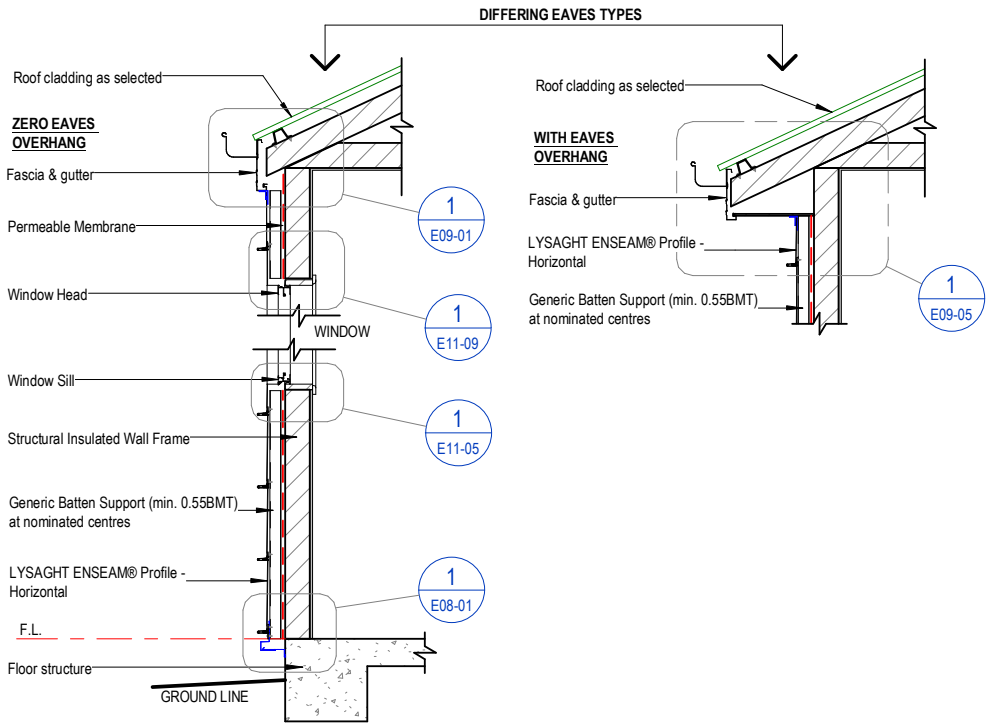


Figure 11.3.2.3:

External Corner Detail - Unsupported ENSEAM® Panel - Horizontal Fix - E05-01

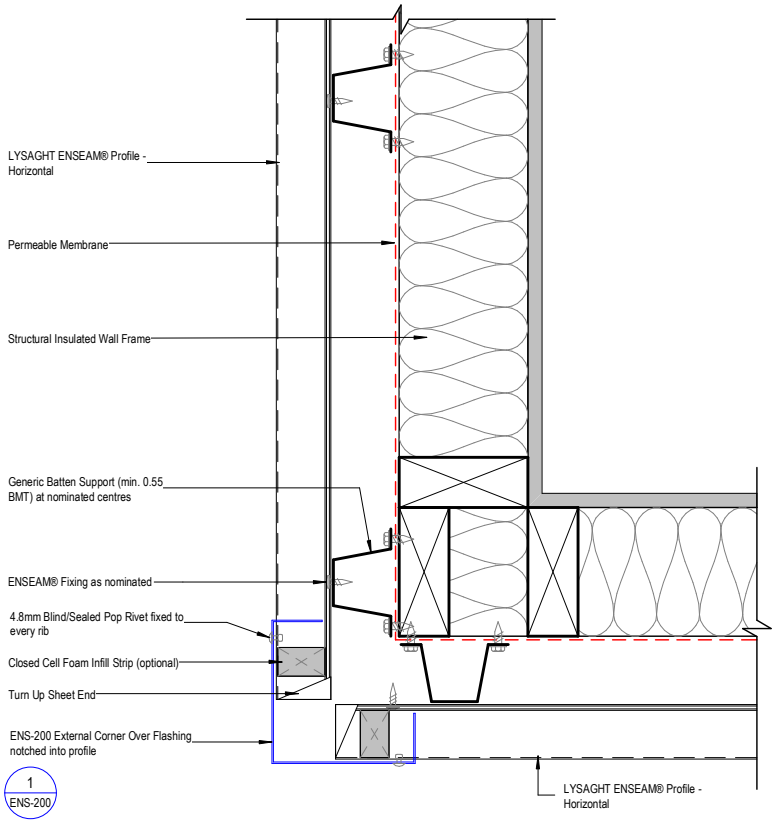


Figure 11.3.2.4:

Internal Corner Detail - Unsupported ENSEAM® Panel - Horizontal Fix - E06-01

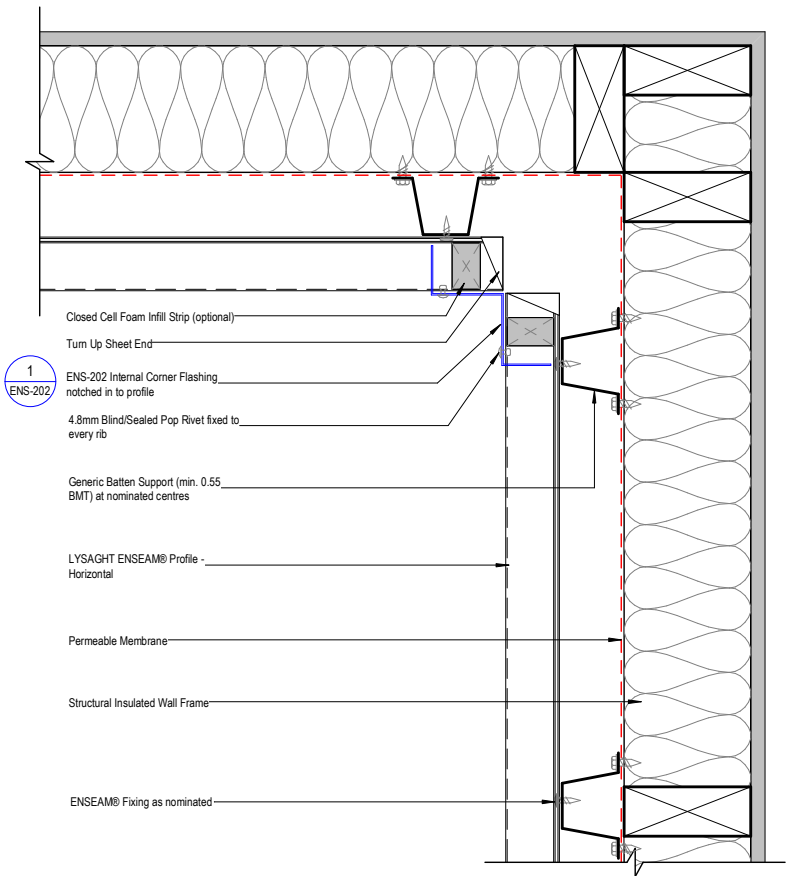


Figure 11.3.2.5:

Wall Closure Detail - Unsupported ENSEAM® Panel - Horizontal Fix - E07-01

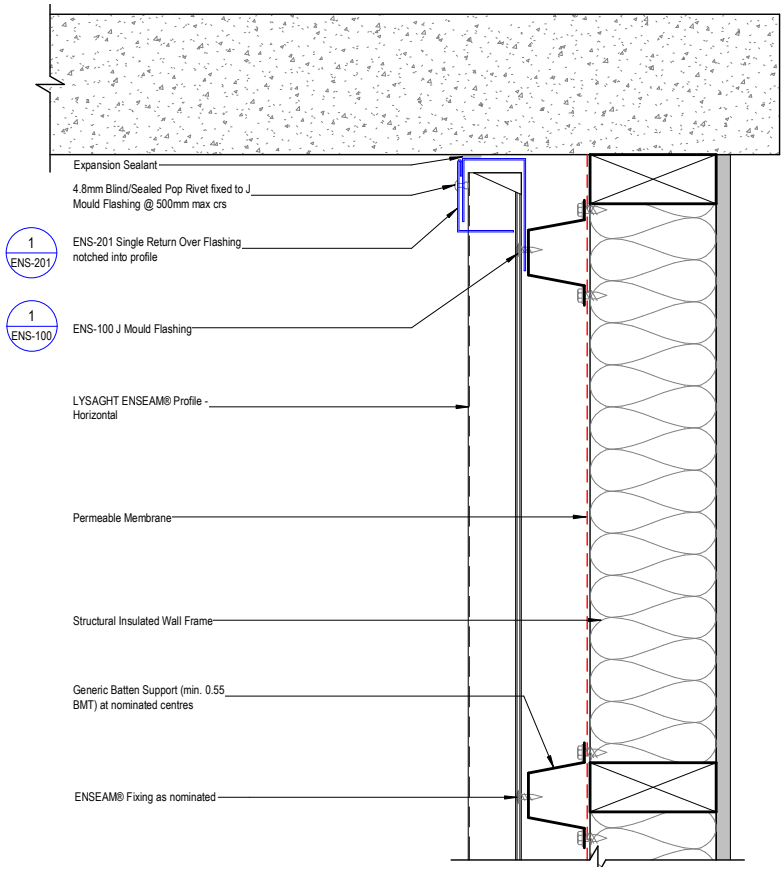


Figure 11.3.2.6:

Window Jamb Detail - Unsupported ENSEAM® Panel - Horizontal Fix - E11-01

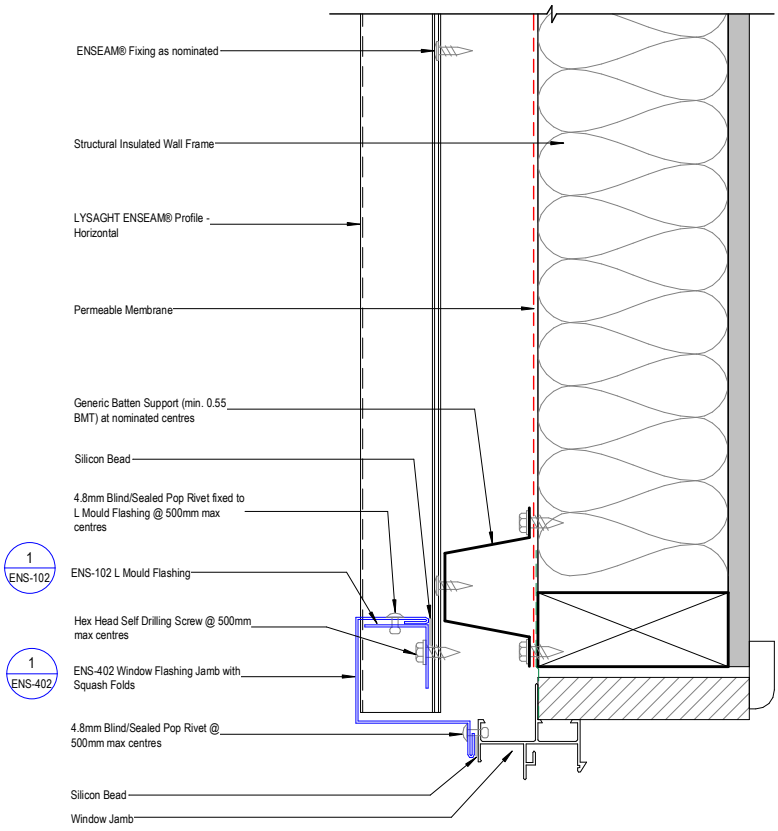


Figure 11.3.2.7:

Wall Base Detail - Unsupported ENSEAM® Panel - Horizontal Fix - E08-01

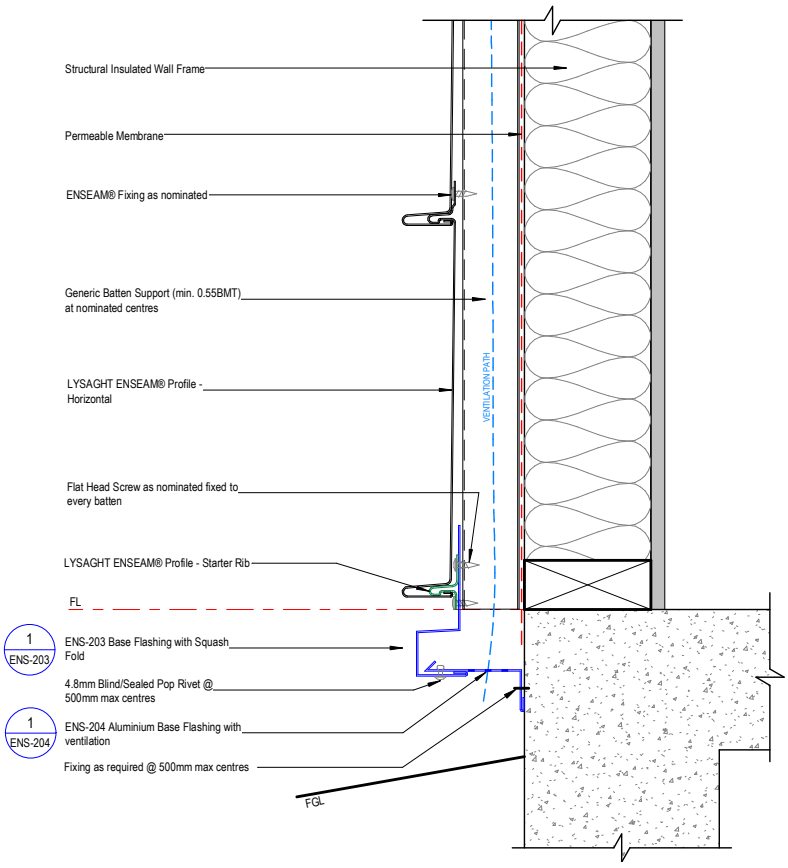


Figure 11.3.2.8:

Top of Wall - Zero Overhang - Unsupported ENSEAM® - Horizontal Fix - E09-01

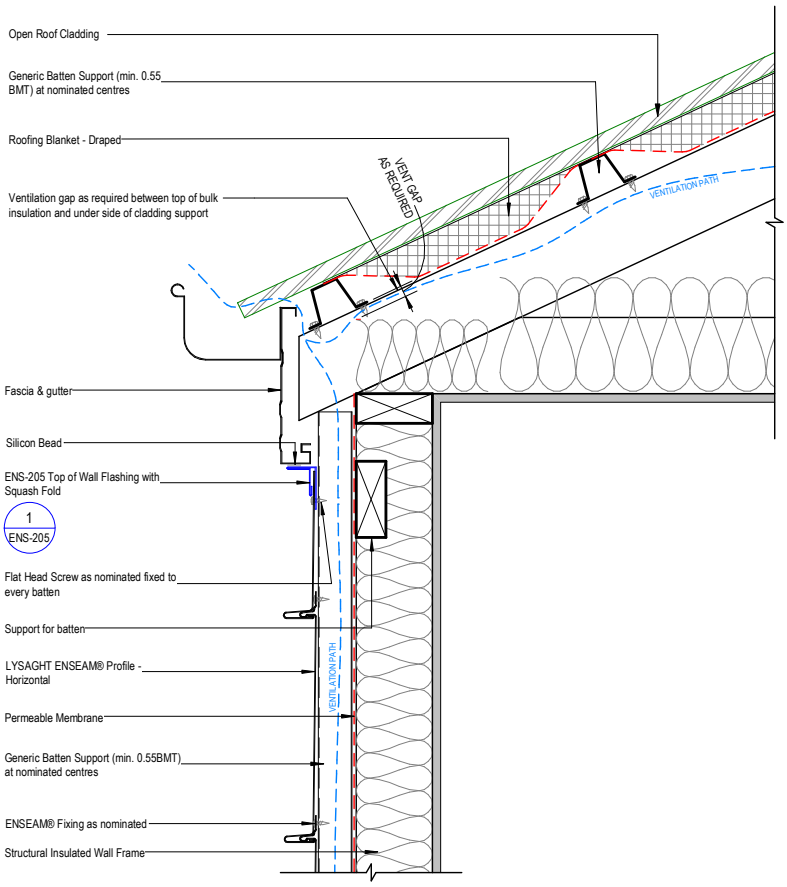


Figure 11.3.2.9:

Top of Eave Detail - Overhang - Unsupported ENSEAM® Panel - Horizontal Fix - E09-05

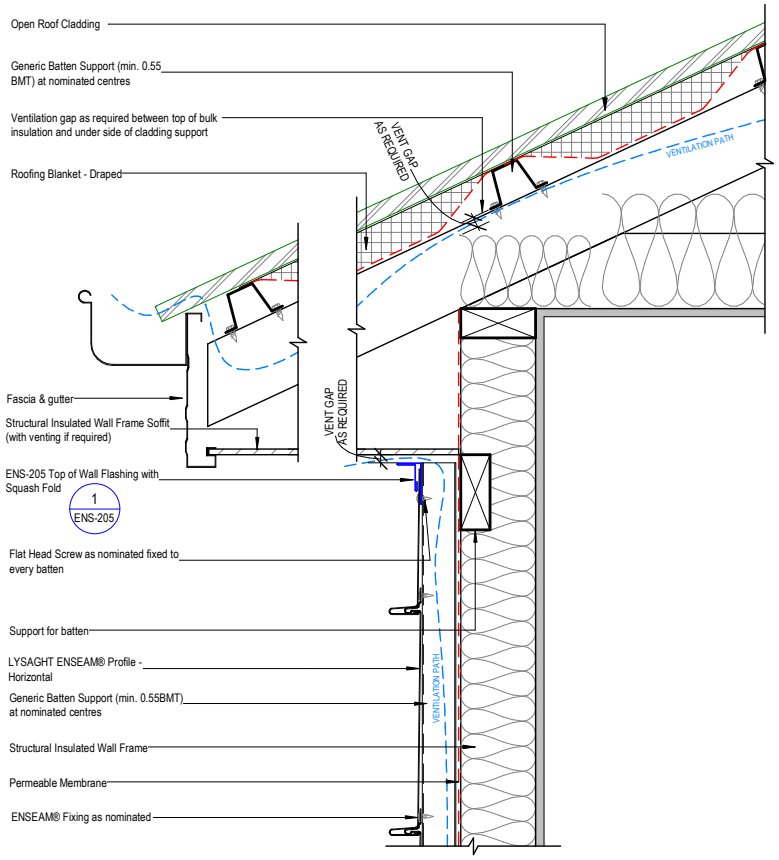


Figure 11.3.2.10:

Window Sill Detail - Unsupported ENSEAM® Panel - Horizontal Fix - E11-05

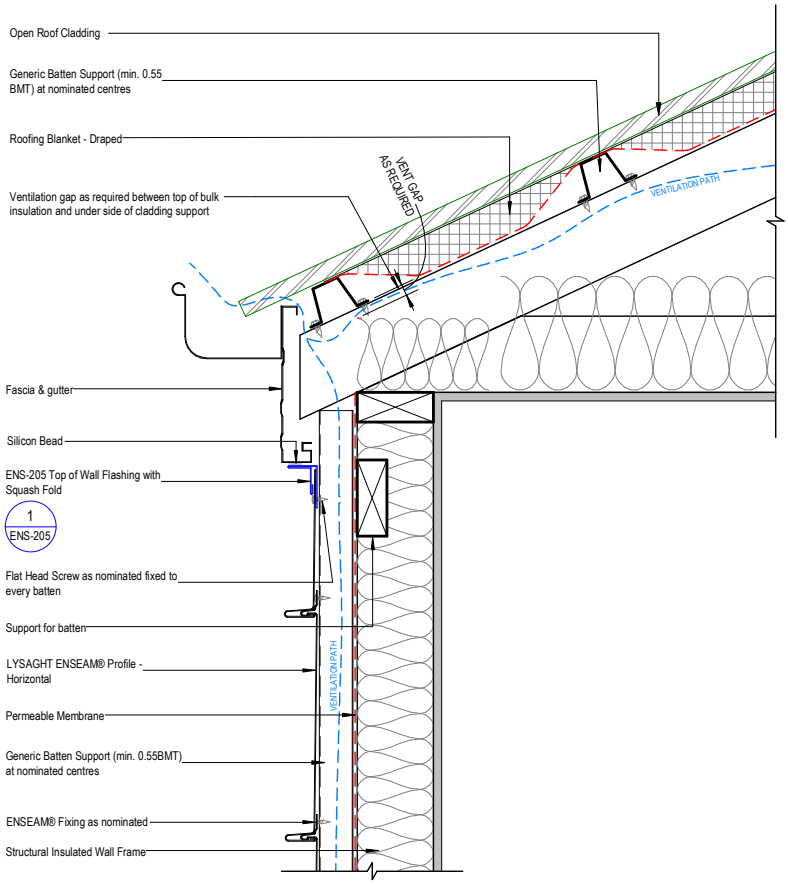
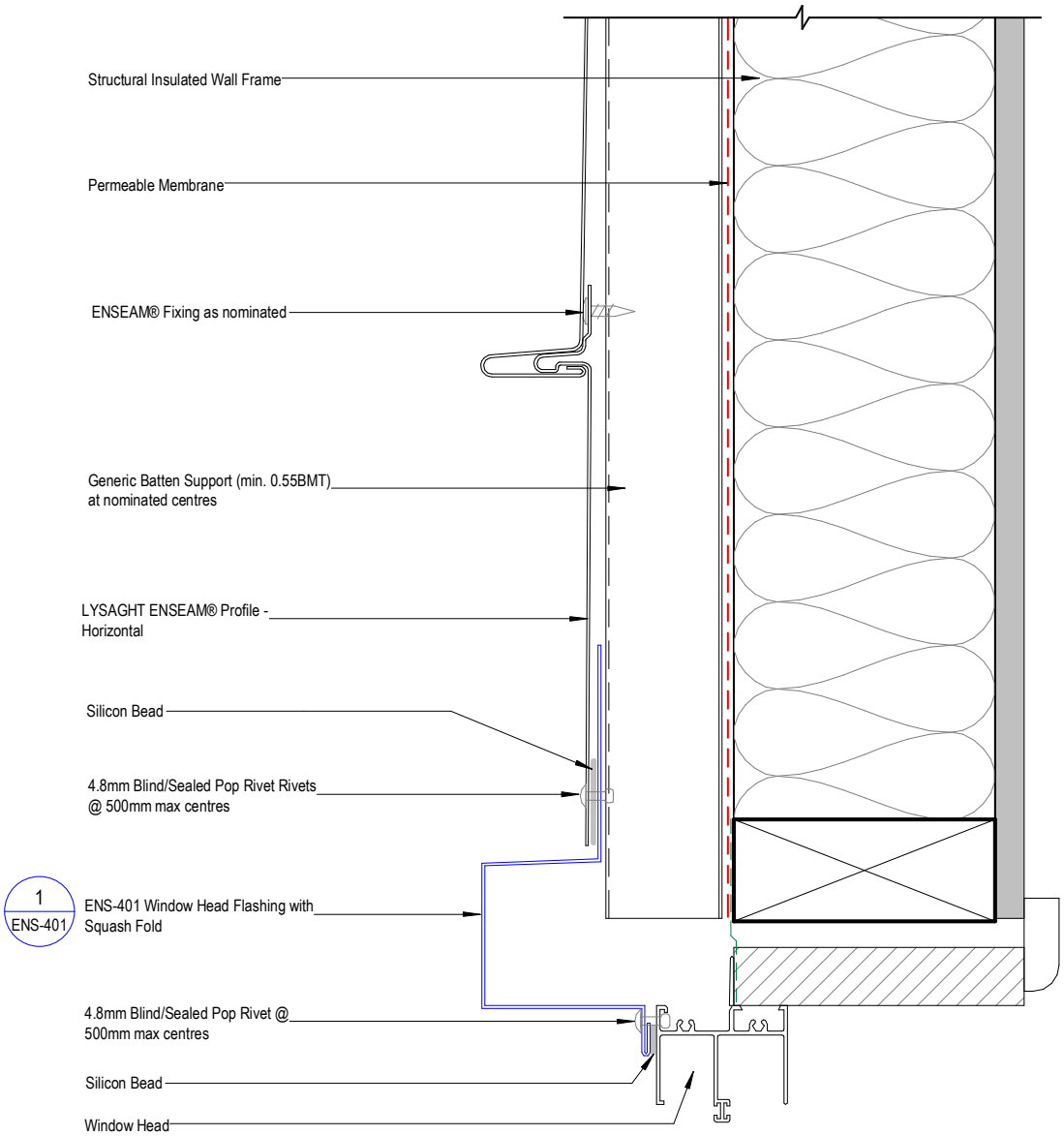


Figure 11.3.2.11:

Window Head Detail - Unsupported ENSEAM® Panel - Horizontal Fix - E11-09



11.3.3 ENSEAM® TYPICAL WALL DETAILS - VERTICAL FIX

Figure 11.3.3.1:

Typical Wall Cladding Setout - Unsupported ENSEAM® Vertical Fix - Plan View - E04-05

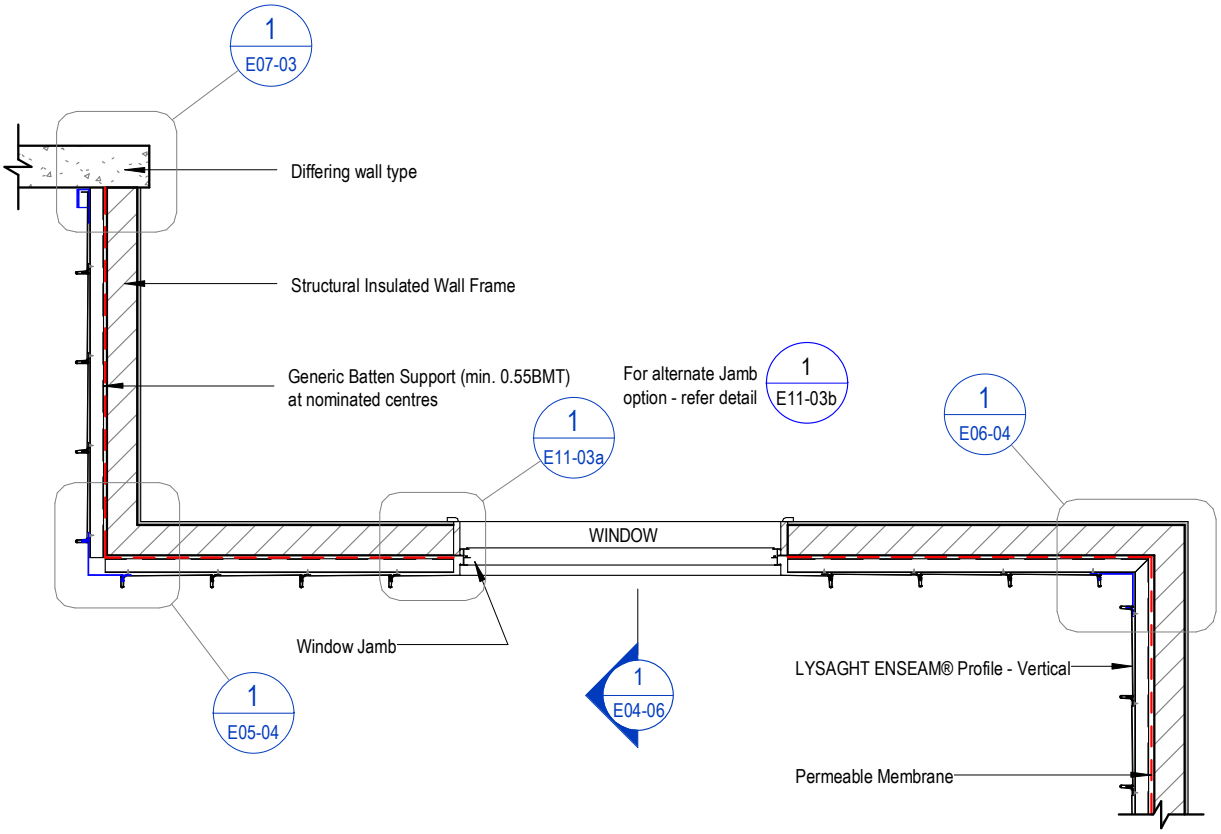


Figure 11.3.3.2:

Typical Wall Cladding Setout - Unsupported ENSEAM® - Vertical Fix - Sectional View - E04-06

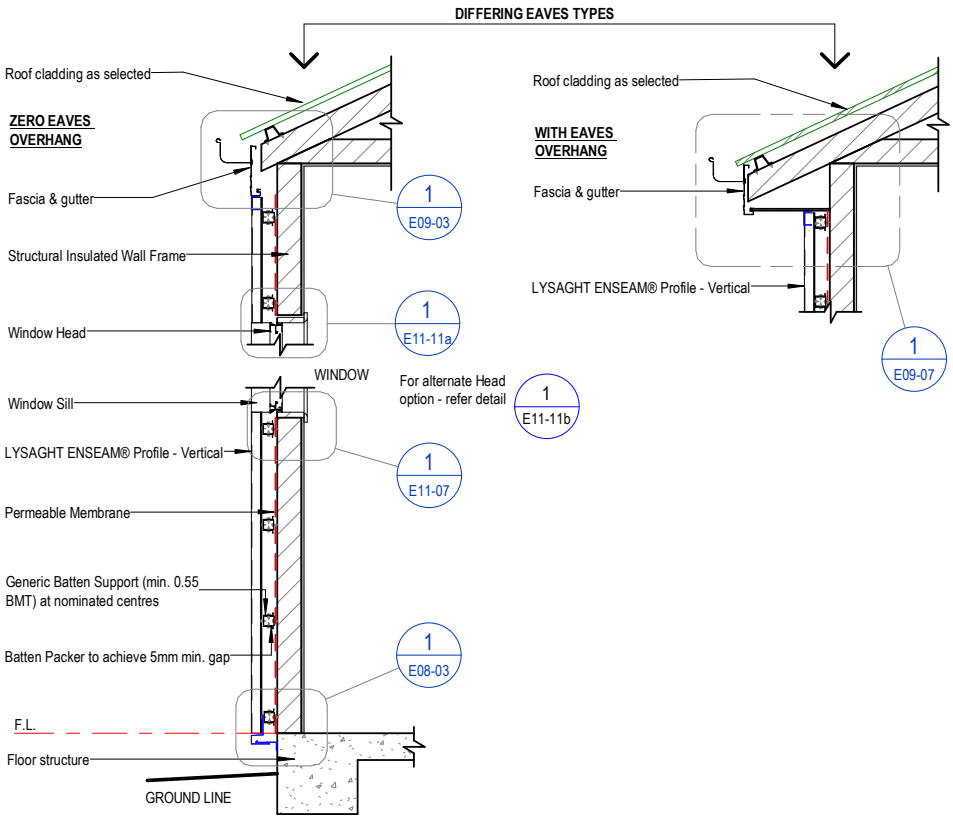


Figure 11.3.3.3:

External Corner Detail - Unsupported ENSEAM® Panel - Vertical Underlap Underlap - E05-04

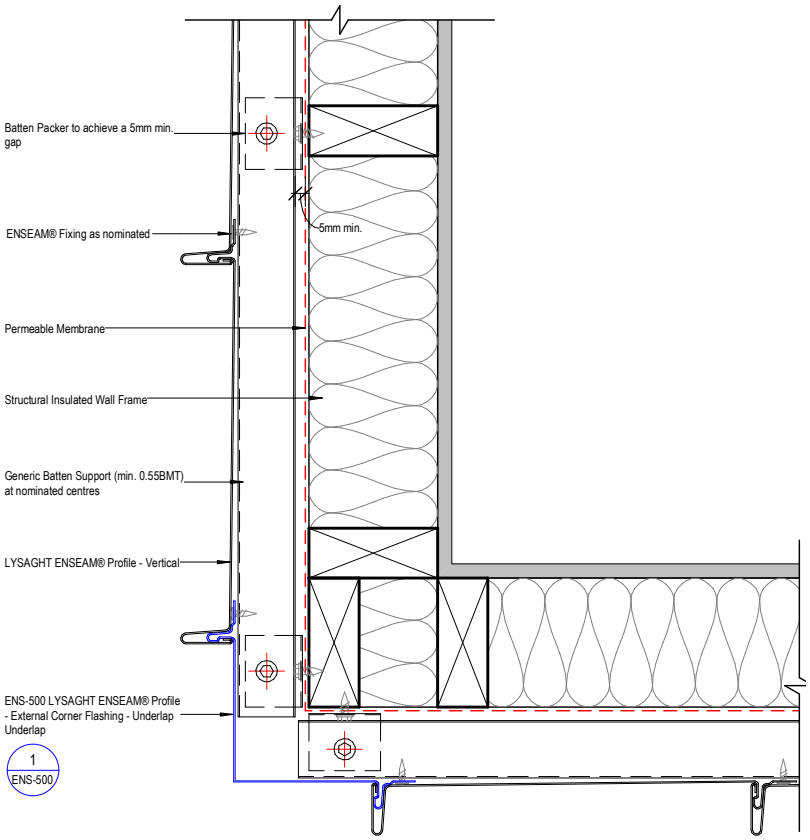


Figure 11.3.3.4:

Internal Corner Detail - Unsupported ENSEAM® Panel - Vertical Underlap Underlap - E06-04

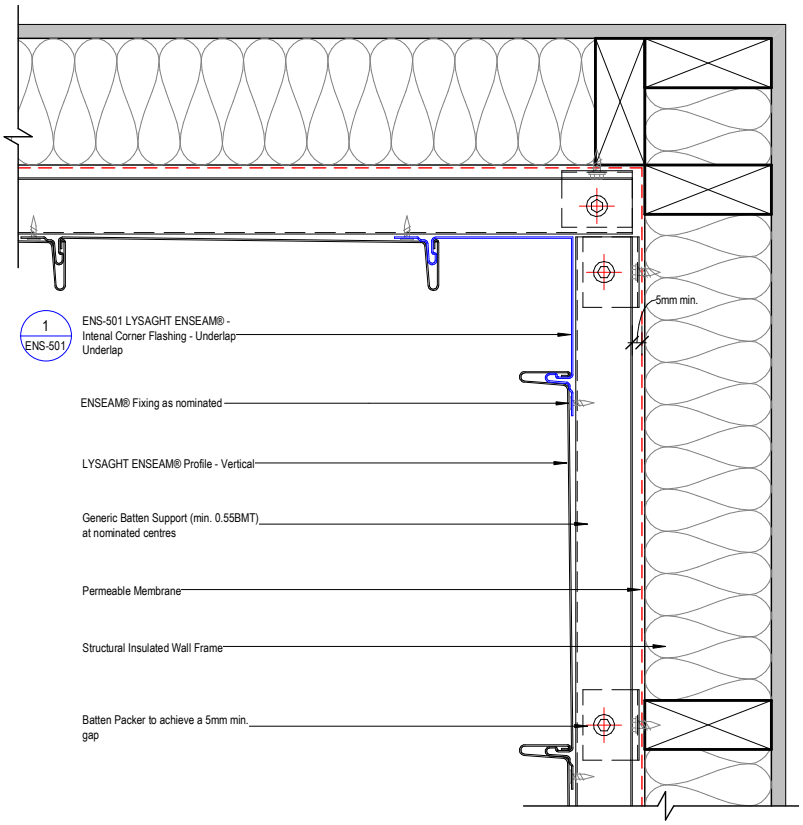


Figure 11.3.3.5:

Wall Closure Detail - Unsupported ENSEAM® Panel - Vertical Fix - E07-03

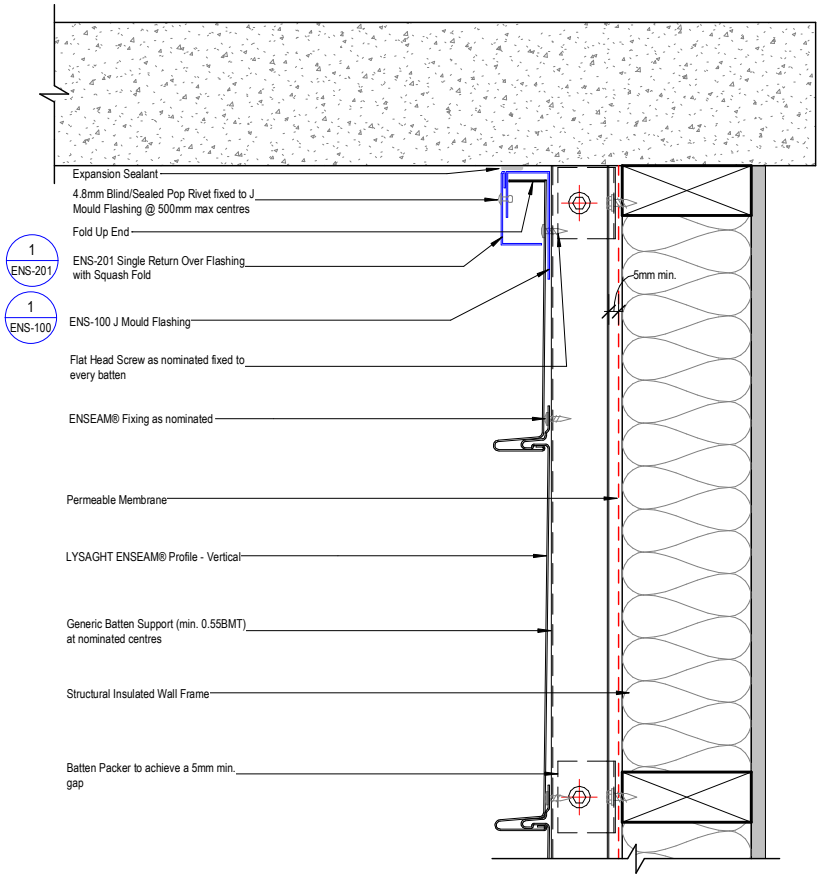


Figure 11.3.3.6:

Window Jamb Detail - Unsupported ENSEAM® Panel - Vertical Fix Option 1 - E11-03a

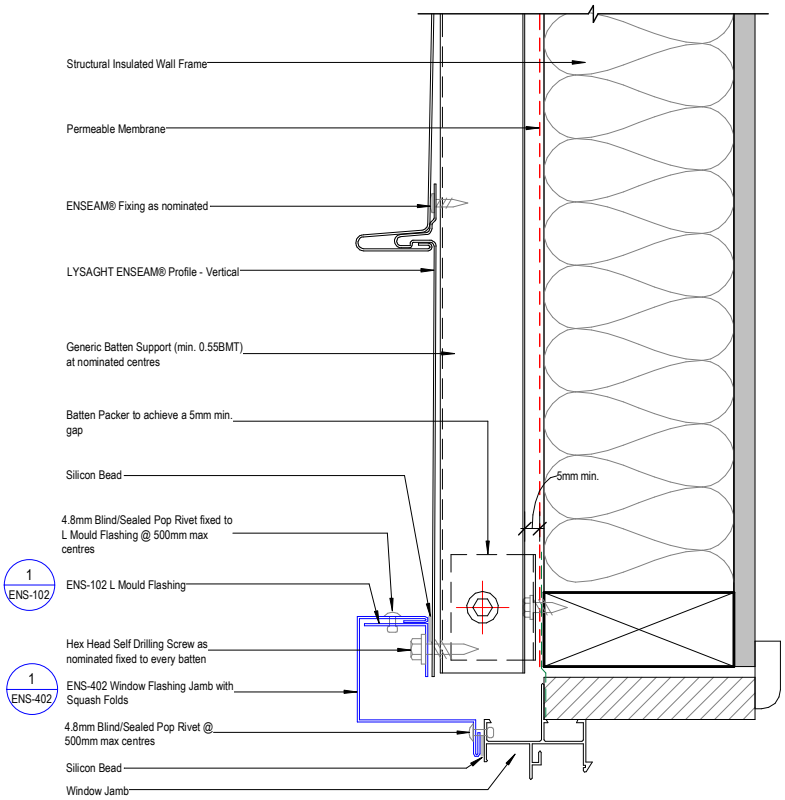


Figure 11.3.3.7:

Window Jamb Detail - Unsupported ENSEAM® Panel - Vertical Fix Option 2 - E11-03b

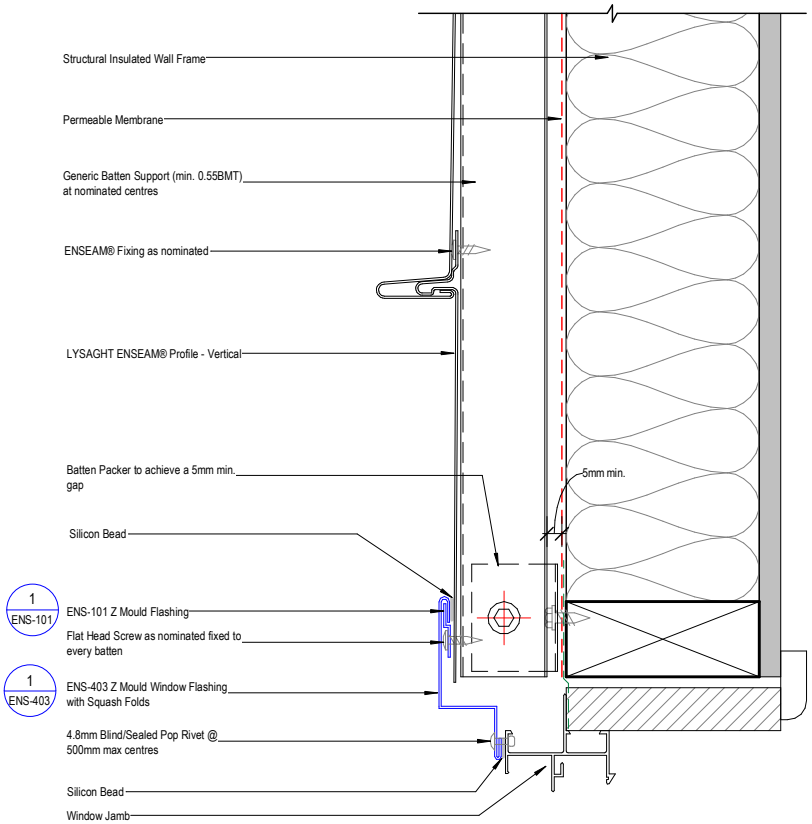


Figure 11.3.3.8:

Wall Base Detail - Unsupported ENSEAM® Panel - Vertical Fix - E08-03

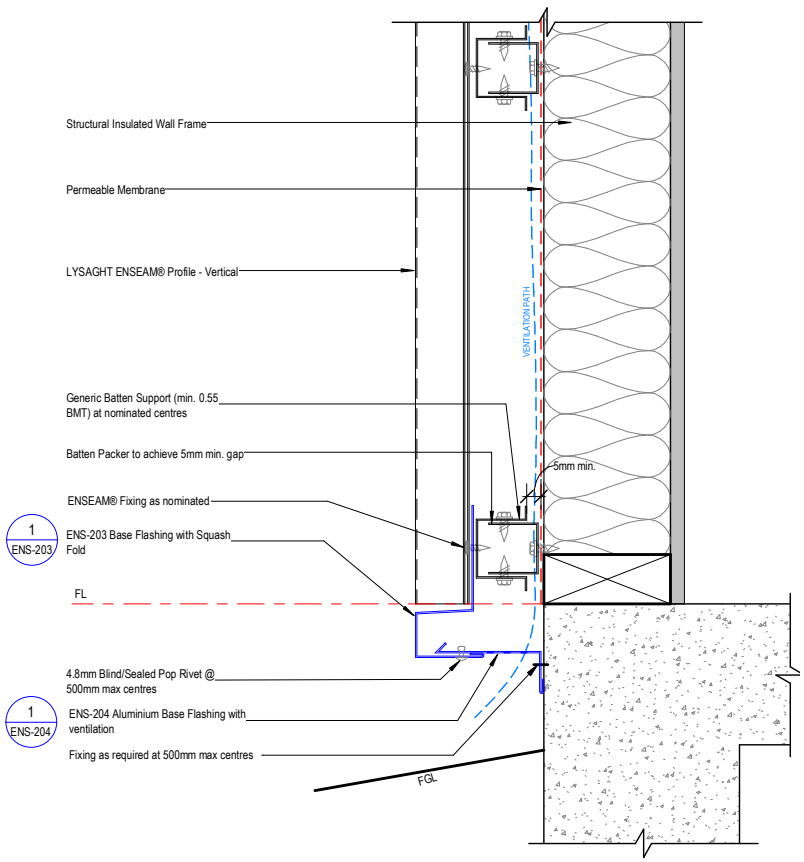


Figure 11.3.3.9:

Top of Wall Eave Detail - Zero Overhang - Unsupported ENSEAM® Panel - Vertical Fix - E09-03

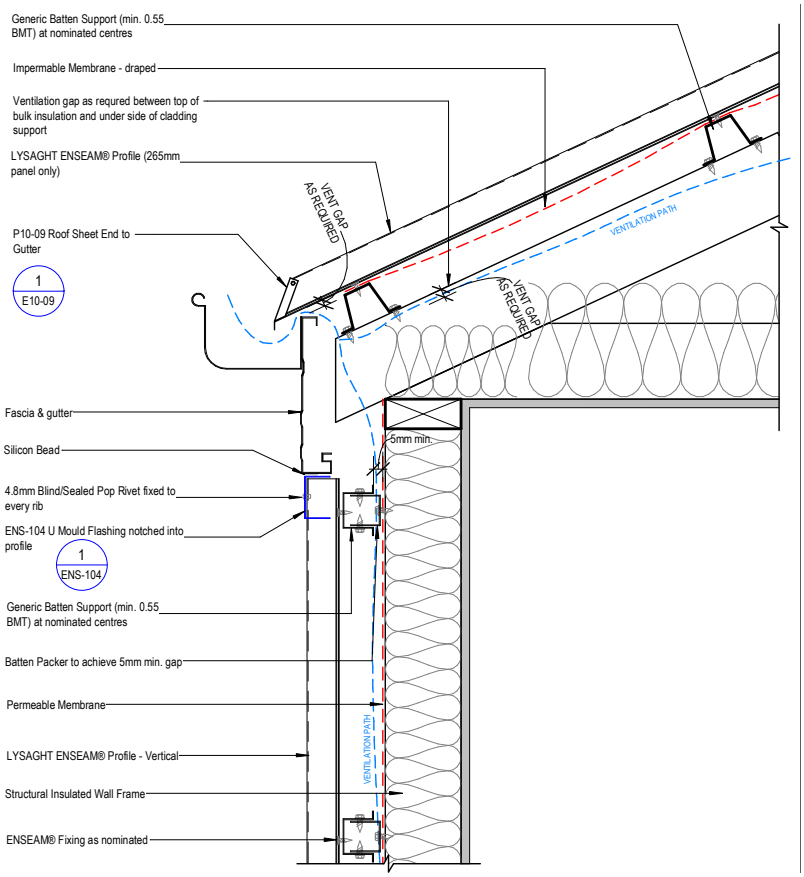


Figure 11.3.3.10:

Top of Wall Eave Detail - Overhang - Unsupported ENSEAM® Panel - Vertical Fix - E09-07

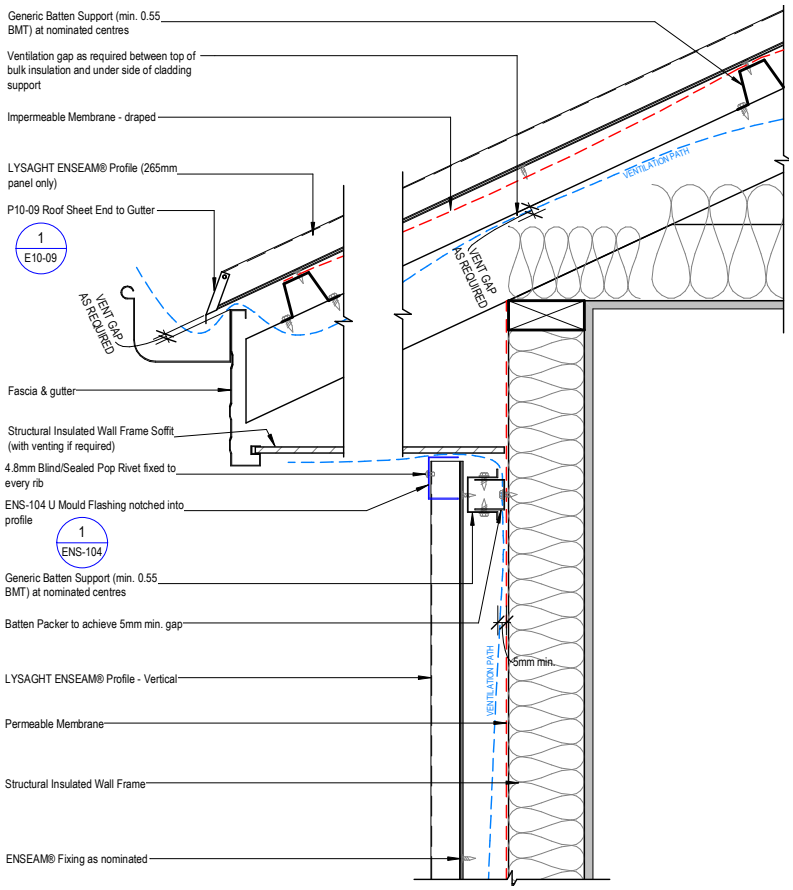


Figure 11.3.3.11:

Window Sill Detail - Unsupported ENSEAM® Panel - Vertical Fix - E11-07

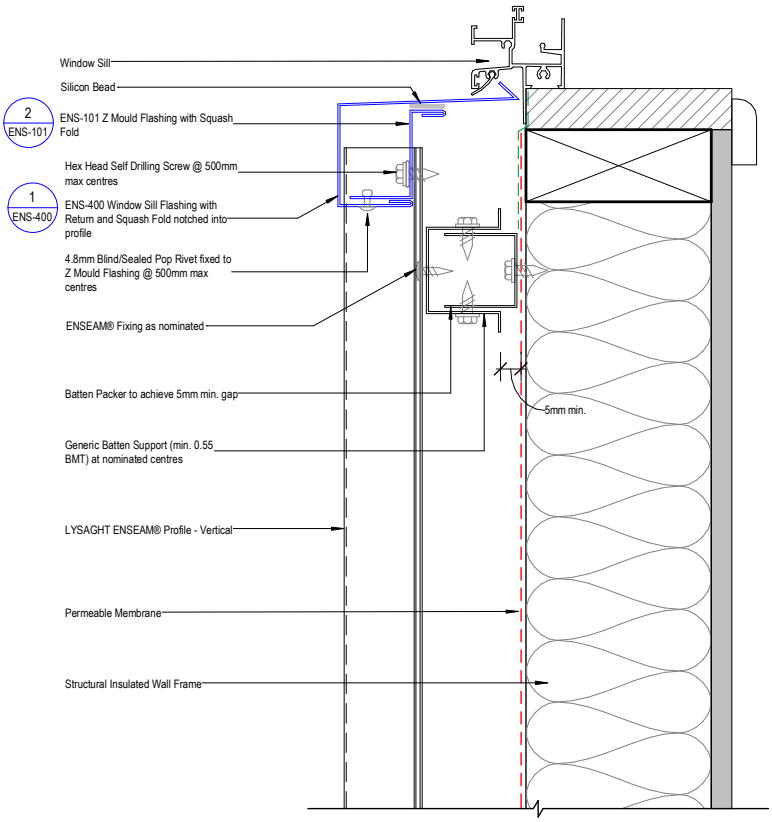


Figure 11.3.3.12:

Window Head Detail - Unsupported ENSEAM® Panel - Vertical Fix Option 1 - E11-11a

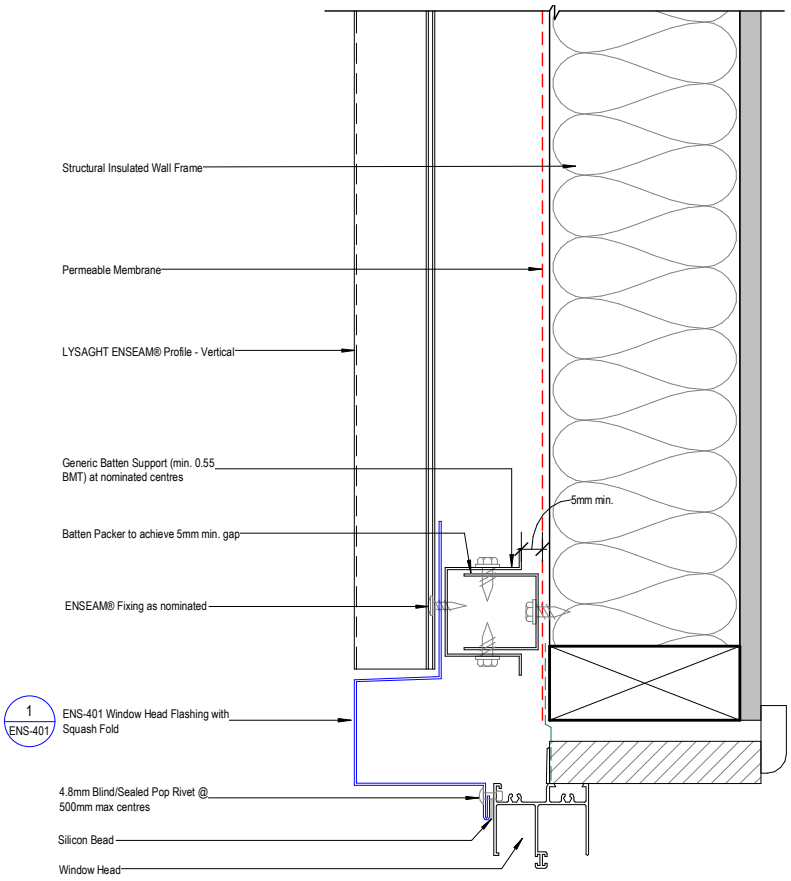
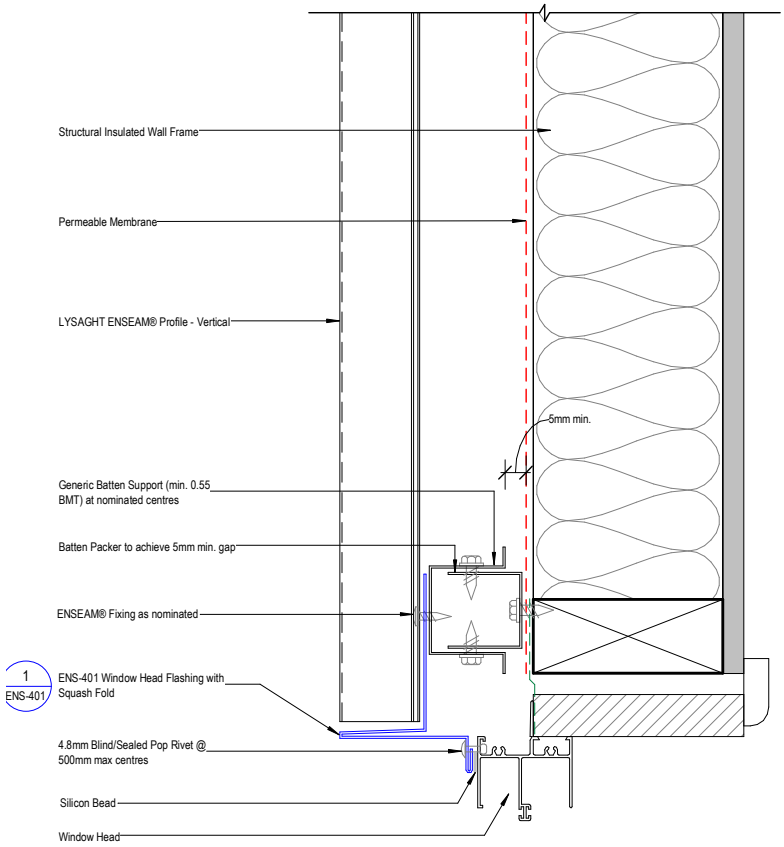


Figure 11.3.3.13:

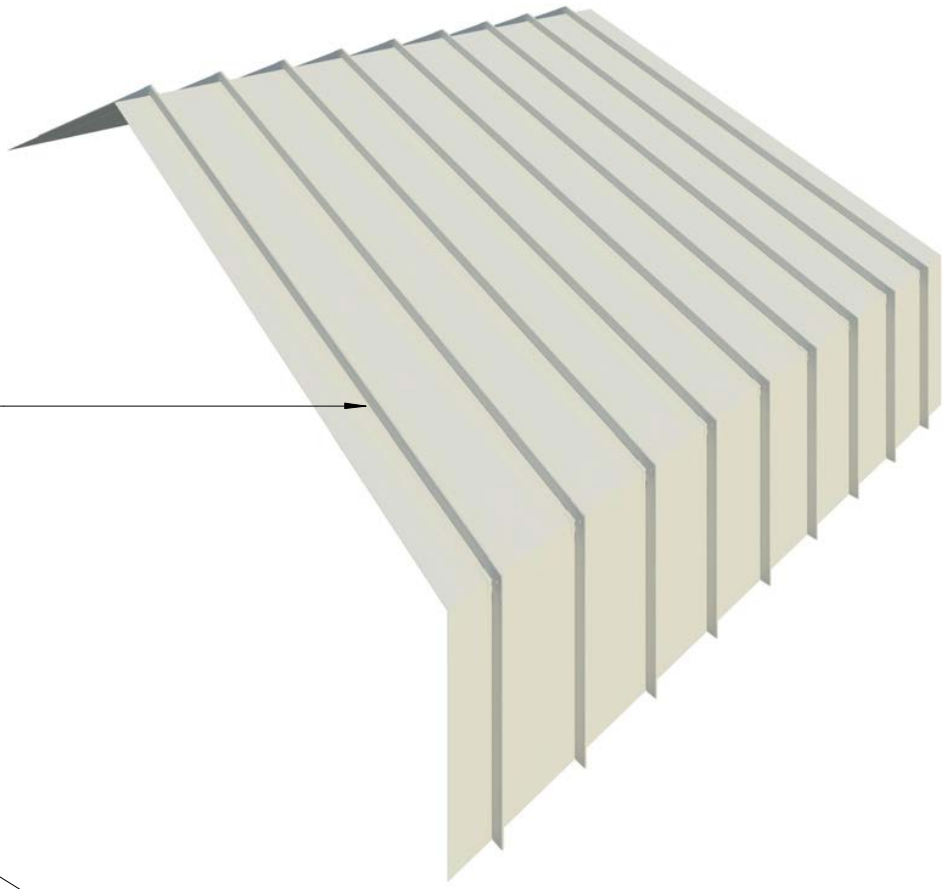
Window Head Detail - Unsupported ENSEAM® Panel - Vertical Fix Option 2 - E11-11b



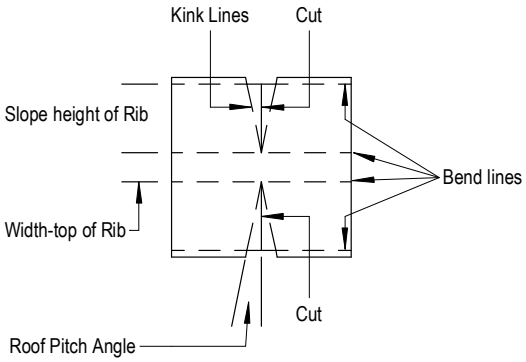
11.3.4 ENSEAM® MANSARD ROOF / WALL

Figure 11.3.4.1:

ENSEAM® Mansard Roof - E12-21



Continuous sheeting. Mansard roof with trays bent and the cut ribs waterproofed with sealed rib caps.



A / _ E12-21 - Development of Cap

1 : 1

A / E12-21 Development Cap



Apply recommended sealant inside ends and along bottom of cap. Place in postiton over opened rib and fasten with four 4mm blind rivets.

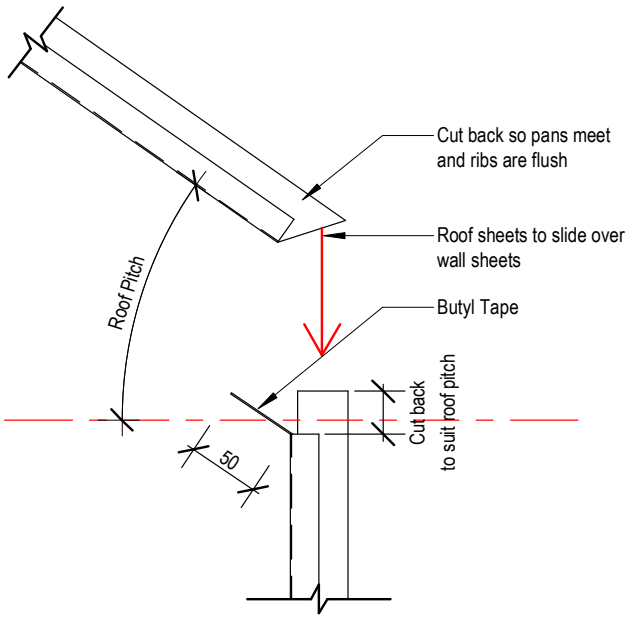
Figure 11.3.4.2:

ENSEAM® Mansard Roof to Wall Connection - E12-22

STEP 1

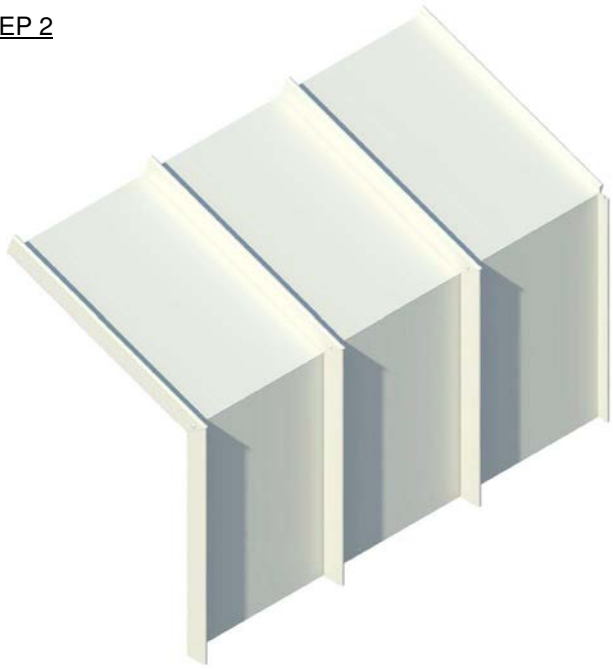


3D VIEW

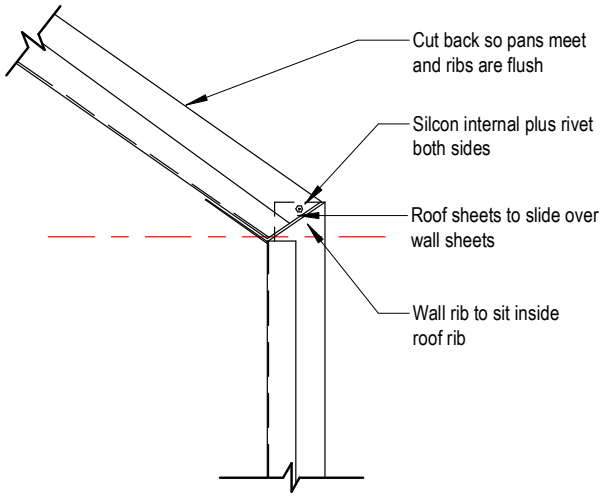


SECTION

STEP 2



3D VIEW

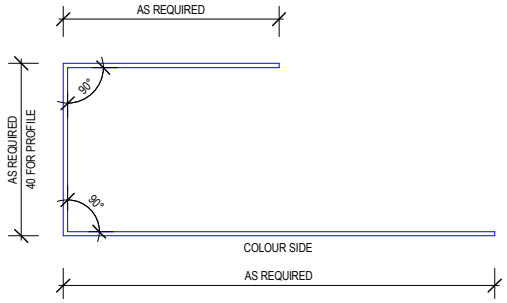


SECTION

11.3.5 ENSEAM® TYPICAL FLASHINGS

Figure 11.3.5.1:

ENS-100 - J Mould Flashings



ENS - J Mould Flashing with Squash Fold

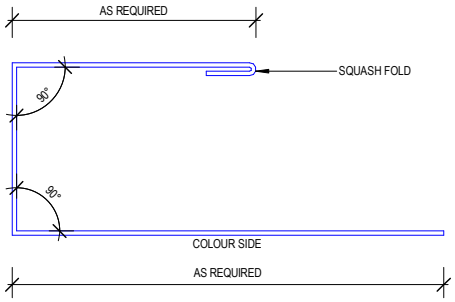
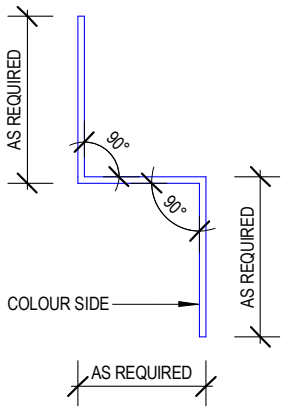


Figure 11.3.5.2:

ENS-101 - Z Mould Flashings



ENS-101 - Z Mould Flashing with Squash Fold

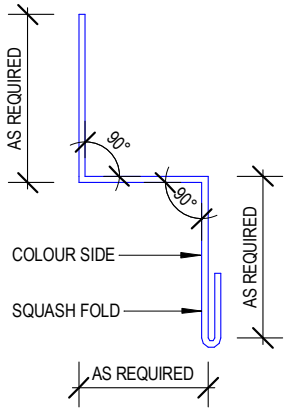
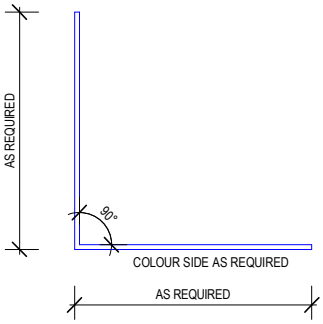
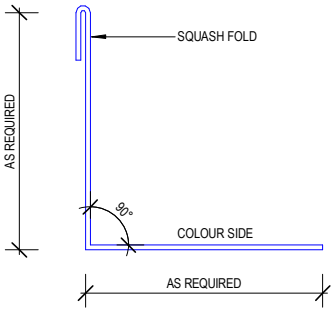


Figure 11.3.5.3:

ENS-102 - L Mould Flashings



ENS-102 - L Mould Flashing with 1 Squash Fold



ENS-102 - L Mould Flashing with Squash Folds

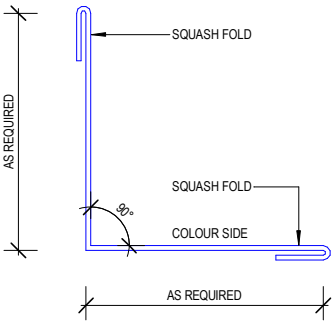
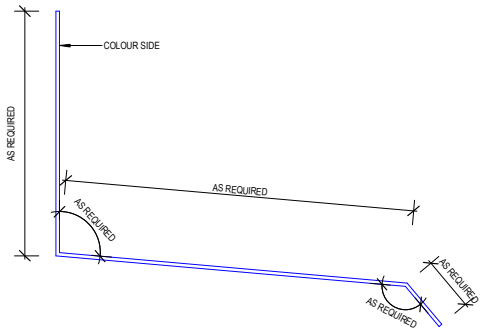


Figure 11.3.5.4:

ENS-103 - Apron Flashings



ENS-103 - Apron Flashing with Squash Fold

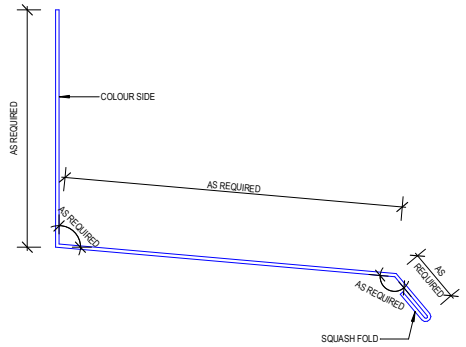


Figure 11.3.5.5:

ENS-104 - U Mould Flashing

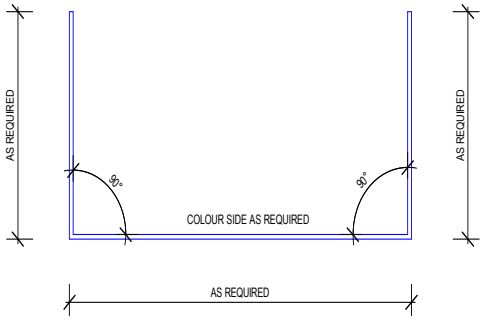


Figure 11.3.5.6:

ENS-200 - External Corner Over Flashing

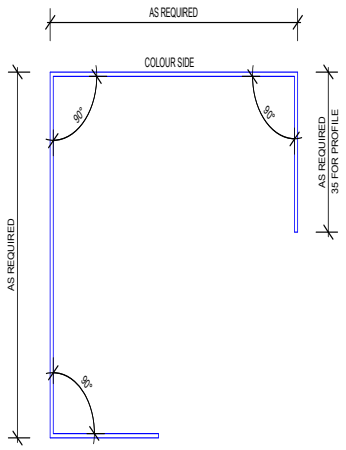


Figure 11.3.5.7:

ENS-201 - Single Return Over Flashing

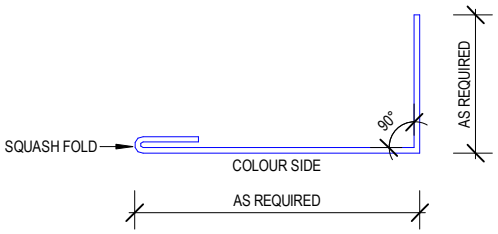


Figure 11.3.5.8:

ENS-202 - Internal Corner Over Flashing

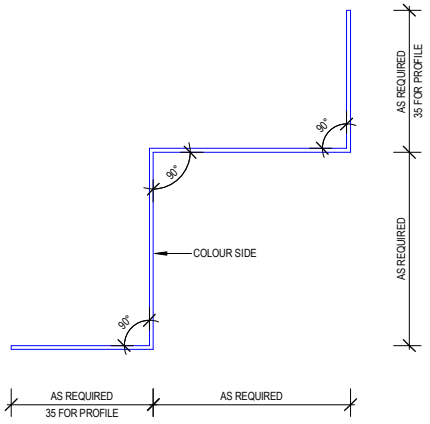
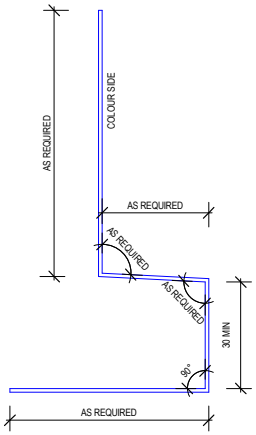


Figure 11.3.5.9:

ENS-203 - Base Flashings



ENS-203 - Base Flashing with Squash Fold

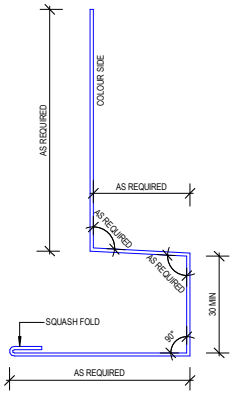


Figure 11.3.5.10:

ENS-204 - Aluminium Base Flashing with Ventilation

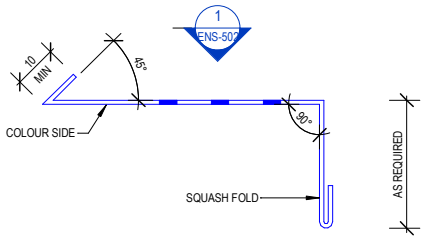


Figure 11.3.5.11:

ENS-205 - Top of Wall Flashing

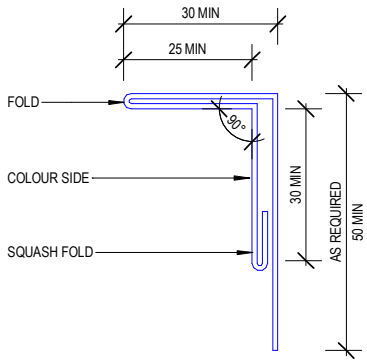
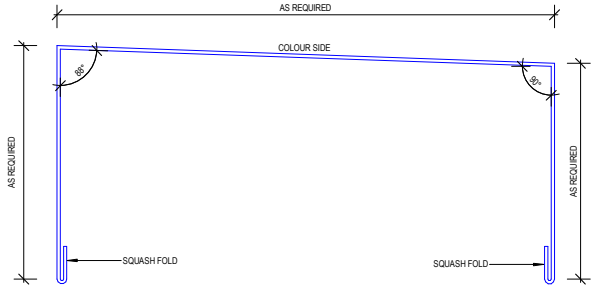


Figure 11.3.5.12:

ENS-206 - Parapet Top Flashing with Squash Folds



LON-206 - Parapet Top Flashing with Squash Fold and return

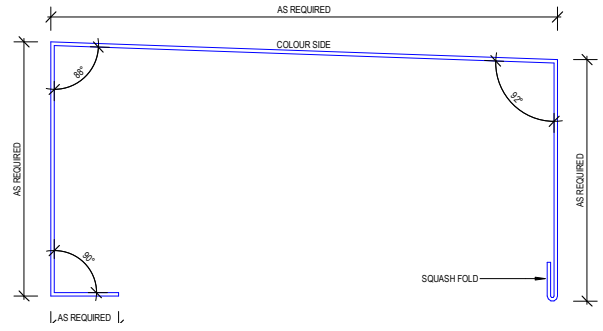


Figure 11.3.5.13:

ENS-300 - Roof Valley Flashing

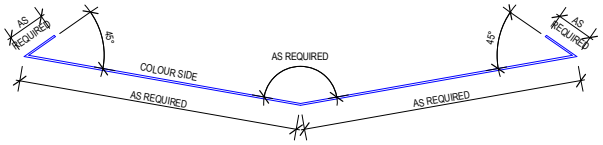
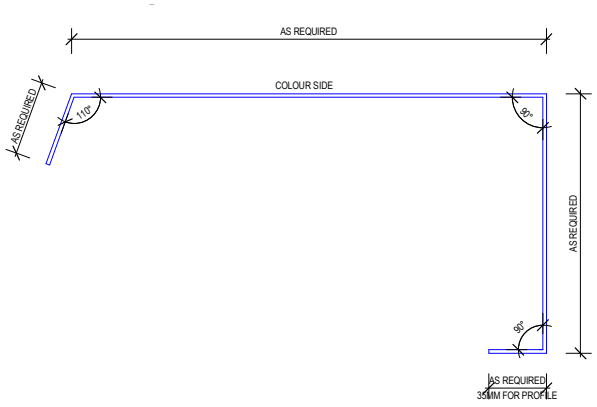


Figure 11.3.5.14:

ENS-301 - Barge Flashing with returns



ENS-301 - Barge Flashing with return and Squash Fold

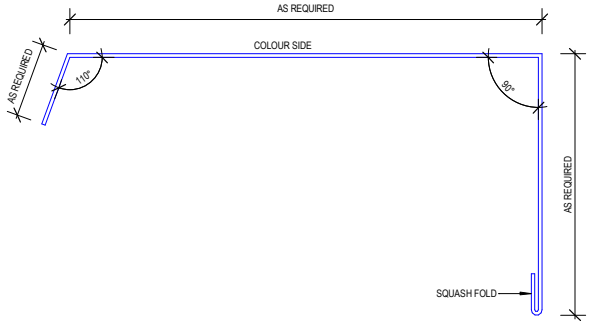


Figure 11.3.5.15:

ENS-302 - Ridge Cap Flashing

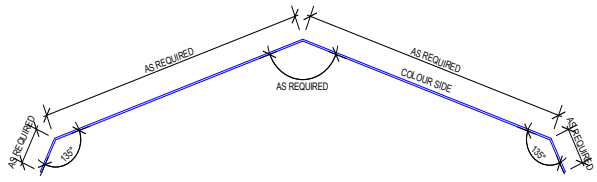


Figure 11.3.5.16:

ENS-400 - Window Sill Flashing with Squash Fold

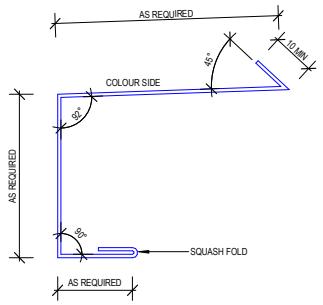


Figure 11.3.5.17:

ENS-401 - Window Head Flashing with Squash Fold

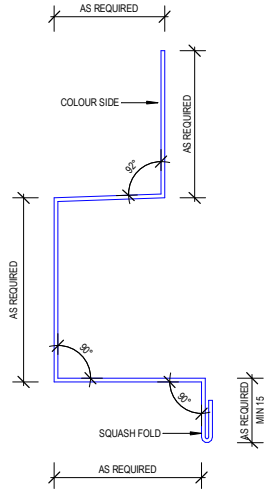


Figure 11.3.5.18:

ENS-402 - Window Jamb Flashing with Squash Folds

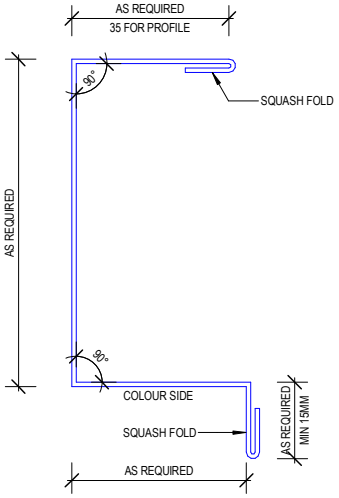


Figure 11.3.5.19:

ENS-403 - Window Z flashing with Squash Fold

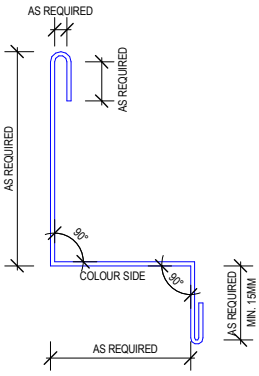
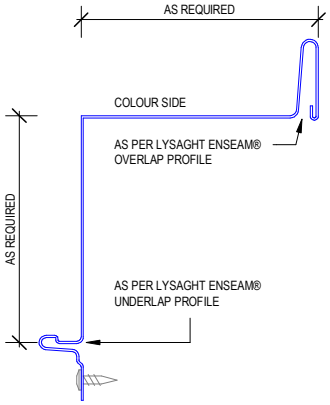


Figure 11.3.5.20:

ENS-500 - External Corner Details - Overlap Underlap



ENS-500 - External Corner Details - Overlap Overlap

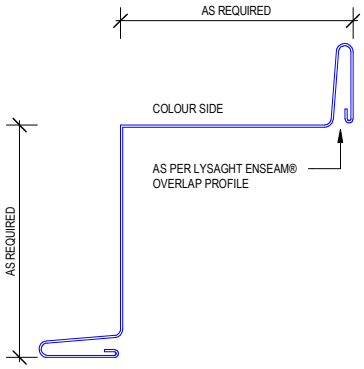
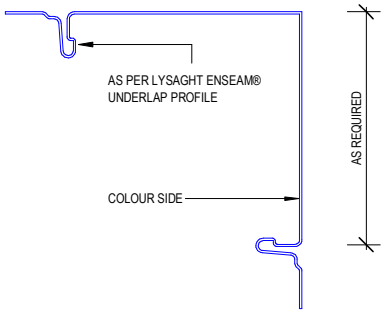
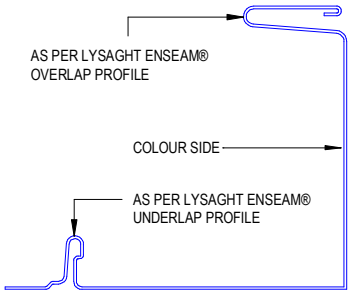


Figure 11.3.5.21:

ENS-501 - Internal Corner Details - Underlap Underlap



ENS-500 - Internal Corner Details - Overlap Underlap



ENS-500 - Internal Corner Details - Overlap Overlap

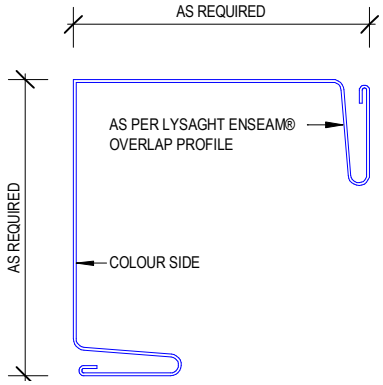


Figure 11.3.5.22:

ENS-502 - Perforation Detail

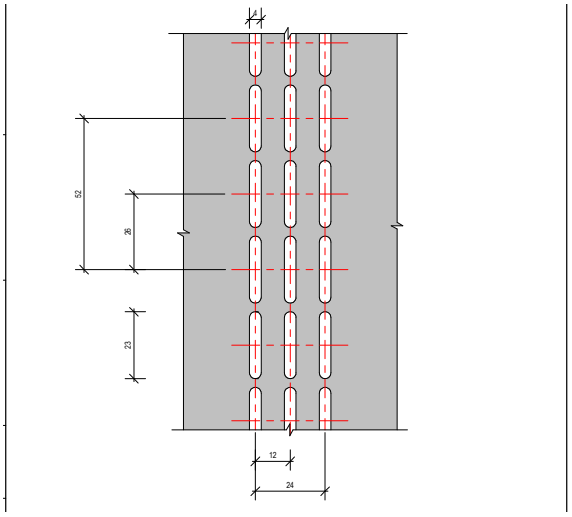
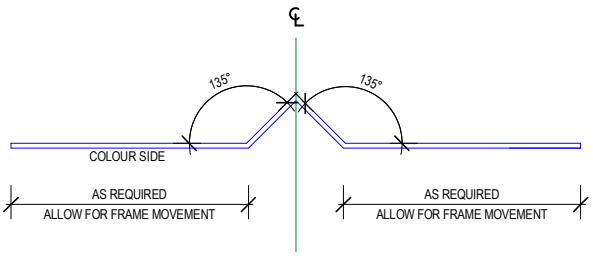


Figure 11.3.5.23:

ENS-503 - Corrosion Resistant Flashing



12.0 SNAPSEAM™ roof and wall cladding

SNAPSEAM™ architectural cladding is a concealed fixed flat panel cladding system. SNAPSEAM™ is structurally sound for clip fixing to steel battens and can also be fixed onto conventional supporting substrate such as plywood or fibre cement panels.

The wide flat profile gives a modern architecturally designed premium finish.

12.1 MATERIAL SPECIFICATIONS

Coverage (mm)	265			465		
Base Metal Thickness (BMT) (mm)	0.55	0.7*	0.75*	0.55	0.7*	0.75*
Total Coated Thickness[1] (TCT) (mm)	0.6	0.75	0.8	0.6	0.75	0.8
Rib Height (mm)	38					
Sheet Length[2] (mm)						
Minimum	500					
Maximum	8,000 [2]					
Mass / Unit Length (kg/m)						
ZINCALUME® steel	1.83	2.25	2.41	2.67	N/A	3.61
COLORBOND® steel[1]	1.96	2.29	2.44	2.73	N/A	3.68
Mass / Unit Area (kg/m²)						
ZINCALUME® steel	6.91	8.50	9.09	5.75	N/A	7.77
COLORBOND® steel[1]	7.02	8.65	9.21	5.88	N/A	7.90
Minimum Yield Strength	300 (G300)					
Coating Class (See Base Material for detail)	AM125 - ZINCALUME® steel AM100 - COLORBOND® steel AM100 - COLORBOND® METALLIC steel AM150 - COLORBOND® ULTRA steel					
Tolerance	Sheet length: ±3mm Cover width: ±2mm					
Thermal Expansion	2.9mm average per 5m @ 50°C change					

Notes:
1. Based on single sided COLORBOND® steel. For other painted steel options please contact your Lysaght representative.
2. To assist minimising the effects of oil canning in SNAPSEAM™ cladding, it is recommended to keep panel length under 8m. Longer lengths may be available subject to minimum order quantity.

*Please check with your local branch for availability.

MINIMUM ROOF PITCH

The minimum recommended roof pitch for SNAPSEAM™ cladding is 3 degree.

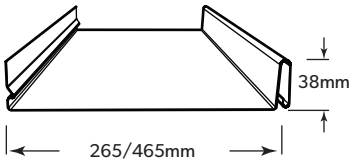
INSULATION

Care needs to be taken when installing insulation with SNAPSEAM™ roof sheeting. The screw length may need to be increased depending on the thickness and density of the insulation. When the screw is properly tightened into metal there should be a minimum of three (3) threads protruding past the support being fixed in to. For timber the screw must have a min embedment of 25mm into the timber.

For insulation, the use of roof spacing system is recommended to help maintain Rw values as well as minimising any bulging in the profile caused by the insulation. Refer to oil canning section for potential visual impacts of insulation on the product.

Figure 12.1.1:

SNAPSEAM™ profile.



FASTENING SNAPSEAM™ CLADDING TO SUPPORTS

SNAPSEAM™ is concealed fixed to batten supports. This means that clips are screw fastened to the supports and no fastening passes through the sheeting.

Table 12.1.1:

Fastener Specification - Non-Cyclonic

Fixing	**Application**
Clip fixing to steel	2 x 10g-16x16 Tri-Fixx Flat head metal screw with minimum class 3 coating
Clip fixing to plywood	3 x 10g-12x25 Flat head type 17 metal screw with minimum class 3 coating
Clip fixing to timber Batten	3 x 10g-12x25 Flat head type 17 metal screw with minimum class 3 coating

MAXIMUM BATTEN/SUPPORT SPACINGS [1]

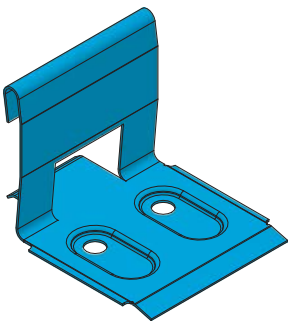
Type of Span	**265mm cover**			**465mm cover**		
	0.55mm BMT	**0.70mm* BMT**	**0.75mm* BMT**	**0.55mm BMT**	**0.70* BMT**	**0.75mm* BMT**
Roofs				Must be fixed to 19mm thick F11 structural CD ply with screw fixing at 450mm c/c and batten / support spacings at maximum 600mm centres		
Single span	600	700	700			
End Span	600	700	700			
Internal Span	600	700	700			
Unstiffened eaves overhang	50	50	50	50	N/A	50
Walls						
Single span	900	1000	1000	450	N/A	550
End span	900	1000	1000	450	N/A	550
Internal span	1200	1300	1300	450	N/A	550
Overhang	100	100	100	100	N/A	100

Notes:
1. Refer Section 2.5 - Support Spacing and Overhang for loading parameters applicable (Region B) to MAXIMUM SUPPORT SPACINGS. For Projects outside these loading parameters designers should reference LIMIT STATE WIND CAPACITIES tables to determine appropriate support spacings.

*Please check with your local branch for availability.

Figure 12.1.2:

SNAPSEAM™ Clip



SNAPSEAM™: LIMIT STATE WIND PRESSURE CAPACITIES (KPA)

Cover width	Support Requirement	Design pressure (kPa)		Application
		Serviceability	Strength	
265mm x 0.55mm BMT 265mm x 0.70mm BMT 265mm x 0.75 mm BMT	Steel batten: 40mm x 0.55mm BMT G550 Batten spacing: 600mm (max) Batten span: 1200mm (max)	1.0	4.5	Roofing & Walling
	Steel batten: 40mm x 0.55mm BMT G550 Batten spacing: 900mm (max) Batten span: 1200mm (max)	1.0	3.0	Roofing & Walling
	19mm F11 CD Structural Grade plywood for roofing applications 15mm F11 CD Structural Grade plywood for walling applications Support spacing 600mm (max) Fastener spacing: 450mm	1.0	4.5	Roofing & Walling
266mm - 464mm x 0.55 BMT 266mm - 464mm x 0.70 BMT 266mm - 464mm x 0.75 BMT	Steel batten 40mm x 0.55mm BMT G550 Batten spacing : 450mm (max) Batten span: 1200mm (max)	0.30	2.50	Walling
	19mm F11 CD Structural Grade plywood for roofing applications 15mm F11 CD Structural Grade plywood for walling applications Support spacing 600mm (max) Fastener spacing: 450mm	0.30	2.50	Roofing & Walling
465mm x 0.55mm BMT 465mm x 0.70mm BMT 465mm x 0.75mm BMT	Steel batten 40mm x 0.55mm BMT G550 Batten spacing : 450mm (max) Batten span: 1200mm (max)	0.30	2.50	Walling
	19mm F11 CD Structural Grade plywood for roofing applications 15mm F11 CD Structural Grade plywood for walling applications Support spacing 600mm (max) Fastener spacing: 450mm	0.30	2.50	Roofing & Walling

Minimum support / purlin thickness must be 1mm BMT, G550

For maximum roof lengths for drainage see Page 17 Table 6.1.1

Table 12.1.2

Guide to fastener layout and sheet coverage.

SHEET COVERAGE

265MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	12	16	19	23	27	31	34	38	42	46	50	53	57	61	65	68	72	76	114	151	189

465MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	7	9	11	13	16	18	20	22	24	26	28	31	33	35	37	39	41	44	65	87	108

WIDTH COVERED BY 'X' NUMBERS OF SHEETS (M)

265MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	0.795	1.06	1.325	1.59	1.855	2.12	2.385	2.65	2.915	3.18	3.445	3.71	4.0	4.24	4.505	4.77	5.0	5.3

465MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	1.395	1.86	2.325	2.79	3.255	3.72	4.185	4.65	5.115	5.58	6.045	6.51	7.0	7.44	7.905	8.37	8.8	9.3

END LAPPING

Do not end lap SNAPSEAM™ cladding.

ENDS OF SHEETS

It is usual to allow roof sheets to overhang into gutters by about 50mm.

LAYING PROCEDURE

SNAPSEAM™ is designed to be installed in conjunction with a heavy duty building membrane as an additional weather-proofing measure. Impermeable Membranes are preferred for roofing applications with Permeable membranes preferred for walling applications. For greater detail on membrane selection and design of ventilation and drainage pathways refer to CONDENSATION CONTROL IN AUSTRALIAN BUILDINGS CONSTRUCTED WITH LYSAGHT® CLADDINGS.

This sarking should be installed in accordance with the manufactures recommendations, sealed at the top, free from ripples and puckers, lapped and taped at joins. All laps in the sarking / blanket must be made with 150mm lap, sealed with double sided tape between the faces of the sarking and taped with sisal tape on the outside face.

For maximum weather-tightness, start laying sheets from the end of the building that will be in the lee of the worst-anticipated or prevailing weather. Lay sheets toward prevailing weather. Also, it is much easier and safer to turn sheets on the ground than up on the roof.

Before lifting sheets on to the roof, check that they are the correct way up and the overlapping side is towards the edge of the roof from which installation will start. Place bundles of sheets over or near firm supports, not at mid span of roof members.

1. Position the first sheet to align with the building edge.
2. Screw fix the clips over the under lap edge to battens or ply as shown in Figure 12.2.1 and Figure 12.2.2.
3. Align and engage the next sheet as shown in Figure 12.2.3 and then screw fix as per Step 2 .
4. Repeat for the roof/wall run.
5. Complete flashings and detailing.

NB Flashing details for SNAPSEAM™ are the same as for ENSEAM® and as such have not been repeated here. Refer to ENSEAM® details for guidance.

In walling applications, horizontal pressure will need to be applied locally to the sheets to engage the ribs. Use body pressure (torso,hand or foot) or use a rubber mallet if required. Care should be exercised due to the potential instability of the temporary worker access equipment.

To prevent SNAPSEAM™ from sliding downwards through clip fixings due to dead load of sheet, pierce fix through each sheet (1, #10-16 x16 Metal Teks with EPDM washer per pan or 2, 4.8mm diameter rivets per pan) under the flashing or capping, along the top of the sheets.

12.2 TYPICAL INSTALLATION DETAILS

Figure 12.2.1:

Fixing to plywood detail.

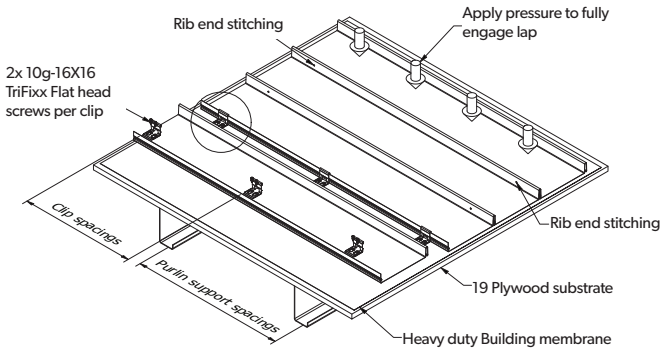


Figure 12.2.1-1:

Fixing to plywood detail

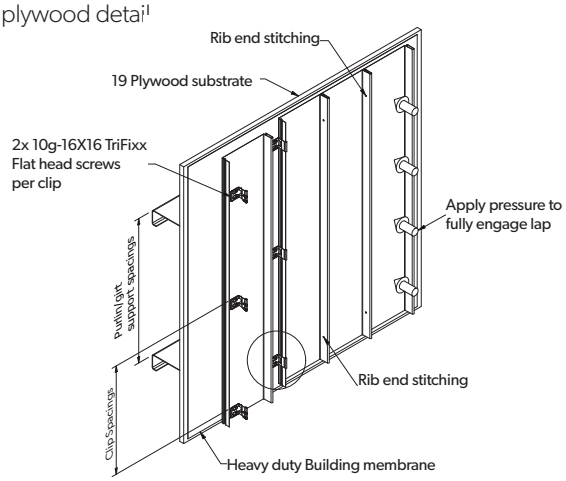


Figure 12.2.2:

Non-cyclonic fixing to steel batten.

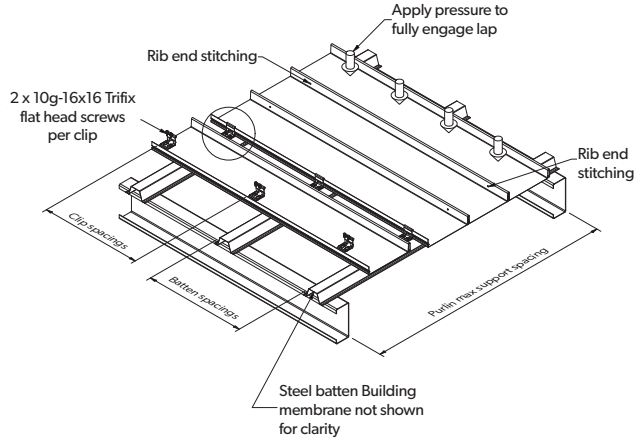


Figure 12.2.2.3:

Non-cyclonic fixing to steel batten.

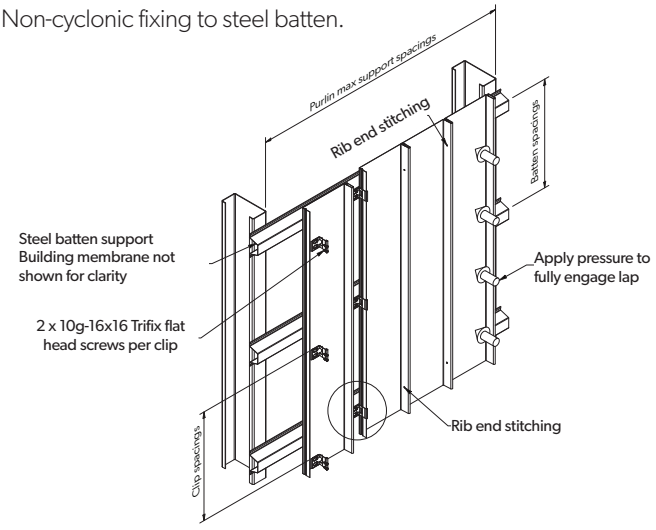
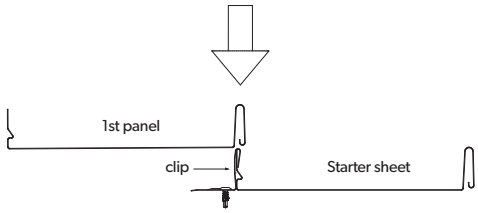


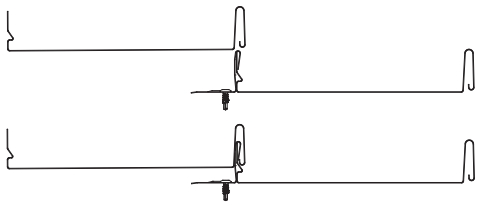
Figure 12.2.3:

Standard lap engagement procedure.

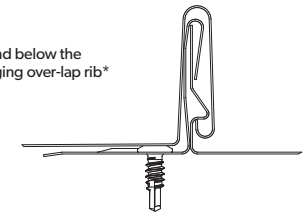


Position the first sheet to align with the building edge. Screw fix the clips over the under lap edge to battens or ply as shown in Figure 12.2.1 and Figure 12.2.2

Engage under-lap and over-lap ribs by applying vertical pressure along the over-lap rib either by hand or using a rubber mullet.



Apply silicone along the bend below the under-lap rib, prior to engaging over-lap rib*



When roof pitch is under 7.5° or total combined sheet length is over 5m

Figure 12.2.4:

Foam Infill detail.

80mm x 40mm closed cell foam infill cut to size and shape on site as required under ridge, hip or corner flashing

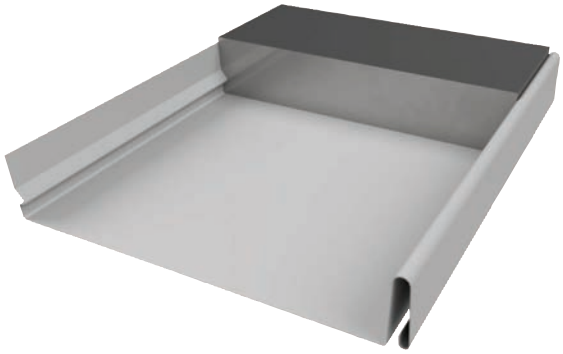
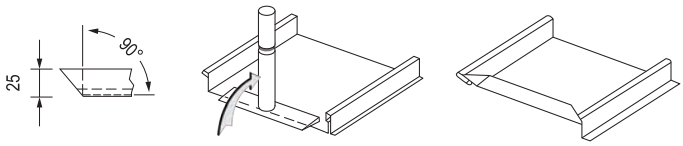


Figure 12.2.5:

Pan turn-up & turn-down details.

TYPICAL STOP END DETAIL
Stop end procedure:
1. Place plan into the panel stop end tool, the front edge of the tool must rest between the rib.
2. While maintaining pressure against the panel, rotate the stop end tool as close to 90° as possible.
3. Inspect completed bend.



Stop end detail | Panel stop end tool | Panel with stop end

TYPICAL TURN DOWN DETAIL
1. Panels requiring field hemmed ends should be fabricated 25mm longer than the finished panel length. Valley sheets must be field cut to the appropriate angle.
2. Cut back panel joints 25mm.
3. Place protruding pan into the panel hemming tool, the front edge of the tool must rest against the notched joint legs on both sides.
4. While maintaining pressure against the panel joints, rotate the hemming tool as close to 90° as possible.

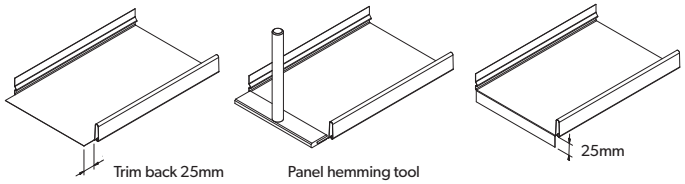
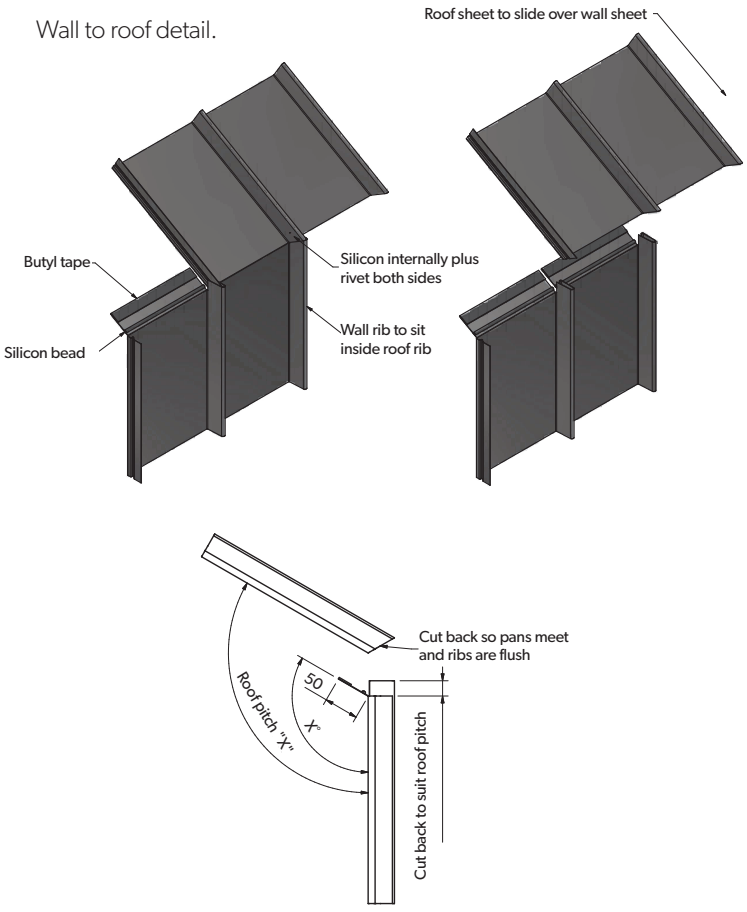


Figure 12.2.6:

Wall to roof detail.



12.3 TYPICAL CONSTRUCTION DETAILS SNAPSEAM™

The construction details presented here represent potential detailing solutions to common construction situations. These details may not be suitable for all projects / situations and users should use professional judgement in determining suitability of the details for their particular project whilst referencing AS 1562.1 and SA HB39. The full suite of ZENITH® constructions details are available for download from https://bimcontent.com/lysaght/ in both REVIT and PDF format.

12.3.1 SNAPSEAM™ TYPICAL ROOF DETAILS

Figure 12.3.1.1:

Typical Roof Cladding Setout - Unsupported SNAPSEAM™ - Plan View - S04-09

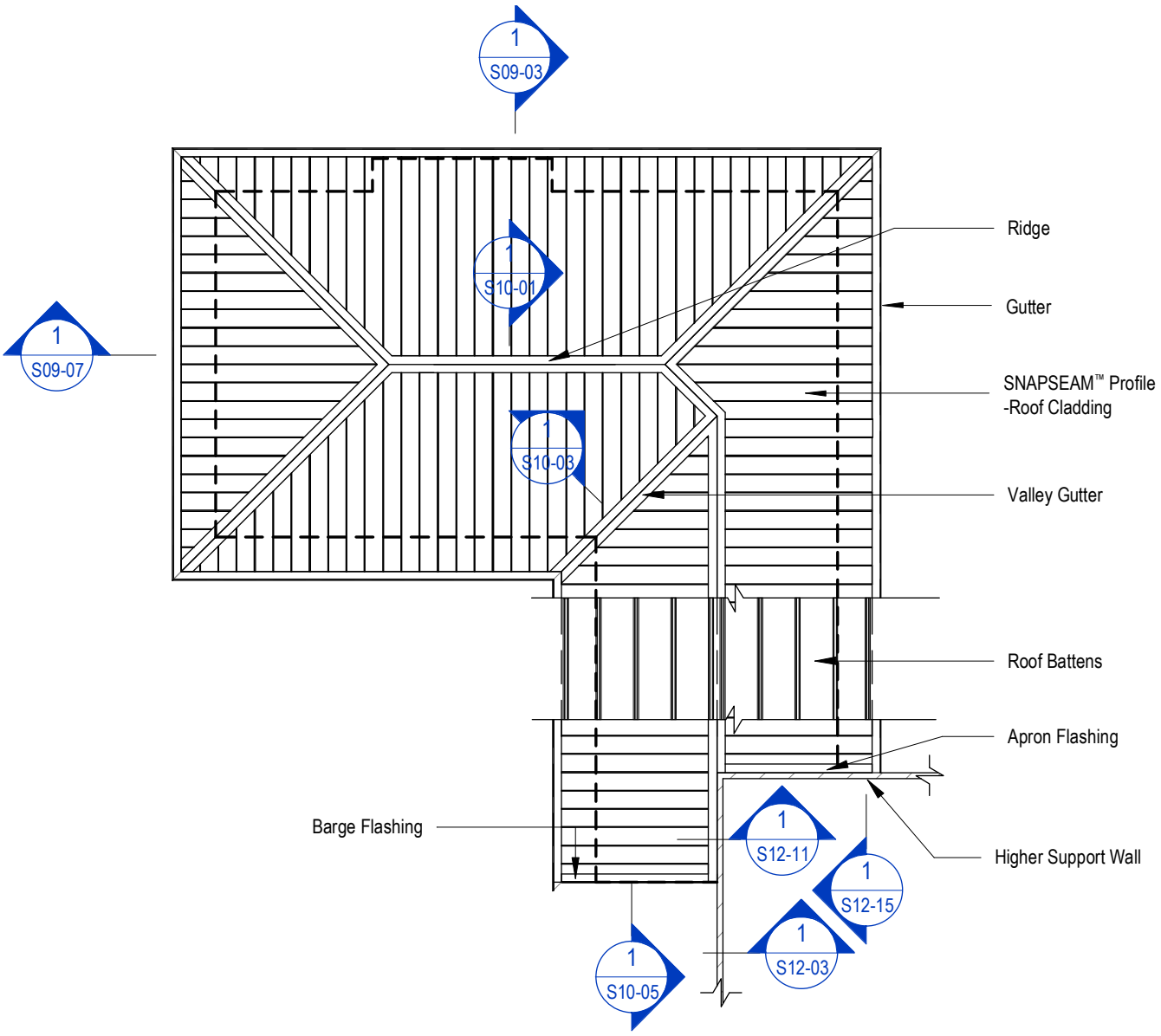


Figure 12.3.1.2:

Top of Wall Eave Detail - Zero Overhang - Unsupported SNAPSEAM™ - Vertical Fix - S09-03

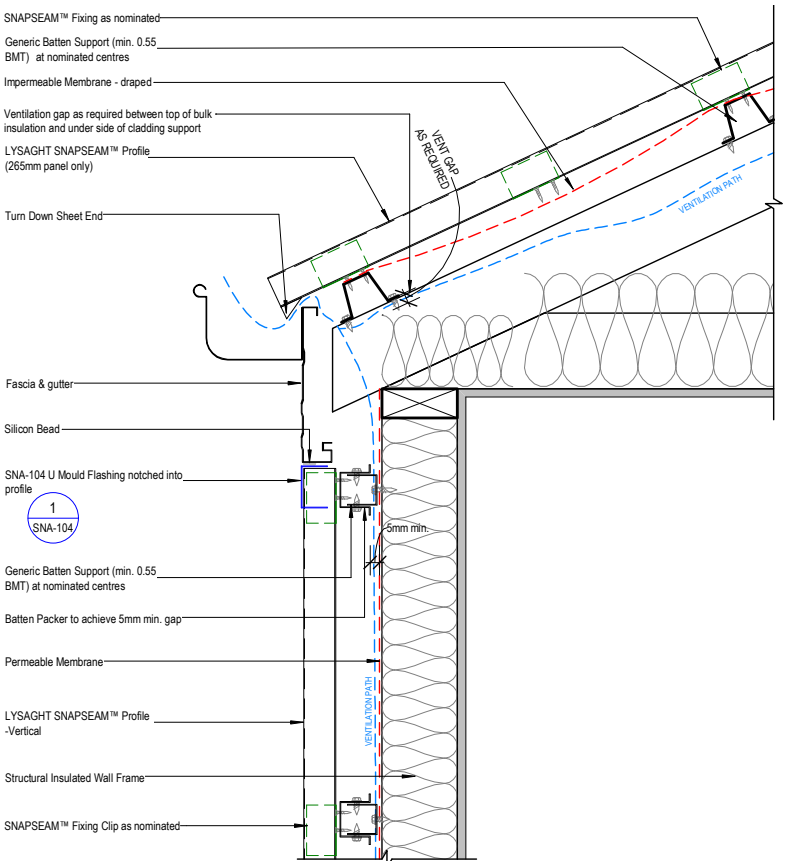


Figure 12.3.1.3:

Top of Wall Eave Detail - Overhang - Unsupported SNAPSEAM™ - Vertical Fix - S09-07

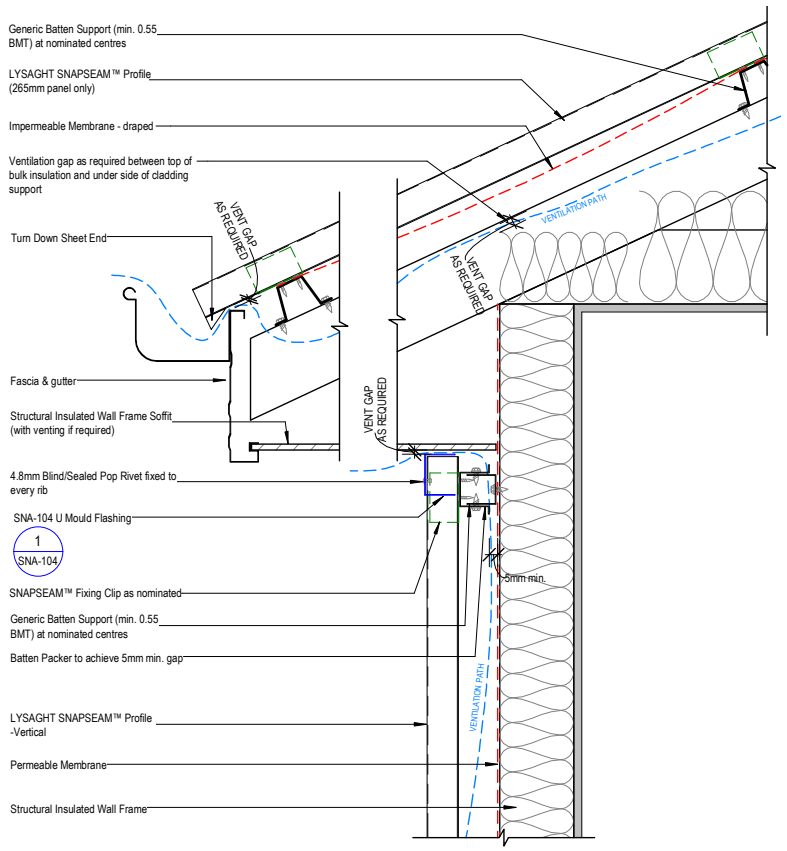


Figure 12.3.1.4:

Ridge Detail - Unsupported SNAPSEAM™ Panel - S10-01

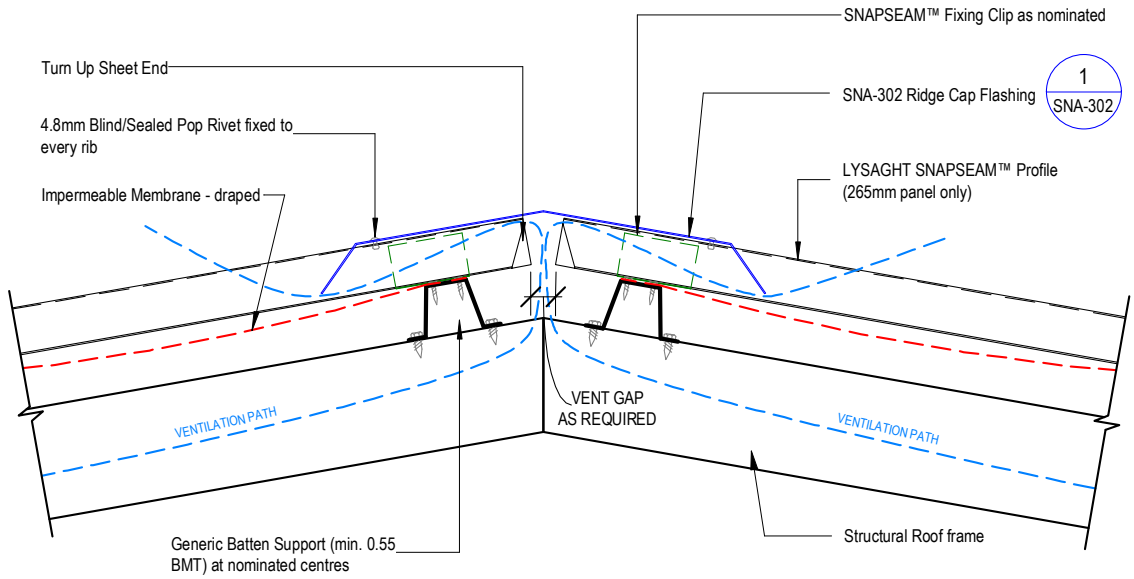


Figure 12.3.1.5:

Valley Detail - Unsupported SNAPSEAM™ Panel - S10-03

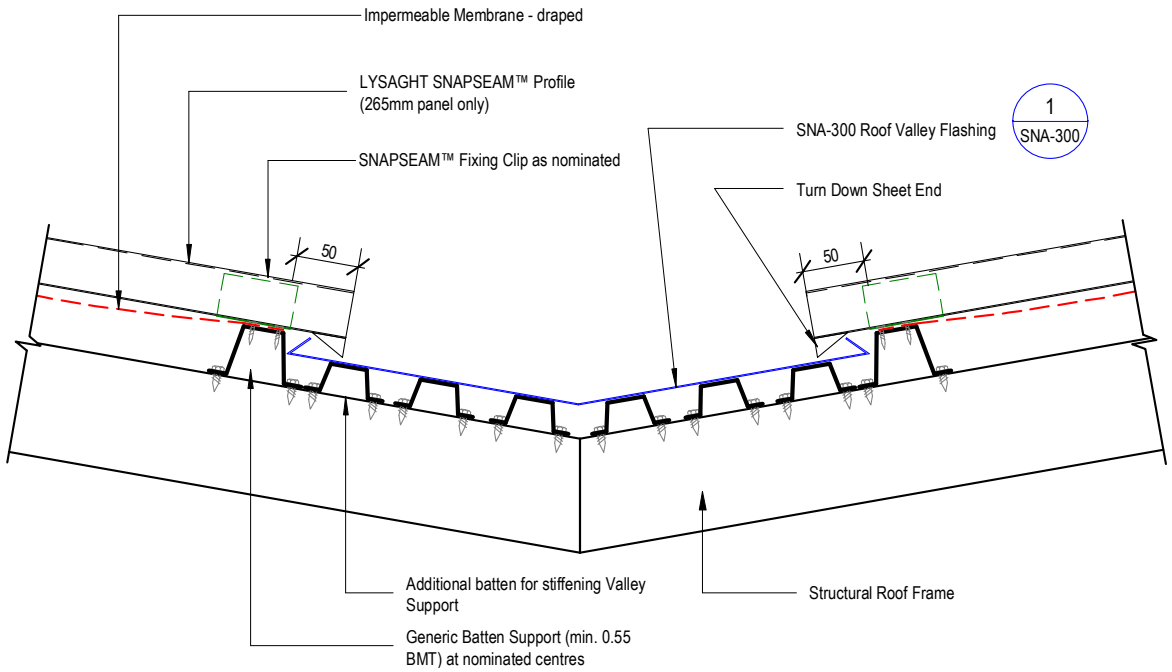


Figure 12.3.1.6:

Gable Detail - Unsupported SNAPSEAM™ Roof to Wall - Vertical Fix - S10-05

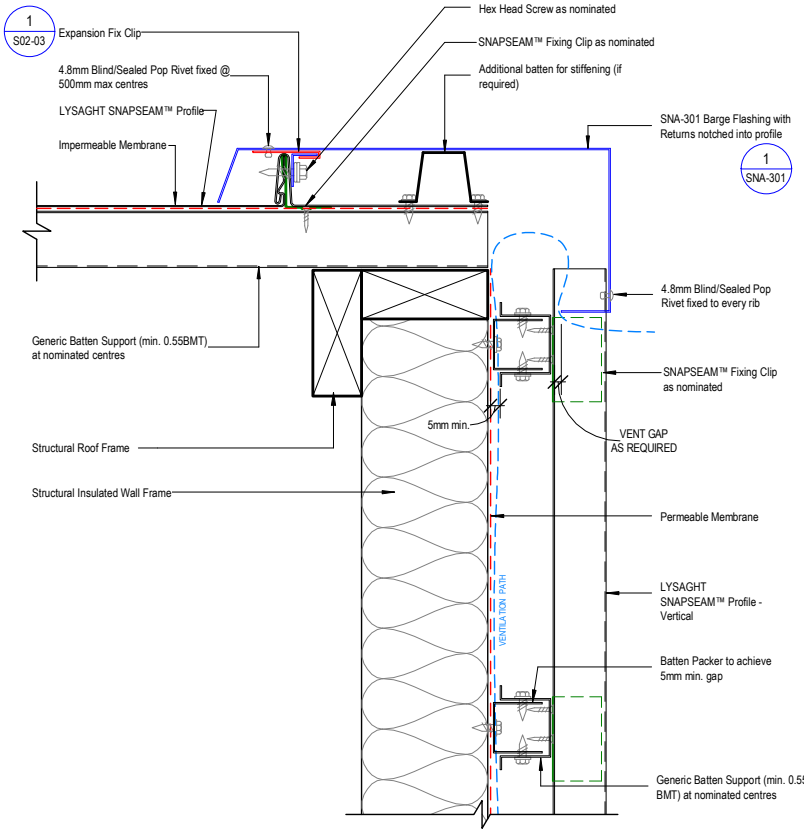


Figure 12.3.1.7:

Parapet Wall Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix - S12-03

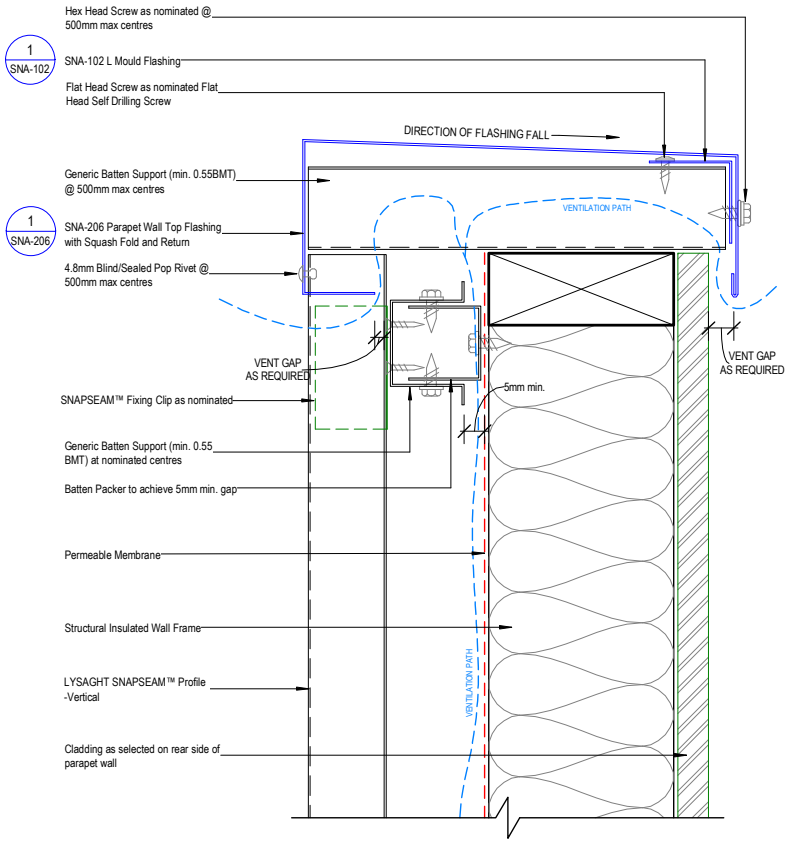


Figure 12.3.1.8:

SNAPSEAM™ Vertical Fix Wall to SNAPSEAM™ Roof - Unsupported - Side View - S12-11

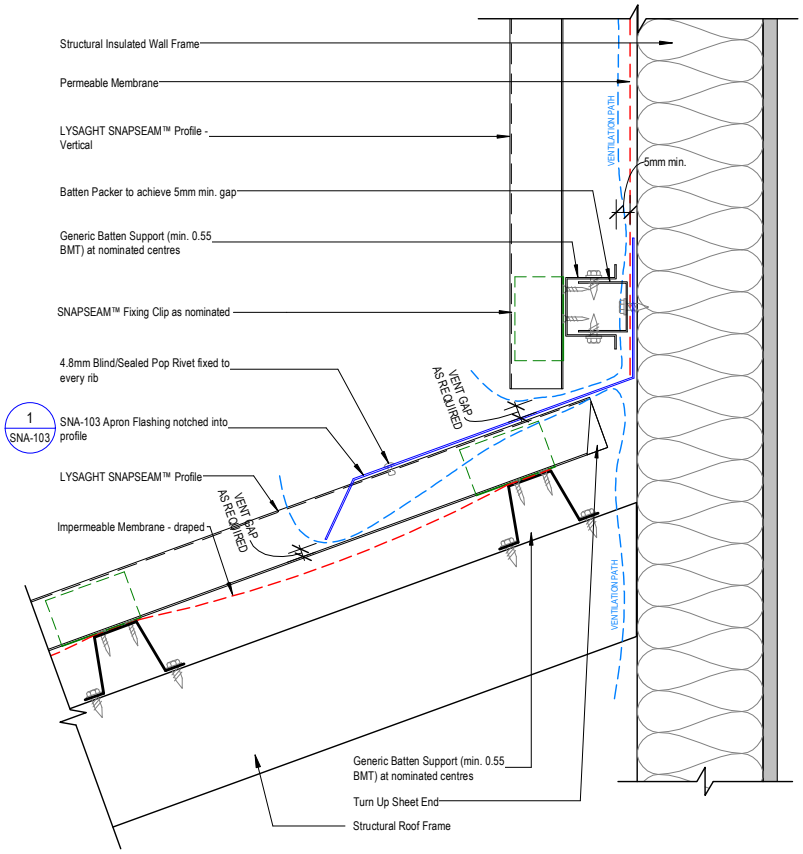
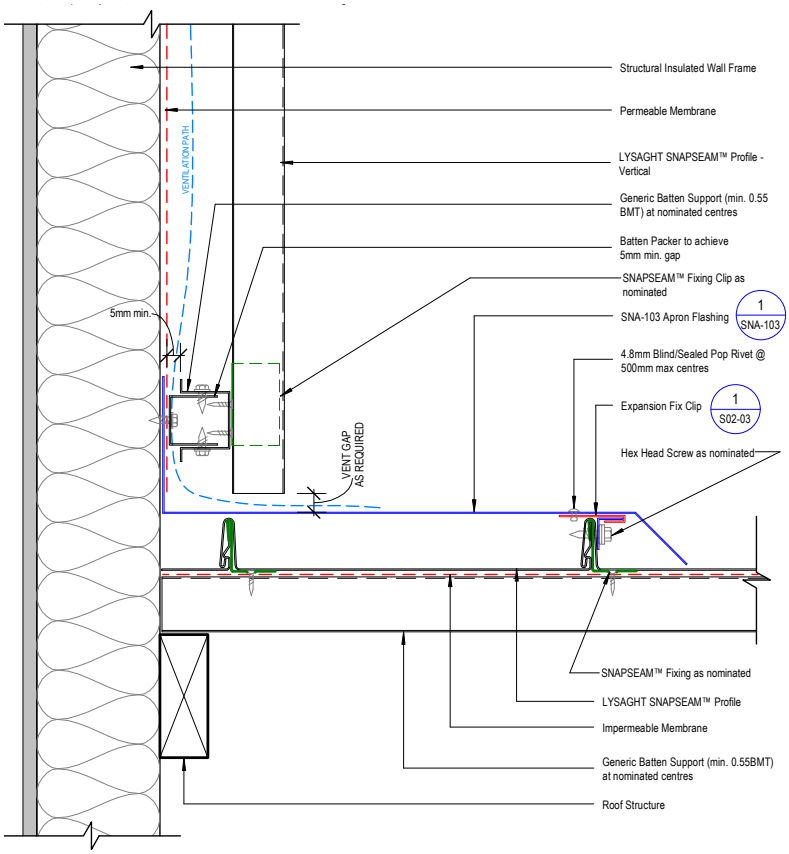


Figure 12.3.1.9:

SNAPSEAM™ Vertical Fix Wall to SNAPSEAM™ Roof - Unsupported - End View - S12-15



12.3.2 SNAPSEAM™ TYPICAL WALL DETAILS - HORIZONTAL FIX

Figure 12.3.2.1:

Typical Wall Cladding Setout - Unsupported SNAPSEAM™ Panel Horizontal Fix - Plan View - S04-01

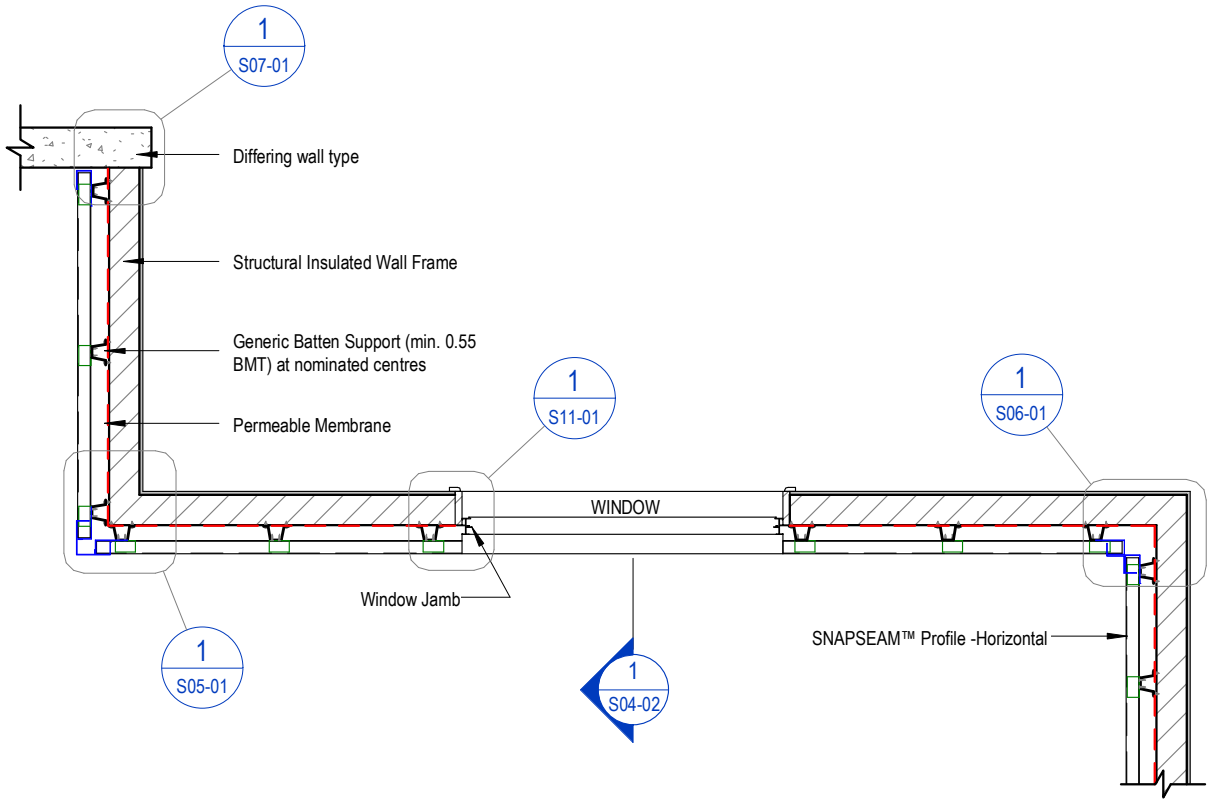


Figure 12.3.2.2:

Typical Wall Cladding Setout - Unsupported SNAPSEAM™ - Horizontal Fix - Sectional View - S04-02

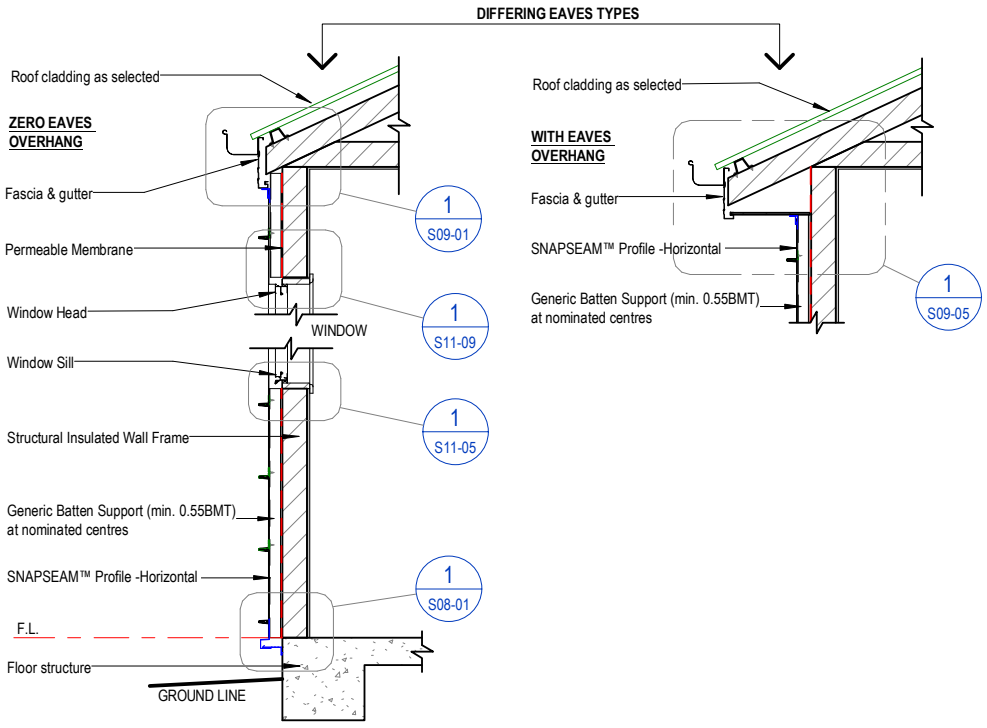


Figure 12.3.2.3:

External Corner Detail - Unsupported SNAPSEAM™ Panel - Horizontal Fix - S05-01

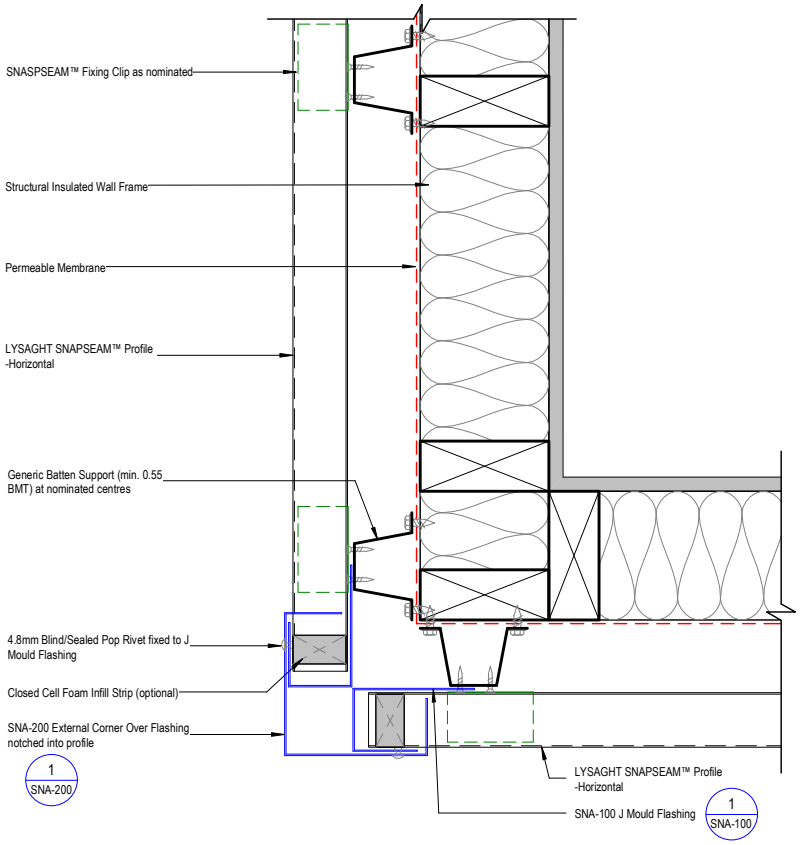


Figure 12.3.2.4:

Internal Corner Detail - Unsupported SNAPSEAM™ Panel - Horizontal Fix - S06-01

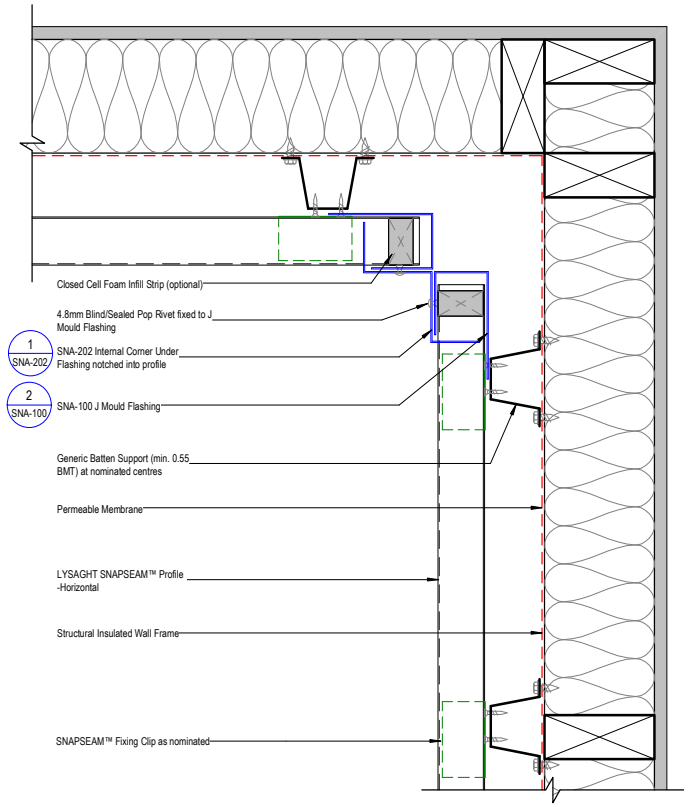


Figure 12.3.2.5:

Wall Closure Detail - Unsupported SNAPSEAM™ Panel - Horizontal Fix - S07-01

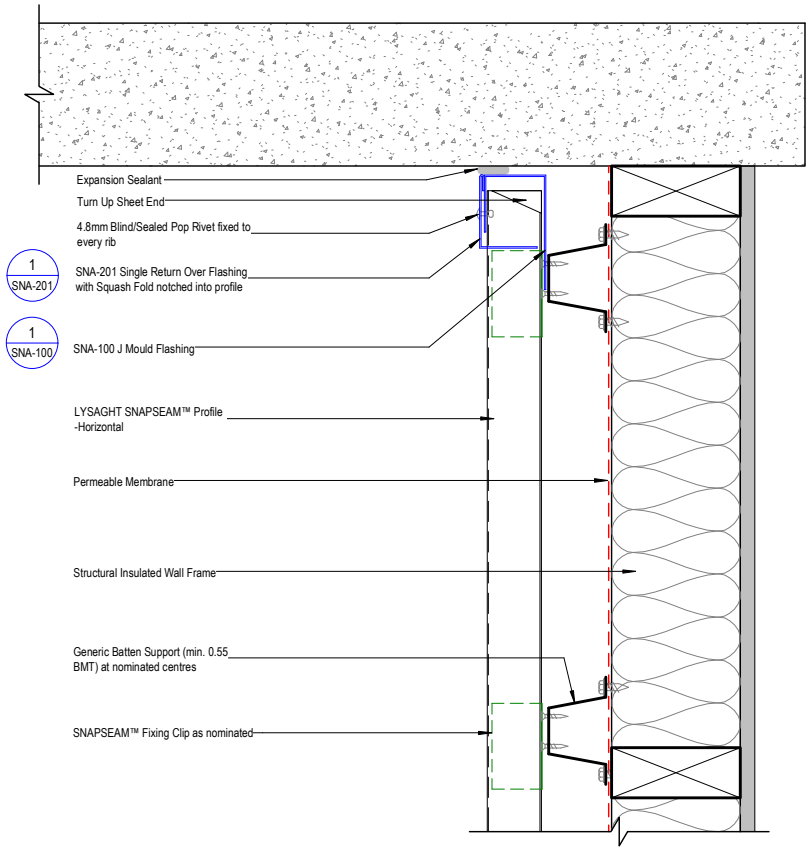


Figure 12.3.2.6:

Window Jamb Detail - Unsupported SNAPSEAM™ Panel - Horizontal Fix - S11-01

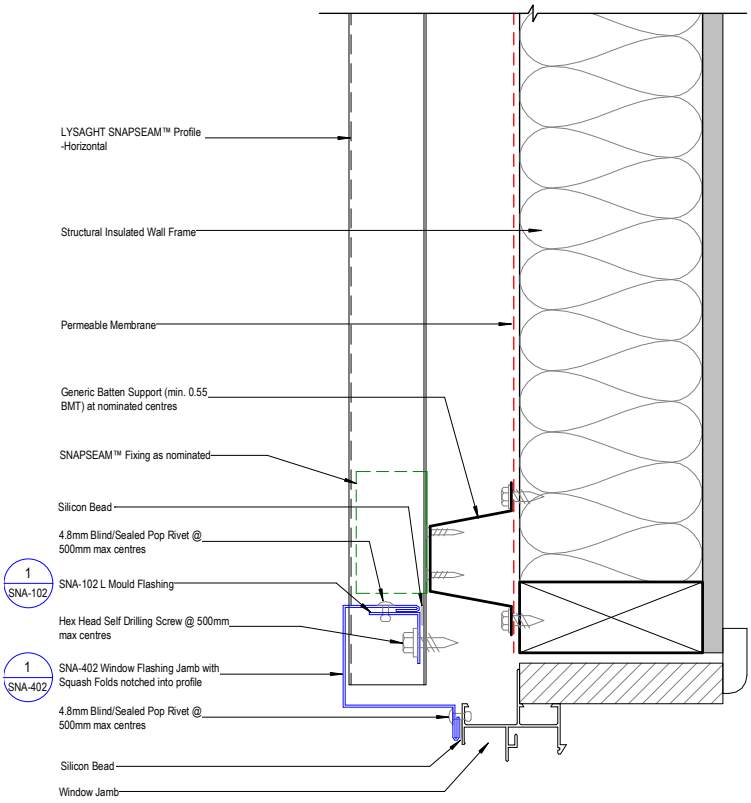


Figure 12.3.2.7:

Wall Base Detail - Unsupported SNAPSEAM™ Panel - Horizontal Fix - S08-01

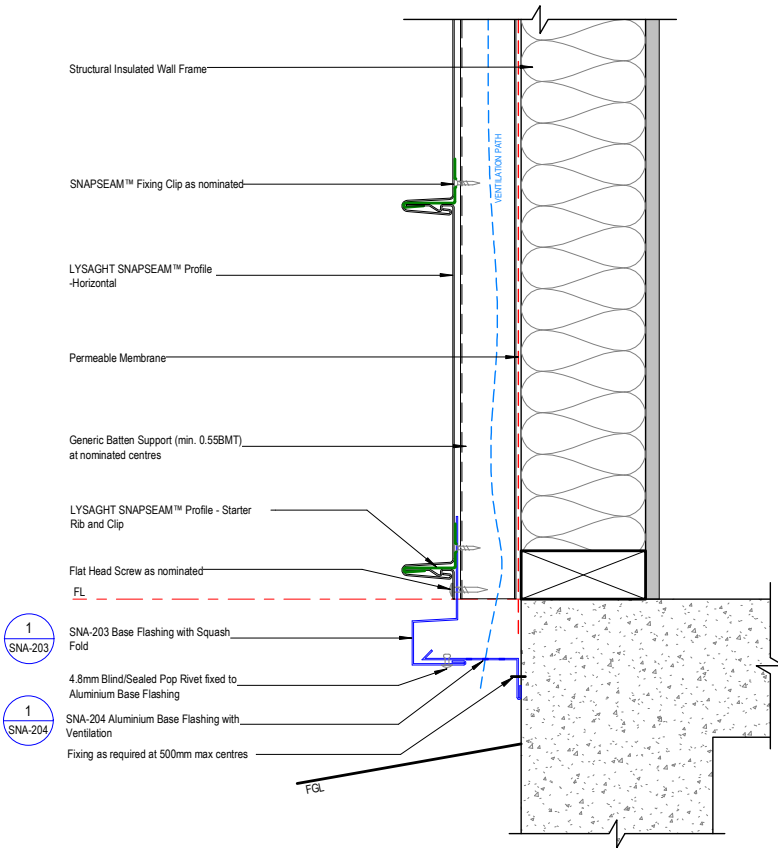


Figure 12.3.2.8:

Top of Wall Eave Detail - Zero Overhang - Unsupported SNAPSEAM™ - Horizontal Fix - S09-01

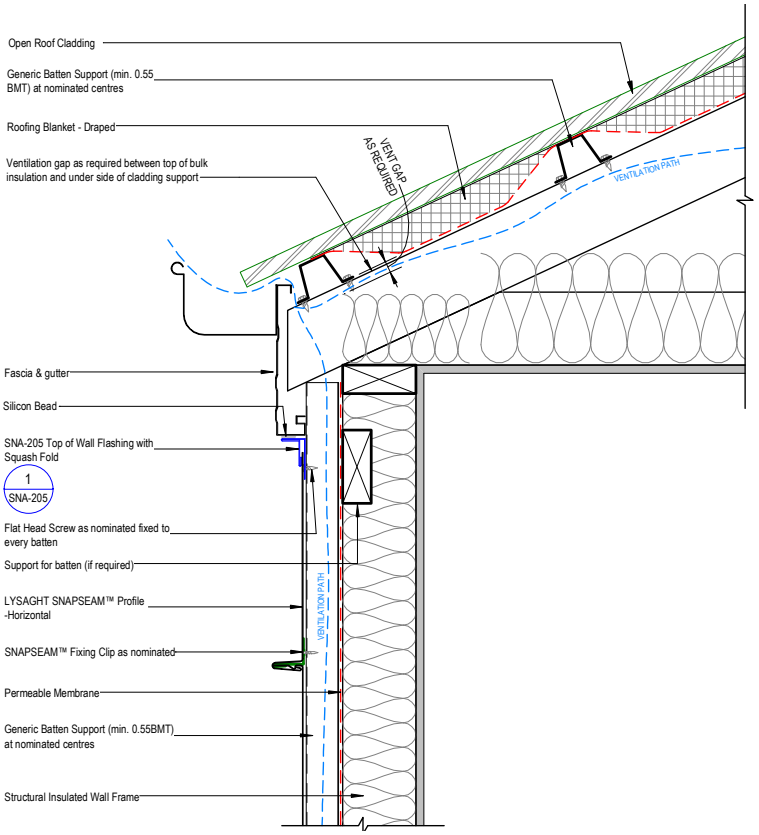


Figure 12.3.2.9:

Top of Wall Eave Detail - Overhang - Unsupported SNAPSEAM™ - Horizontal Fix - S09-05

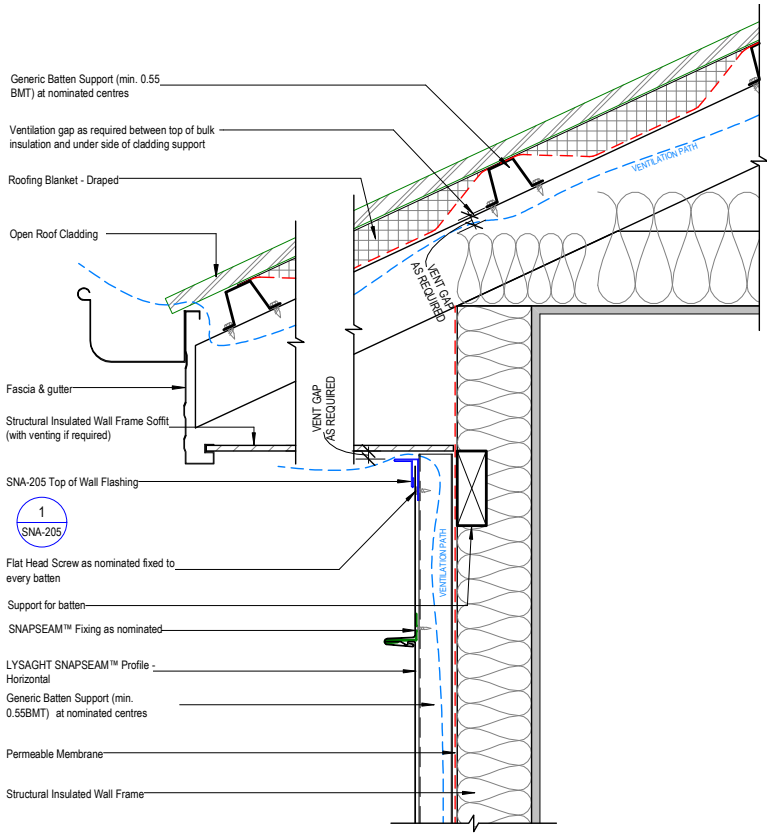


Figure 12.3.2.10:

Window Sill Detail - Unsupported SNAPSEAM™ Panel - Horizontal Fix - S11-05

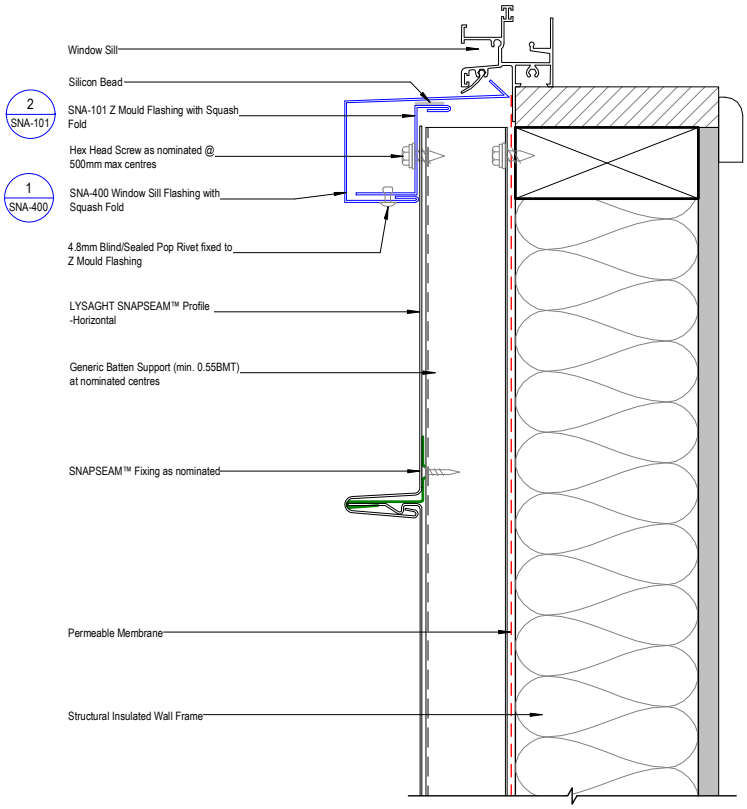
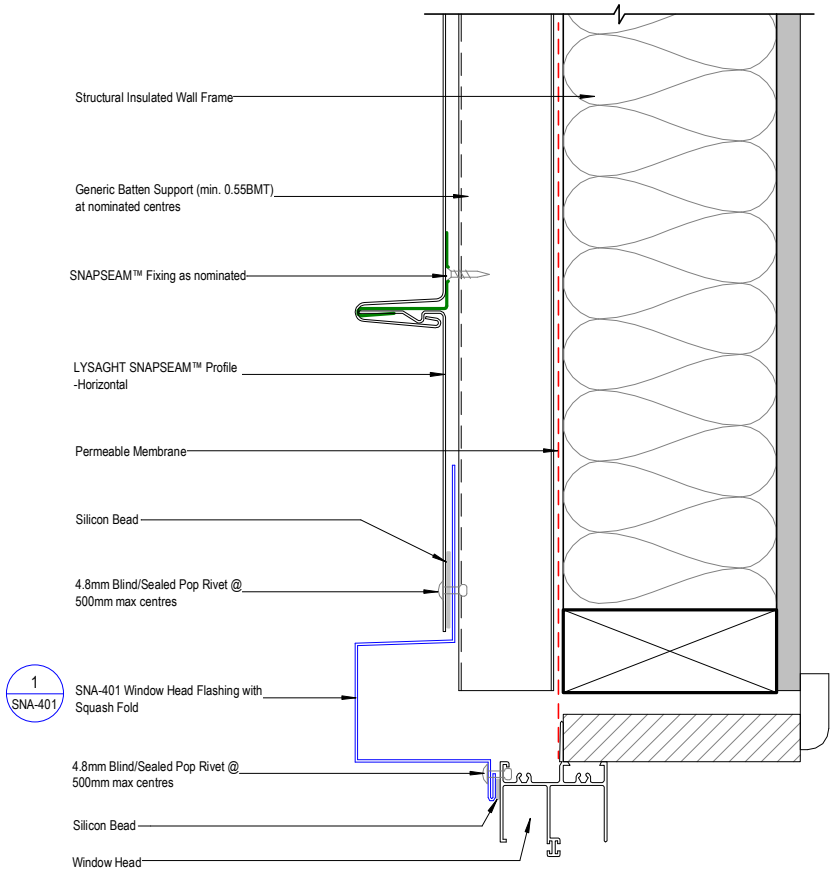


Figure 12.3.2.11:

Window Head Detail - Unsupported SNAPSEAM™ Panel - Horizontal Fix - S11-09



12.3.3 SNAPSEAM™ TYPICAL WALL DETAILS - VERTICAL FIX

Figure 12.3.3.1:

Typical Wall Cladding Setout - Unsupported SNAPSEAM™ Vertical Fix - Plan View - S04-05

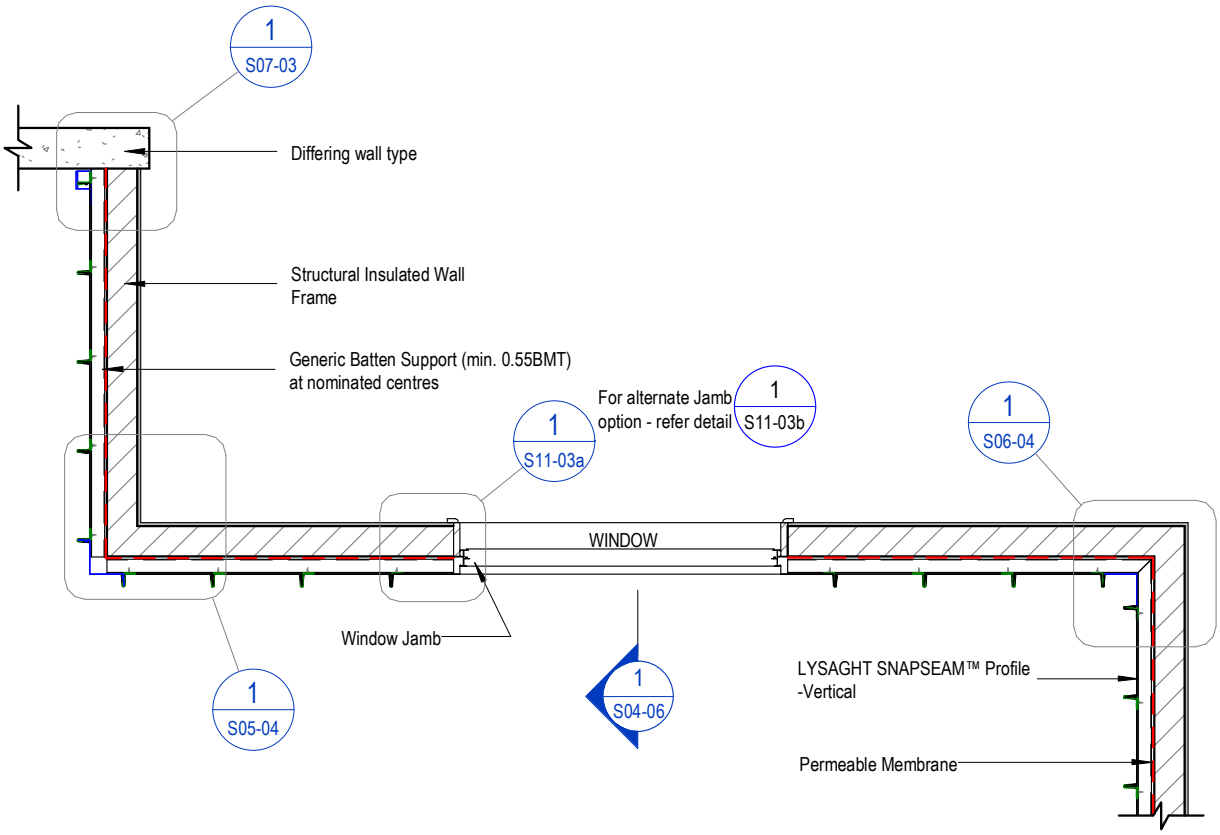


Figure 12.3.3.2:

Typical Wall Cladding Setout - Unsupported SNAPSEAM™ - Vertical Fix - Sectional View -S04-06

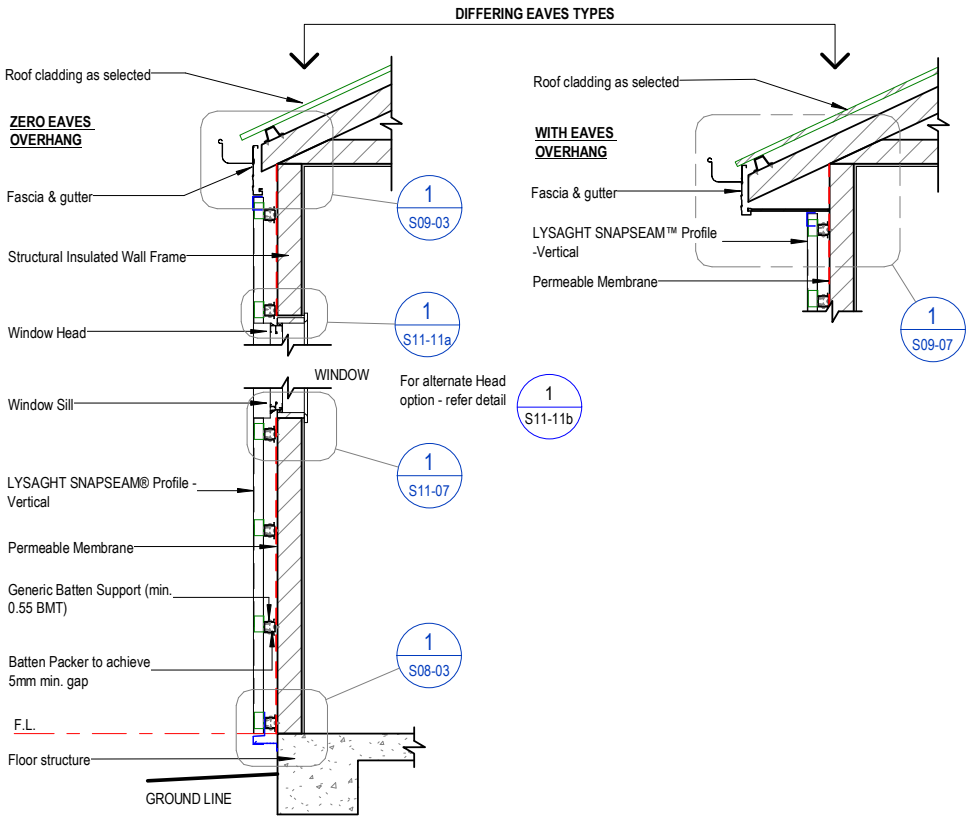


Figure 12.3.3.3:

External Corner Detail - Unsupported SNAPSEAM™ Panel - Vertical Underlap Underlap - S05-04

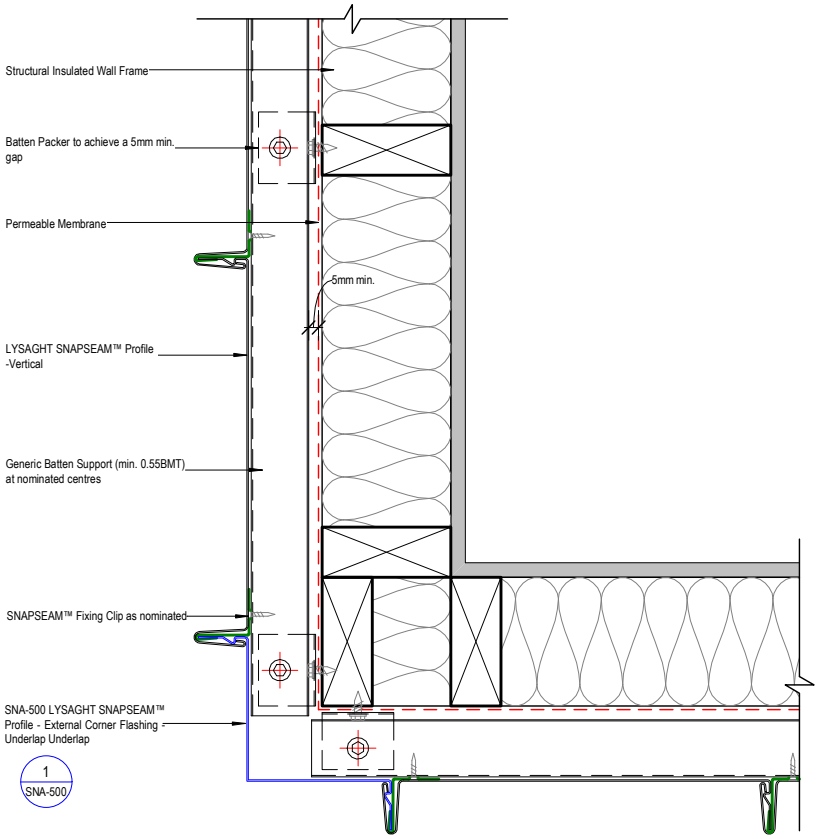


Figure 12.3.3.4:

Internal Corner Detail - Unsupported SNAPSEAM™ Panel - Vertical Underlap Underlap - S06-04

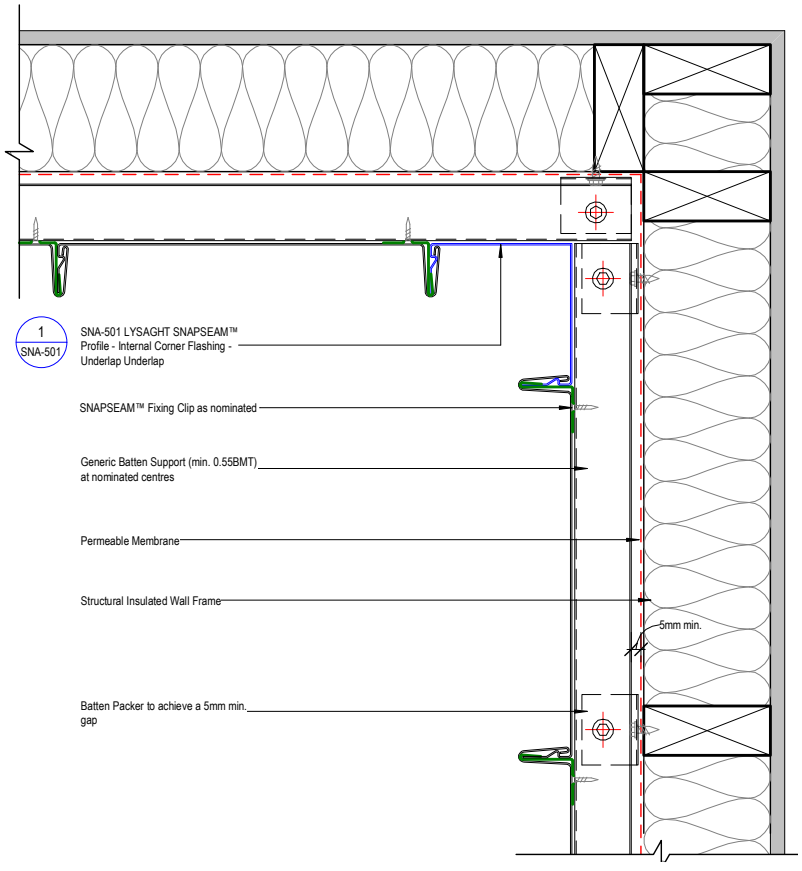


Figure 12.3.3.5:

Wall Closure Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix - S07-03

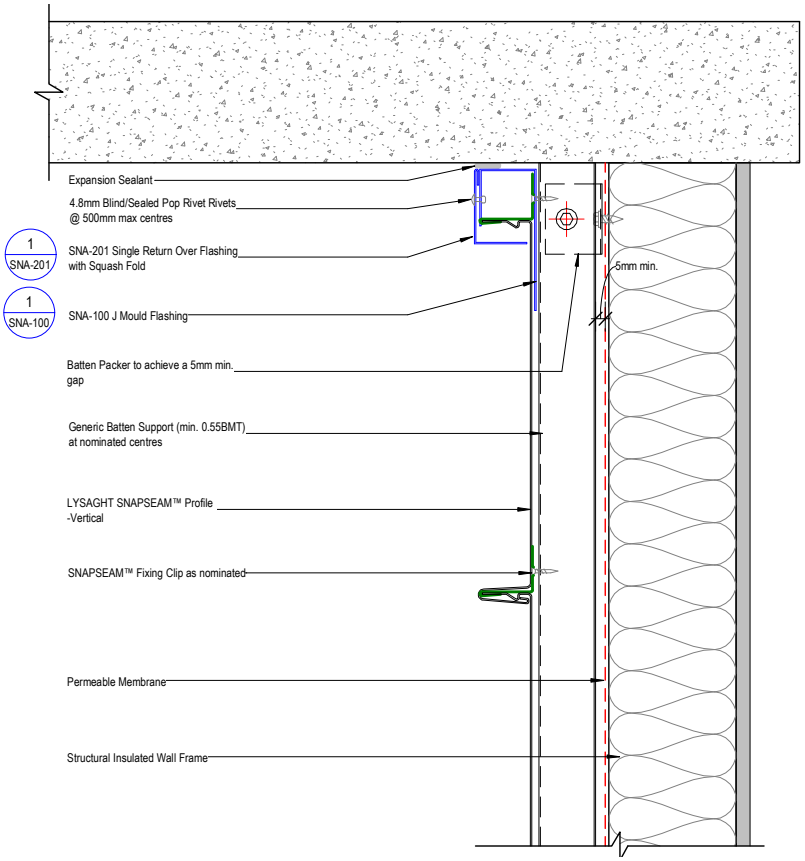


Figure 12.3.3.6:

Window Jamb Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix Option 1 - S11-03a

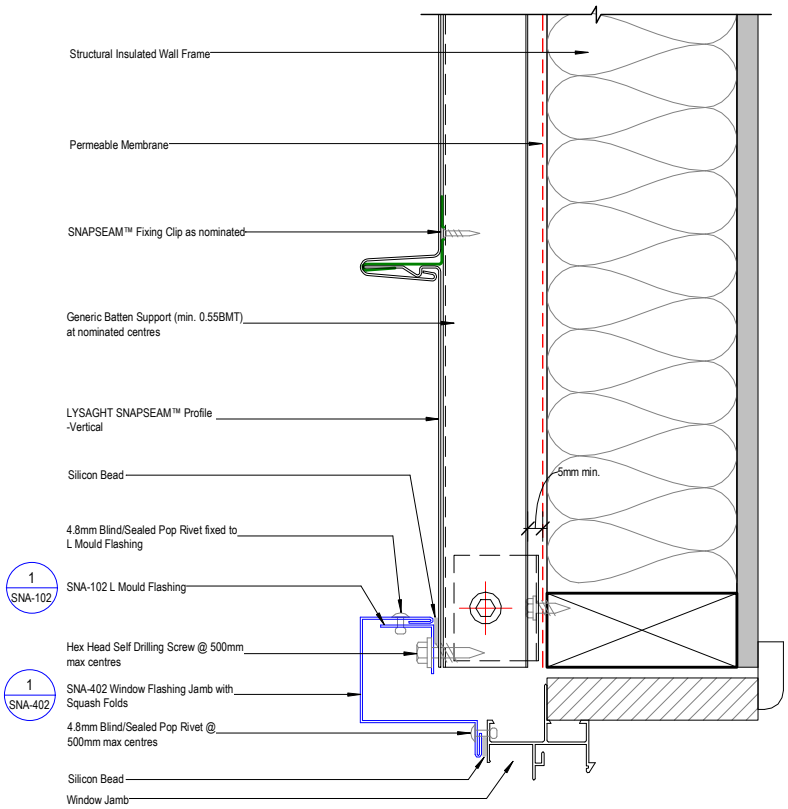


Figure 12.3.3.7:

Window Jamb Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix Option 2 - S11-03b

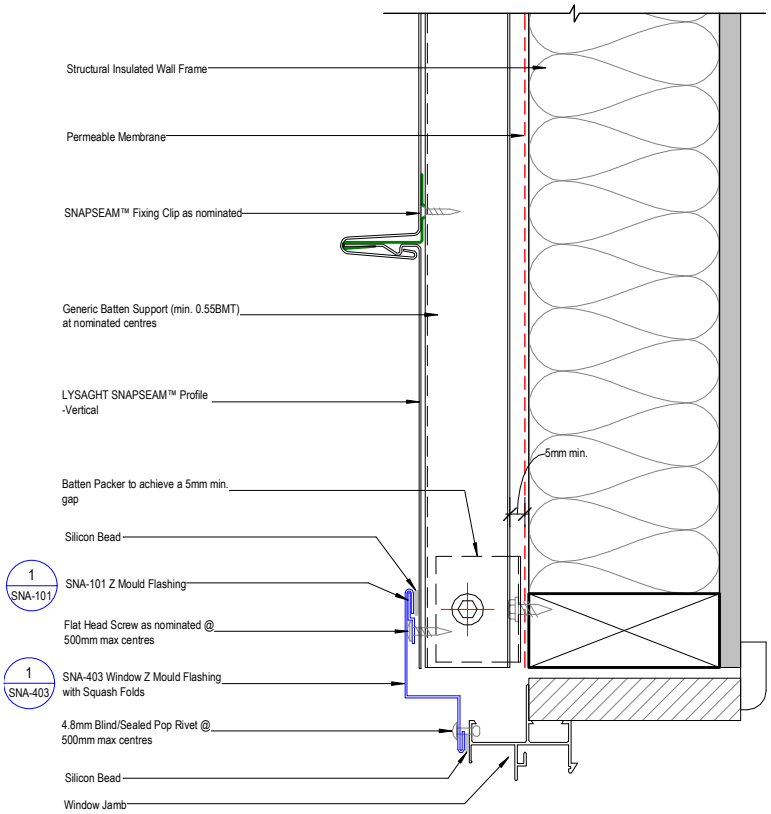


Figure 12.3.3.8:

Wall Base Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix - S08-03

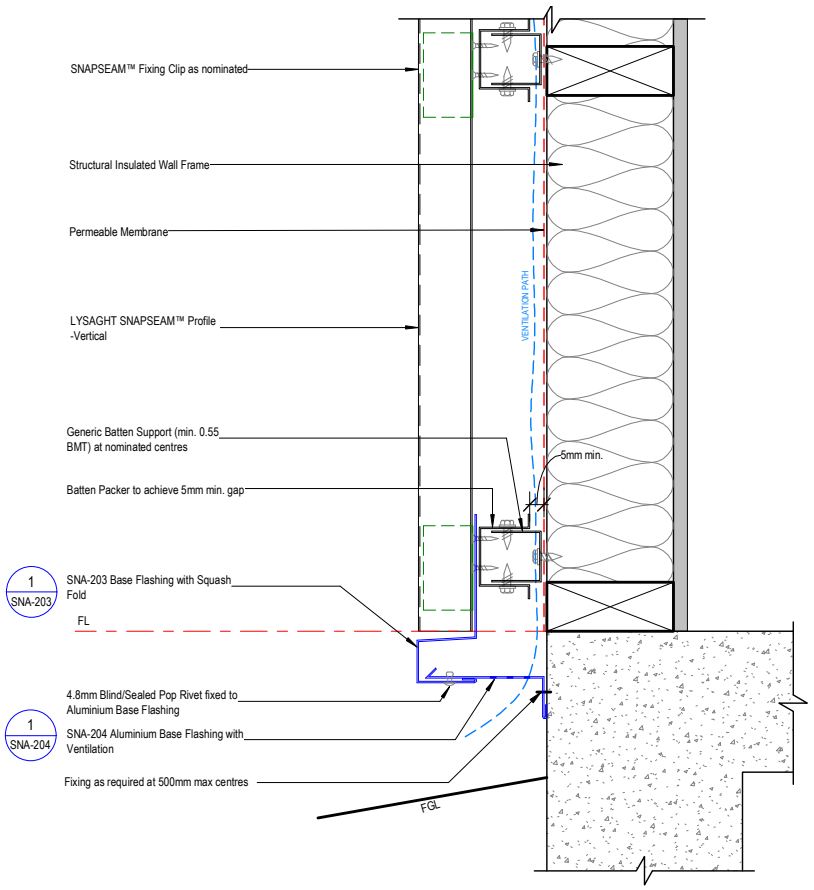


Figure 12.3.3.9:

Top of Wall Eave Detail - Zero Overhang - Unsupported SNAPSEAM™ - Vertical Fix - S09-03

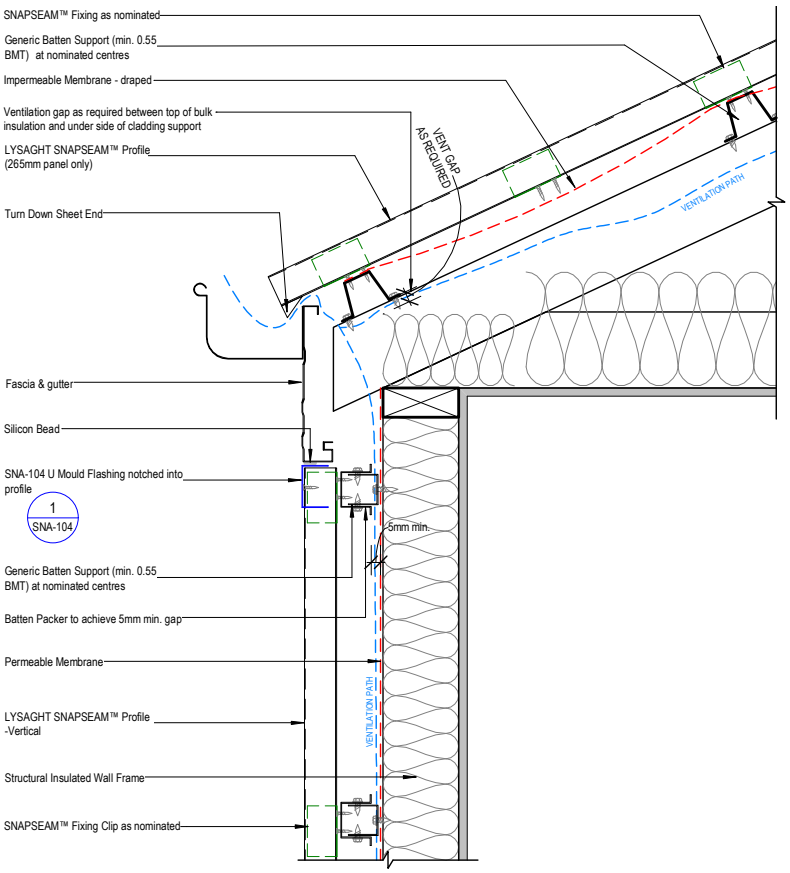


Figure 12.3.3.10:

Top of Wall Eave Detail - Overhang - Unsupported SNAPSEAM™ - Vertical Fix - S09-07

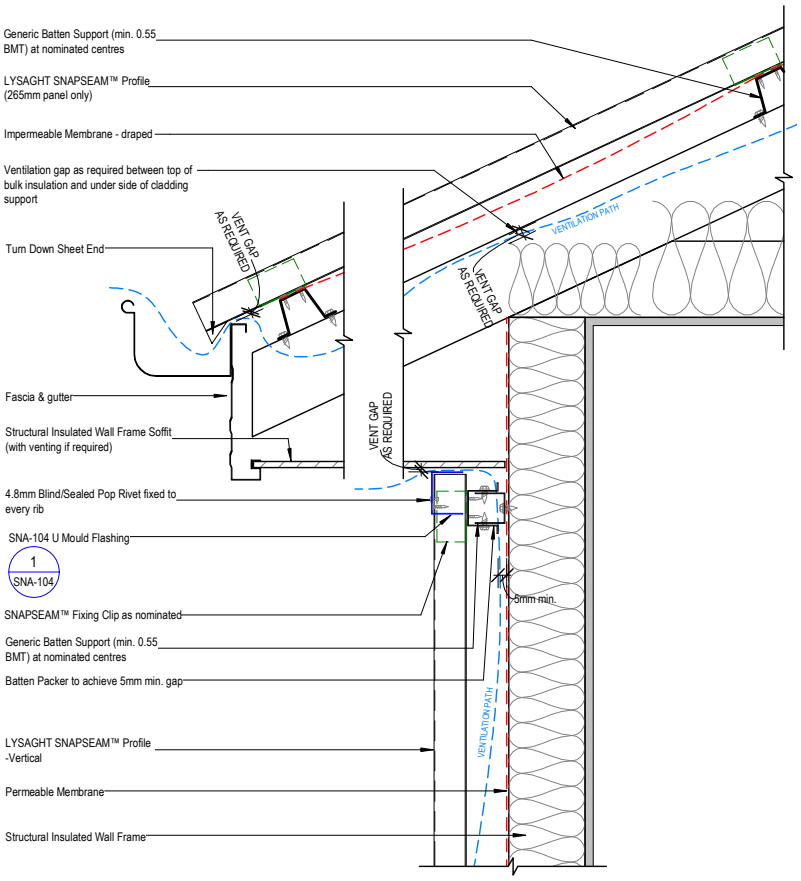


Figure 12.3.3.11:

Window Sill Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix - S11-07

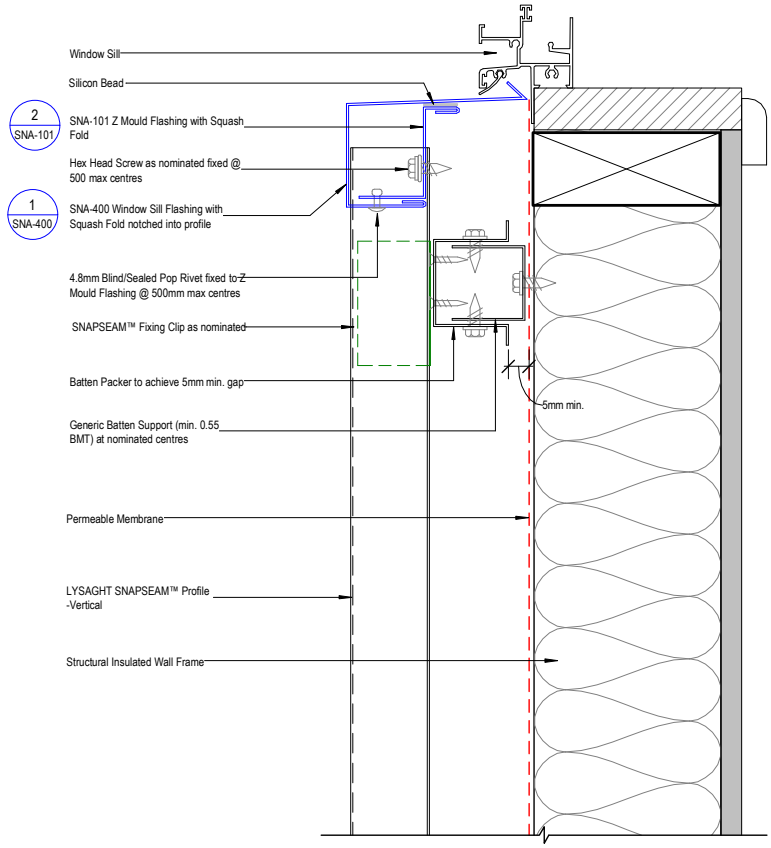


Figure 12.3.3.12:

Window Head Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix Option 1 - S11-11a

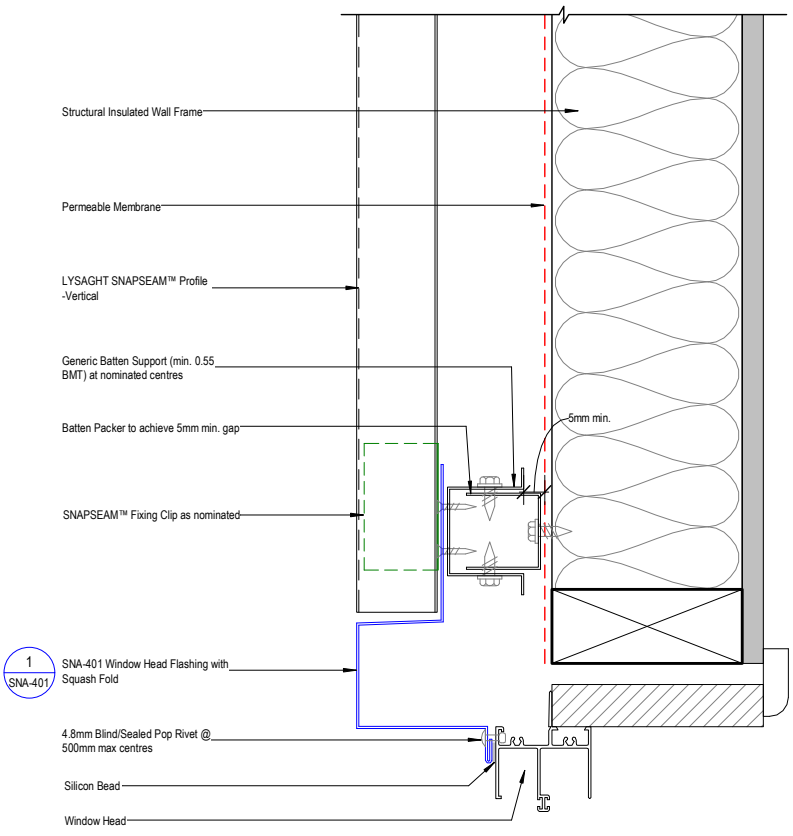
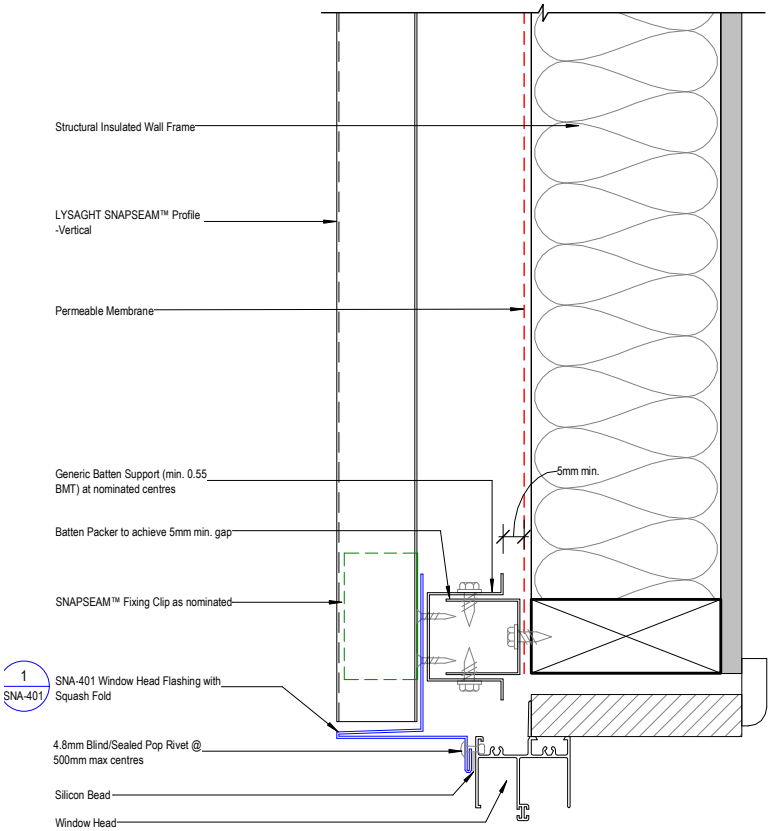


Figure 12.3.3.13:

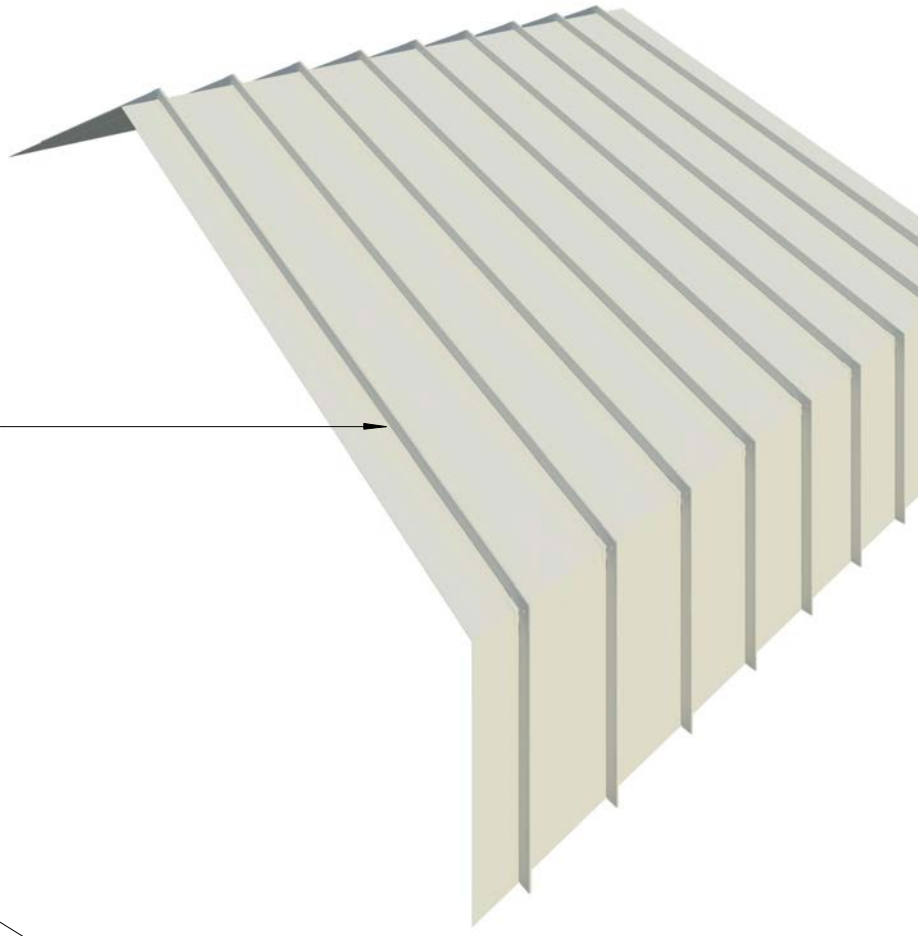
Window Head Detail - Unsupported SNAPSEAM™ Panel - Vertical Fix Option 2 - S11-11b



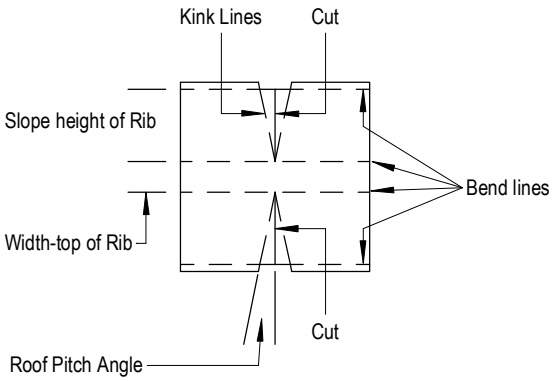
12.3.4 SNAPSEAM™ MANSARD ROOF / WALL

Figure 12.3.4.1:

SNAPSEAM™ Mansard Roof - S12-21



Continuous sheeting. Mansard roof with trays bent and the cut ribs waterproofed with sealed rib caps.



A S12-21 - Development of Cap
1 : 1

A
S12-21

Development Cap



Apply recommended sealant inside ends and along bottom of cap. Place in postiton over opened rib and fasten with four 4mm blind rivets.

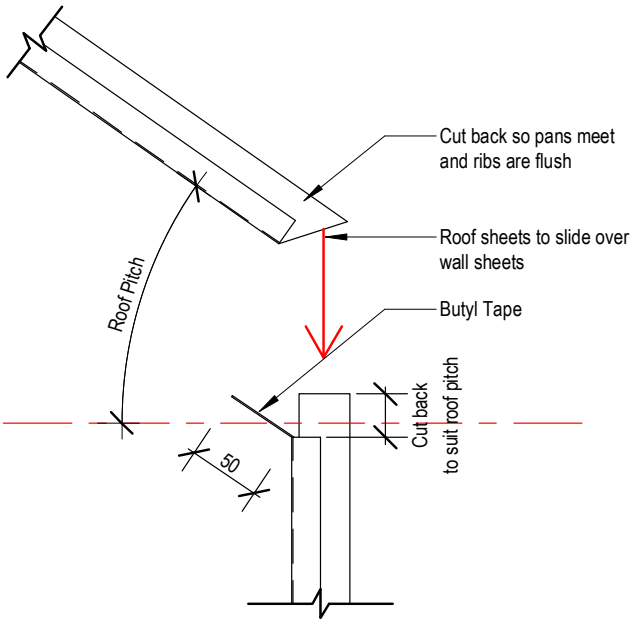
Figure 12.3.4.2:

Typical Wall Cladding Setout - Unsupported SNAPSEAM™ Vertical Fix - Plan View - S12-22

STEP 1

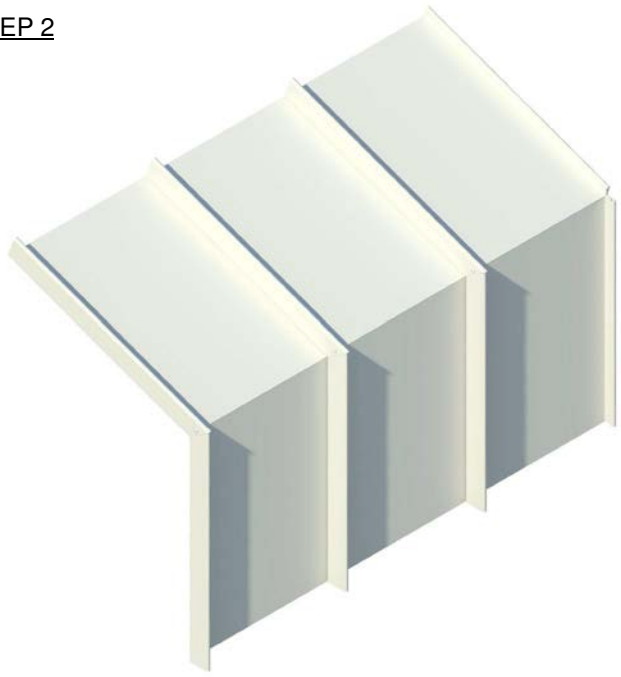


3D VIEW

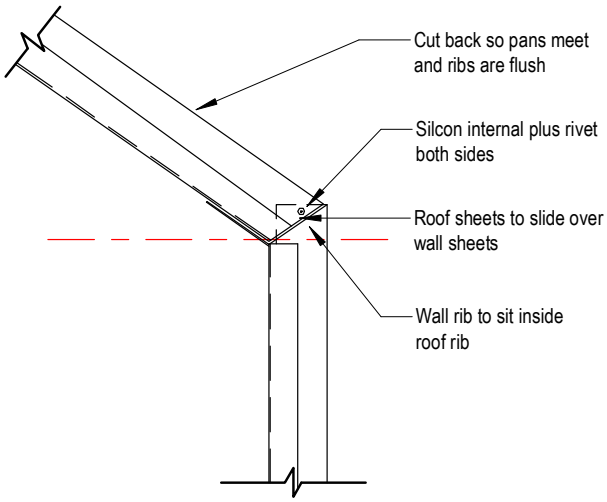


SECTION

STEP 2



3D VIEW

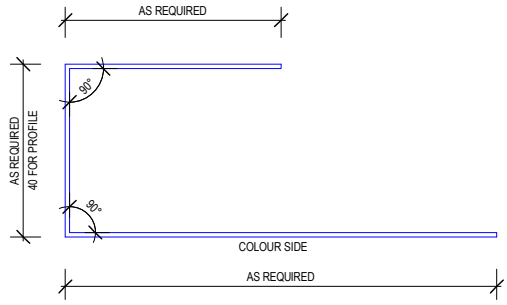


SECTION

12.3.5 SNAPSEAM™ TYPICAL FLASHINGS

Figure 12.3.5.1:

SNA-100 - J Mould Flashings



SNA-100 - J Mould Flashing with Squash Fold

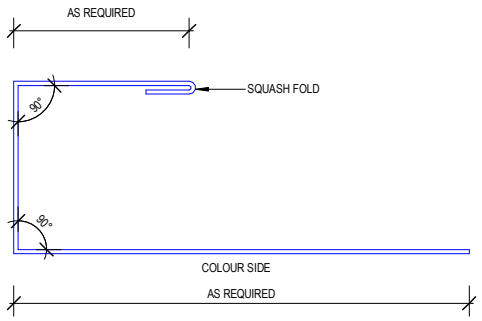
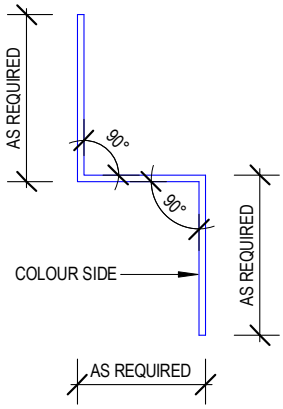


Figure 12.3.5.2:

SNA-101 - Z Mould Flashings



SNA-101 - Z Mould Flashing with 1 Squash Fold

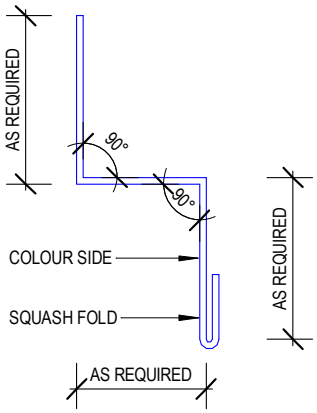
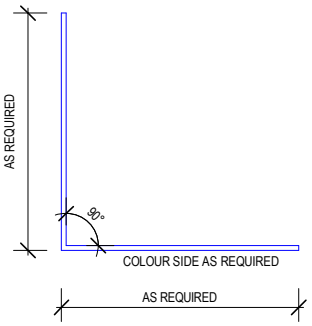
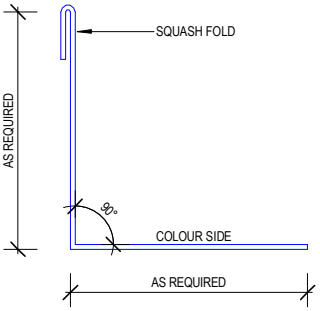


Figure 12.3.5.3:

SNA-102 - L Mould Flashings



SNA-102 - L Mould Flashing with 1 Squash Fold



SNA-102 - L Mould Flashing with Squash Folds

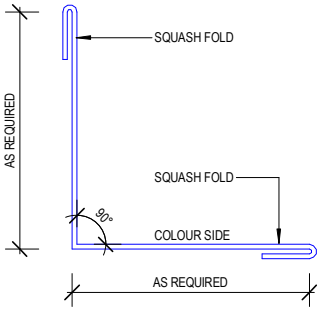
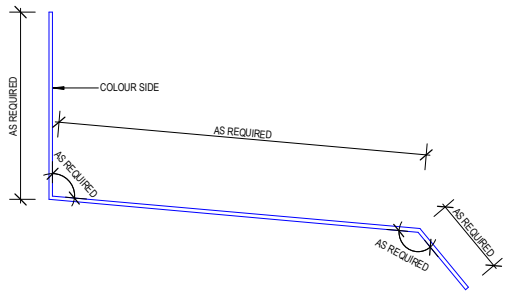


Figure 12.3.5.4:

SNA-103 - Apron Flashings



SNA-103 - Apron Flashing with Squash Fold

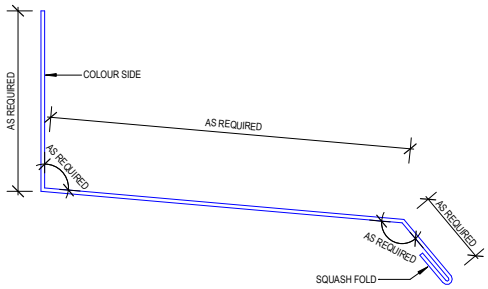


Figure 12.3.5.5:

SNA-104 - U Mould Flashing

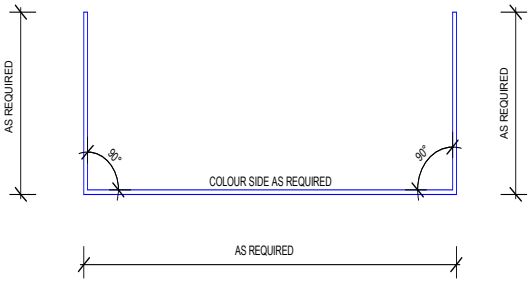


Figure 12.3.5.6:

SNA-200 - External Corner Over Flashing

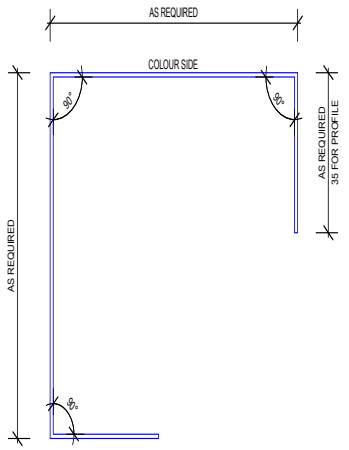


Figure 12.3.5.7:

SNA-201 - Single Return Over Flashing

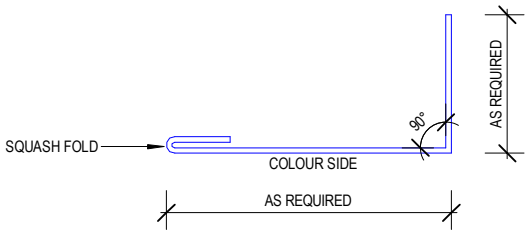


Figure 12.3.5.8:

SNA-202 - Internal Corner Over Flashing

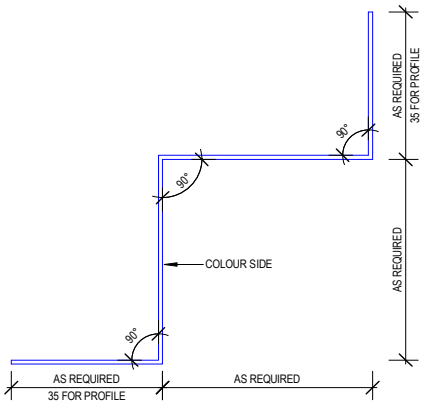
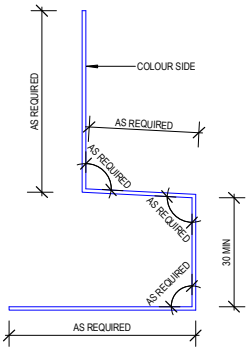


Figure 12.3.5.9:

SNA-203 - Base Flashings



SNA-203 - Base Flashing with Squash Fold

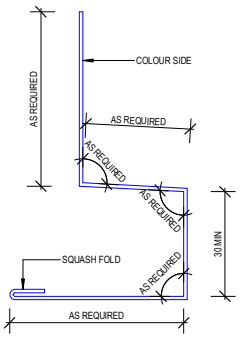


Figure 12.3.5.10:

SNA-204 - Aluminium Base Flashing with Ventilation

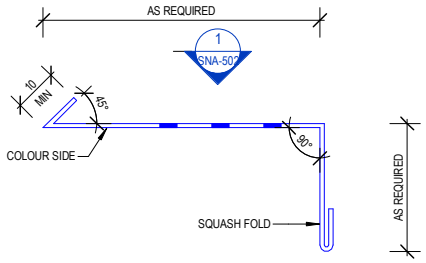


Figure 12.3.5.11:

SNA-205 - Top of Wall Flashing

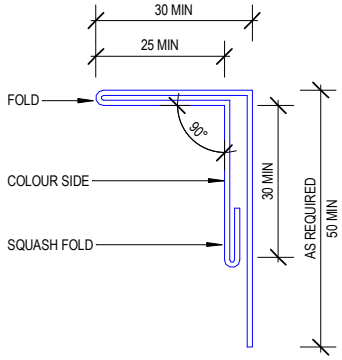
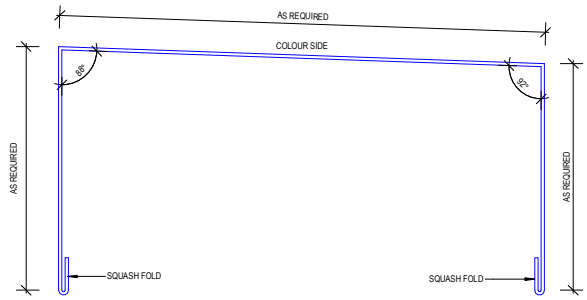


Figure 12.3.5.12:

SNA-206 - Parapet Top Flashing with Squash Folds



SNA-206 - Parapet Top Flashing with Squash Fold and return

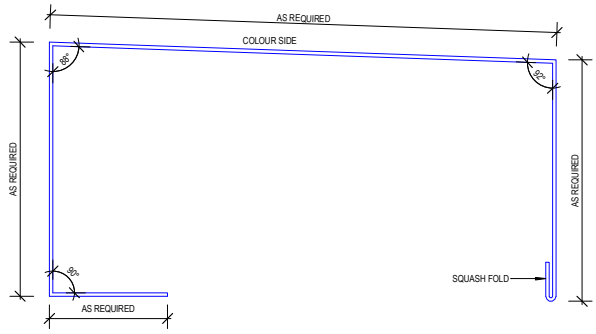


Figure 12.3.5.13:

SNA-300 - Roof Valley Flashing

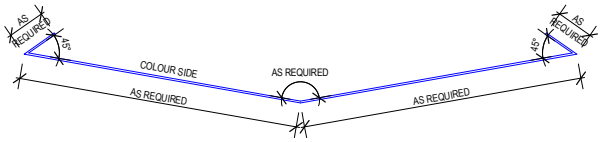
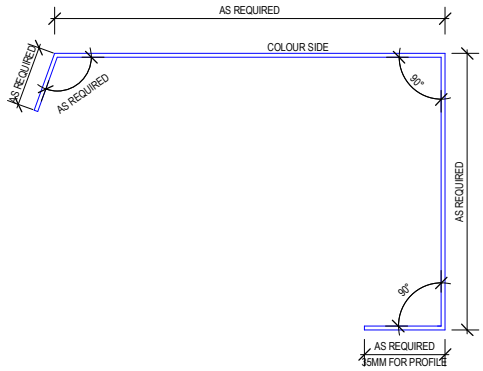


Figure 12.3.5.14:

SNA-301 - Barge Flashing with returns



SNA-301 - Barge Flashing with return and Squash Fold

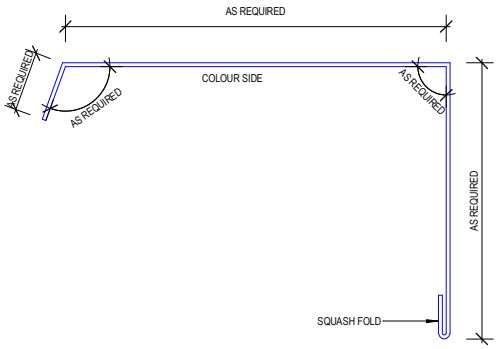


Figure 12.3.5.15:

SNA-302 - Ridge Cap Flashing

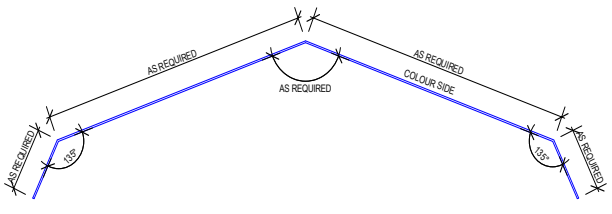


Figure 12.3.5.16:

SNA-400 - Window Sill Flashing with Squash Fold

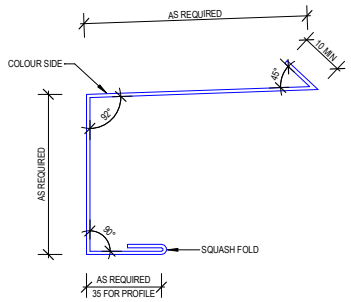


Figure 12.3.5.17:

SNA-401 - Window Head Flashing with Squash Fold

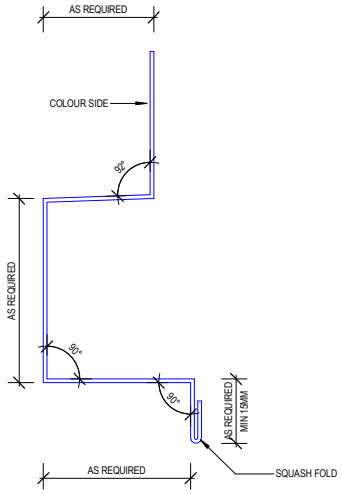


Figure 12.3.5.18:

SNA-402 - Window Jamb Flashing with Squash Folds

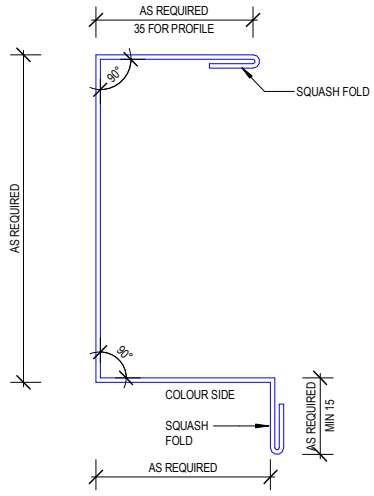


Figure 12.3.5.19:

SNA-403 - Window Z flashing with Squash Fold

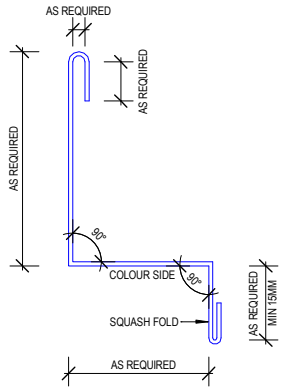
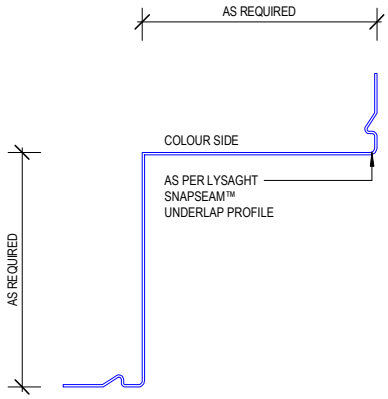
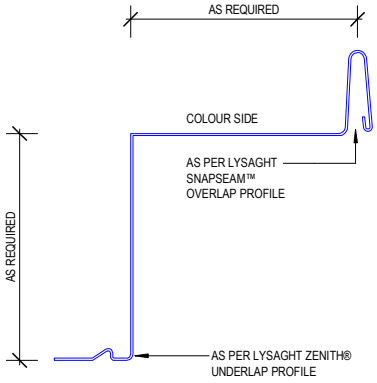


Figure 12.3.5.20:

SNA-500 - External Corner Details - Underlap Underlap



SNA-500 - External Corner Details - Overlap Underlap



SNA-500 - External Corner Details - Overlap Overlap

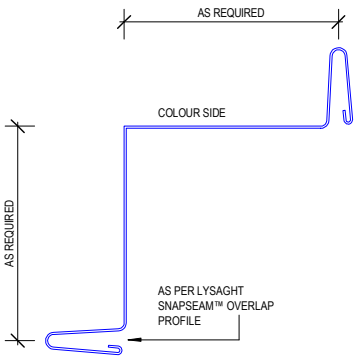
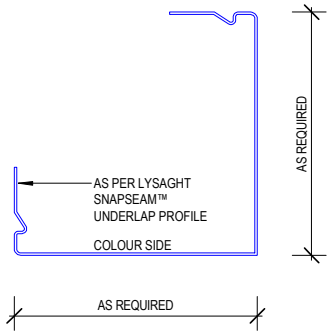
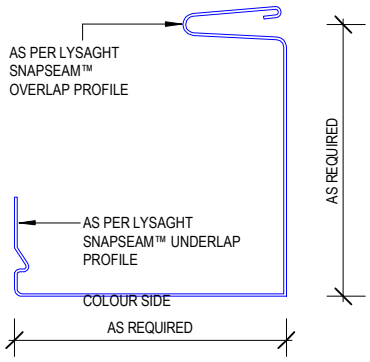


Figure 12.3.5.21:

SNA-501 - Internal Corner Details - Underlap Underlap



SNA-501 - Internal Corner Details - Overlap Underlap



SNA-501 - Internal Corner Details - Overlap Overlap

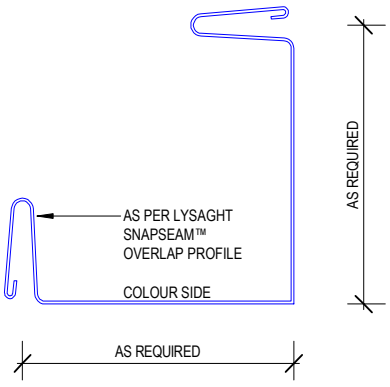


Figure 12.3.5.22:

SNA-502 - Perforation Detail

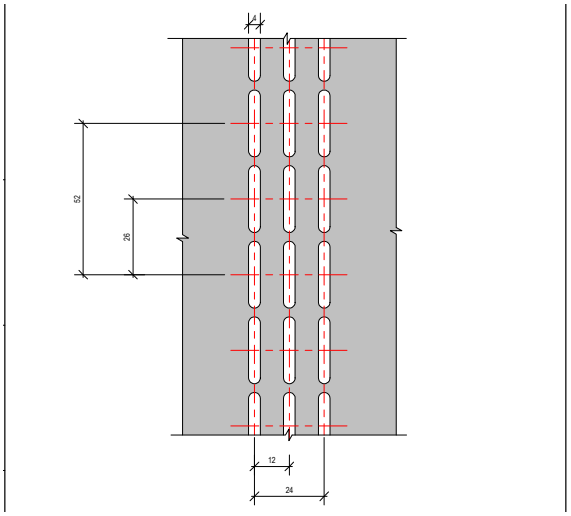
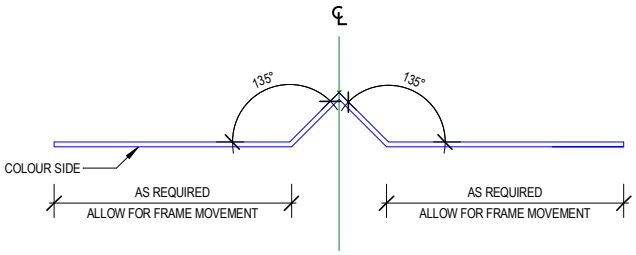


Figure 12.3.5.23:

SNA-503 - Corrosion Resistant Flashing



13.0 IMPERIAL™ roof and wall cladding

IMPERIAL™ architectural cladding is a concealed fixed flat panel cladding system. IMPERIAL™ is structurally sound for direct fixed to steel battens and can also be fixed onto conventional supporting substrate such as plywood or fibre cement panels. The wide flat profile gives a modern architecturally designed premium finish.

IMPERIAL™ cladding has a curving capacity, not easily achieved with all cladding profiles. IMPERIAL™ cladding can be pre-curved to a radius of 3m.

13.1 MATERIAL SPECIFICATIONS

Coverage (mm)	325			525		
Base Metal Thickness (mm)	0.55	0.7*	0.75*	0.55	0.7*	0.75*
Total Coated Thickness[1] (mm)	0.6	0.75	0.8	0.6	0.75	0.8
Rib Height (mm)	27					
Sheet Length[2] (mm)						
Minimum	850					
Maximum	24,000 [2]					
Mass / Unit Length (kg/m)						
ZINCALUME® steel	1.78	2.25	2.41	2.67	N/A	3.61
COLORBOND® steel[1]	1.79	2.29	2.42	2.69	N/A	3.63
Mass / Unit Area (kg/m²)						
ZINCALUME® steel	5.48	6.92	7.42	5.09	N/A	6.89
COLORBOND® steel[1]	5.52	7.06	7.46	5.13	N/A	6.92
Minimum Yield Strength	300 (G300)					
Coating Class **(See Base Material for detail)**	AM125 - ZINCALUME® steel AM100 - COLORBOND® steel AM100 - COLORBOND® METALLIC steel AM150 - COLORBOND® ULTRA steel					
Tolerance	Sheet length: ±3mm Cover width: ±2mm					
Thermal Expansion	2.9mm average per 5m @ 50°C change					

Notes:

1. Based on standard, single sided COLORBOND® steel. For other painted steel options please contact your Lysaght representative.
2. Sheet lengths greater than 24,000mm are not recommended due to thermal expansion and contraction.

*Please check with your local branch for availability.

MINIMUM ROOF PITCH

The minimum recommended roof pitch for IMPERIAL™ cladding is 1 degree or 3 degrees minimum pitch for end lapped roofs.

INSULATION

Care needs to be taken when installing insulation with IMPERIAL™ roof sheeting. The screws may need to be increased depending on the thickness and density of the insulation. When the screw is properly tightened into metal there should be a minimum of three (3) threads protruding past the support being fixed in to. For timber the screw must have a min embedment of 25mm into the timber.

For insulation, the use of roof spacing system is recommended to help maintain Rw values as well as minimising any bulging in the profile caused by the insulation. Refer to oil canning section for potential visual impacts of insulation on the product.

Figure 13.1.1:

IMPERIAL™ profile.

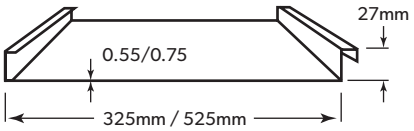


Figure 13.1.2:

Single lock seam



FASTENING IMPERIAL™ CLADDING TO SUPPORTS

IMPERIAL™ is a conceal fixed cladding system utilising 2 type of clips, the fixed clip are usually positioned at building edge and the sliding clip is used at non perimeter areas as well as at building edges.

Table 13.1.1:

Fastener Specification.

Application	Fixing to steel	Fixing to plywood/timber batten
Non-Cyclonic Roofing & Walling	Fixed clip: 2x M4.8-16x16 Smooth top flat head metal screw with minimum class 3 coating	Fixed clip: 2 x #8-10x25 CSK ribbed head needle point screw fastener with minimum class 3 coating Sliding clip: 3 x #8-10x25 CSK ribbed head needle point screw fastener with minimum class 3 coating

MAXIMUM BATTEN / SUPPORT SPACINGS [1]

Type of Span	325mm cover			525mm cover		
	0.55mm BMT	0.70mm* BMT	0.75mm* BMT	0.55mm BMT	0.70mm* BMT	0.75mm* BMT
Roofs						
Single span End span Internal Span	For all span type: Fixed clip at 350 at roof edge Sliding clip at 700 at general area	For all span type: Fixed clip at 450 at roof edge Sliding clip at 800 at general area		Not suitable for roofing applications		
Unstiffened eaves overhang	50	50	50			
Walls						
Single span End span Internal span	For all span type: Fixed clip at 350 at wall edge Sliding clip at 700 at wall area	For all span type: Fixed clip at 450 at wall edge Sliding clip at 800 at wall area		For all span type: Fixed clip at 350 at wall edge Sliding clip at 700 at wall area	N/A	For all span type: Fixed clip at 450 at wall edge Sliding clip at 800 at wall area
Overhang	100	100	100	100	N/A	100

1. Refer Section 2.5 - Support Spacing and Overhang for loading parameters applicable to MAXIMUM SUPPORT SPACINGS. For Projects outside these loading parameters (Region B) designers should reference LIMIT STATE WIND CAPACITIES tables to determine appropriate support spacings.
2. For installation on steel batten support, only the fixed clip can be used. These should be used at 350mm centres at building edges and 700mm centres in all other areas as denoted at Figure 13.2.1 and 13.2.2. Sheeting lengths should be limited to a maximum of 8m in this situation.

*Please check with your local branch for availability.

IMPERIAL™: LIMIT STATE WIND PRESSURE CAPACITIES (KPA)

BMT/Cover width	Support	Clip type /Spacing	Design Pressure (kPa)		Application
			Serviceability	Strength	
0.55mm /325mm	15mm F11 CD structural grade plywood maximum batten / support spacing 450mm 19mm F11 CD structural grade plywood maximum batten / support spacing 600mm	Sliding /700mm	1.16	4.15	Roofing & Walling
		Fixed/Sliding /350mm	0.78	4.93	
	Steel batten: 40mm x 0.55mm BMT G550 Batten span: 1200mm (max)	Fixed /700mm	1.16	2.58	
		Fixed /350mm	0.78	4.59	
0.55mm /525mm	15mm F11 CD structural grade plywood maximum batten / support spacing 600mm	Sliding /700mm	0.45	1.45	Walling only
		Fixed/Sliding /350mm	0.32	2.37	
	Steel batten: 40mm x 0.55mm BMT G550 Batten span: 1200mm (max)	Fixed /700mm	0.45	1.45	
		Fixed /350mm	0.32	2.42	

Minimum support / purlin thickness must be 1mm BMT, G550

For maximum roof lengths for drainage see Page 17 Table 6.1.1

Table 13.1.2:

Guide to fastener layout and sheet coverage.

SHEET COVERAGE

325MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	10	13	16	19	22	25	28	31	34	37	40	44	47	50	53	56	59	62	93	124	154

525MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	6	8	10	12	14	16	18	20	21	23	25	27	29	31	33	35	37	39	58	77	96

WIDTH COVERED BY 'X' NUMBERS OF SHEETS (M)

325MM

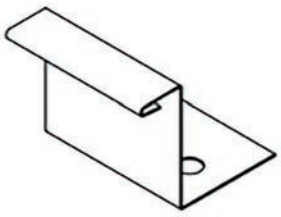
Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	0.98	1.30	1.63	1.95	2.28	2.60	2.93	3.25	3.58	3.90	4.23	4.55	4.90	5.20	5.53	5.85	6.13	6.50

525MM

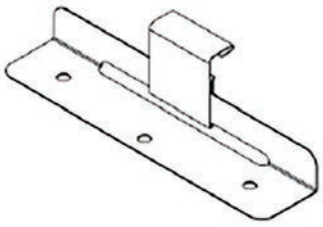
Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	1.58	2.10	2.63	3.15	3.68	4.20	4.73	5.25	5.78	6.30	6.83	7.35	7.90	8.40	8.93	9.45	9.93	10.5

STAINLESS STEEL CLIPS

IMPERIAL™ is a conceal fixed cladding system utilising 2 type of clips, the fixed clip are usually positioned at building edge and the sliding clip is used at non perimeter areas as well as at building edges.



IMPERIAL™ fixed clip



IMPERIAL™ sliding clip

Refer to Figure 13.2.1 for recommended clip layout and maximum support spacings for roofing and walling application.

For installation on steel batten support, only the fixed clip can be used. These should be used at 350mm centres at building edges and 700mm centres in all other areas as denoted at Figure 13.2.1 and 13.2.2. Naturally batten spacings will need to align these clip spacings. The IMPERIAL™ clips are manufactured from 304 Grade Stainless Steel for maximum corrosion resistance. Direct contact between stainless steel clips and any galvanised steel materials should be avoided. It is therefore recommended to place a barrier such as either a min 250 micron thickness PVC tape, heavy duty sarking or rubber membrane/pad between the clip and batten interface.

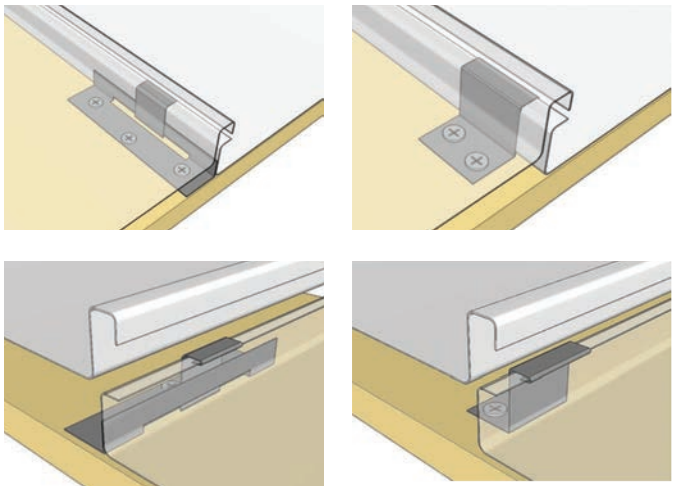
Note: steel batten supports with fixed clips is suitable for sheet lengths less than 12m. Fixed clips will restrict thermal movement of the profile, this may contribute to oil-canning on wider profiles and darker colours. Shorter lengths may need to be considered if this is a concern.

SEAMING TOOL

The cladding is to be installed with the seam running at 90° to the immediate support. The seam is then formed using a specially designed seaming tool that bends the lip of the overlap rib 90° locking it into the underlap rib. This process is done once for a single seam.

Figure 13.1.2:

Sliding & fixed clips.



13.2 PRE-CURVED SHEETS

Pre-curving of IMPERIAL™ is available for various applications - we don't recommend pre-curving for other ZENITH® profiles.

Pre-curved IMPERIAL™ is popular for aesthetics, or for function (such as a gutterless eave design). IMPERIAL™ can be curved to a small radius of 3m radius

Because of the spacing of curving rolls, there is usually a straight portion at the end of the sheet beyond the curve of 500mm. Allow for this in your design. It can be trimmed off if necessary.

RECOMMENDED CLIP LAYOUT

"a" maybe approximately calculated as -

1. RESIDENTIAL APPLICATIONS Residential applications covered by AS 4055, for any building face (including roof face) "a" is 1200mm.
2. NON RESIDENTIAL APPLICATIONS For applications other than residential, covered under AS 1170.2, calculation of "a" is more complex and generally determined by the project design engineer. The general principles that apply to the calculation of "a" are the lesser of;
   i. Building wall face length x 0.2
   ii. Building wall face width x 0.2
   iii. Building height

As an example ; we have a non residential building with a ridge line length of 50m and a building end wall width of 9m, and a building height of 8m. Calculation of "a" is as follows;

a. Building face length x 0.2 = 50m x 0.2 = 10m

b. Building face width x 0.2 = 9m x 0.2 = 1.8m

c. Building height = 8m

In this example the lesser dimension of 10m , 1.8m and 8m is 1.8m and as a consequence "a" = 1.8m to all edges of the building including roofing edges.

Figure 13.2.1:

Roofing and Vertical Walling.

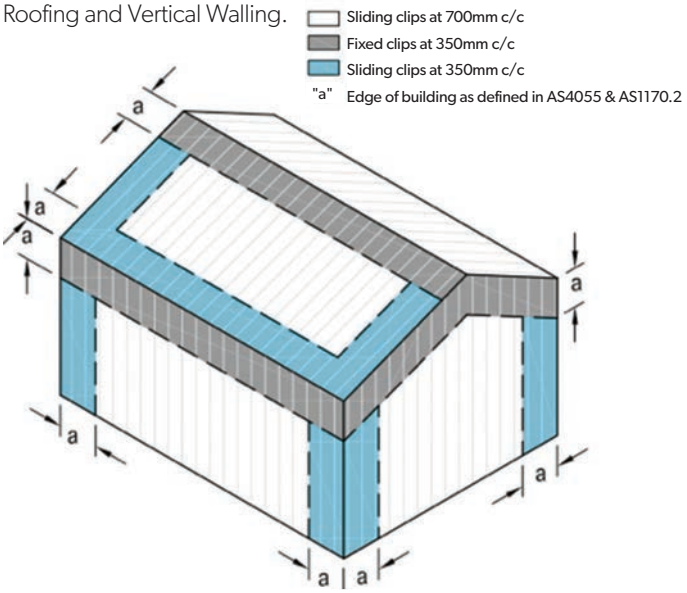


Figure 13.2.2:

Horizontal Walling.

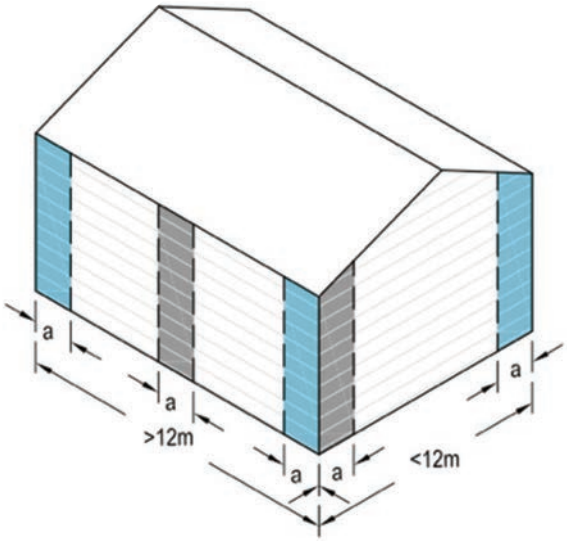
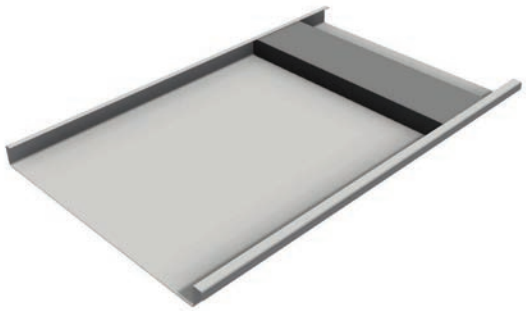


Figure 13.2.3:

Foam Infill detail.

80mm x 30mm closed cell foam infill cut to size and shape on site as required under ridge, hip or corner flashing



ROOF LENGTH FOR VARIOUS ROOF SLOPES AND RAINFALL INTENSITY

See Page 17 Table 6.1.1 for more information.

ENDS OF SHEETS

It is usual to allow roof sheets to overhang into gutters by about 50mm.

TYPICAL ROOFING INSTALLATION

1. IMPERIAL™ is designed to be installed in conjunction with a heavy duty building membrane as an additional weather-proofing measure. This membrane should be installed in accordance with the manufactures recommendations, sealed at the top, free from ripples and puckers, starting from the lowest part of the roof, lay across the roof supports the breathable membrane. Proceed to lay further runs up the roof pitch until the whole of the plywood / battens is covered. Make sure that all the laps are from the top run over the lower run so any moisture will run into the gutters.
2. Install a starter edge trim before attempting to fix the first panel.
3. Place the first panels over-lap rib over the lip of the edge trim and when engaged lay the panel flat on the covered plywood
4. Fit the clips to the under-lap rib at the specified spacings, making sure that they are square with no sharp edges protruding and screws fully tightened.
5. Remove any protective strippable film before fixing the next panel.
6. Place the next panel's over-lap rib over the under-lap rib and repeat for rest of the panels.
7. Seam the ribs with one pass for the single seam.
8. Flash the roof with products of the same material as the roof panels as per architects details.

TYPICAL WALLING INSTALLATION

In walling applications, horizontal pressure will need to be applied locally to the sheets to engage the ribs. Use body pressure (torso,hand or foot) or use a rubber mallet if required. Care should be exercised due to the potential instability of the temporary worker access equipment.

To prevent IMPERIAL™ from sliding downwards through clip fixing due to dead load of sheet, pierce fix through each sheet (1, #10-16x 16 Metal Teks with EPDM washer per pan or 2, 4.8mm diameter rivets per pan) under the flashing or capping, along the top of the sheets.

13.3 TYPICAL CONSTRUCTION DETAILS IMPERIAL™

The construction details presented here represent potential detailing solutions to common construction situations. These details may not be suitable for all projects / situations and users should use professional judgement in determining suitability of the details for their particular project whilst referencing AS 1562.1 and SA HB39. The full suite of ZENITH® constructions details are available for download from https://bimcontent.com/lysaght/ in both REVIT and PDF format.

13.3.1 IMPERIAL™ TYPICAL ROOF DETAILS

Figure 13.3.1.1:

Typical Roof Cladding Setout - Unsupported IMPERIAL™ - Plan View - I04-09

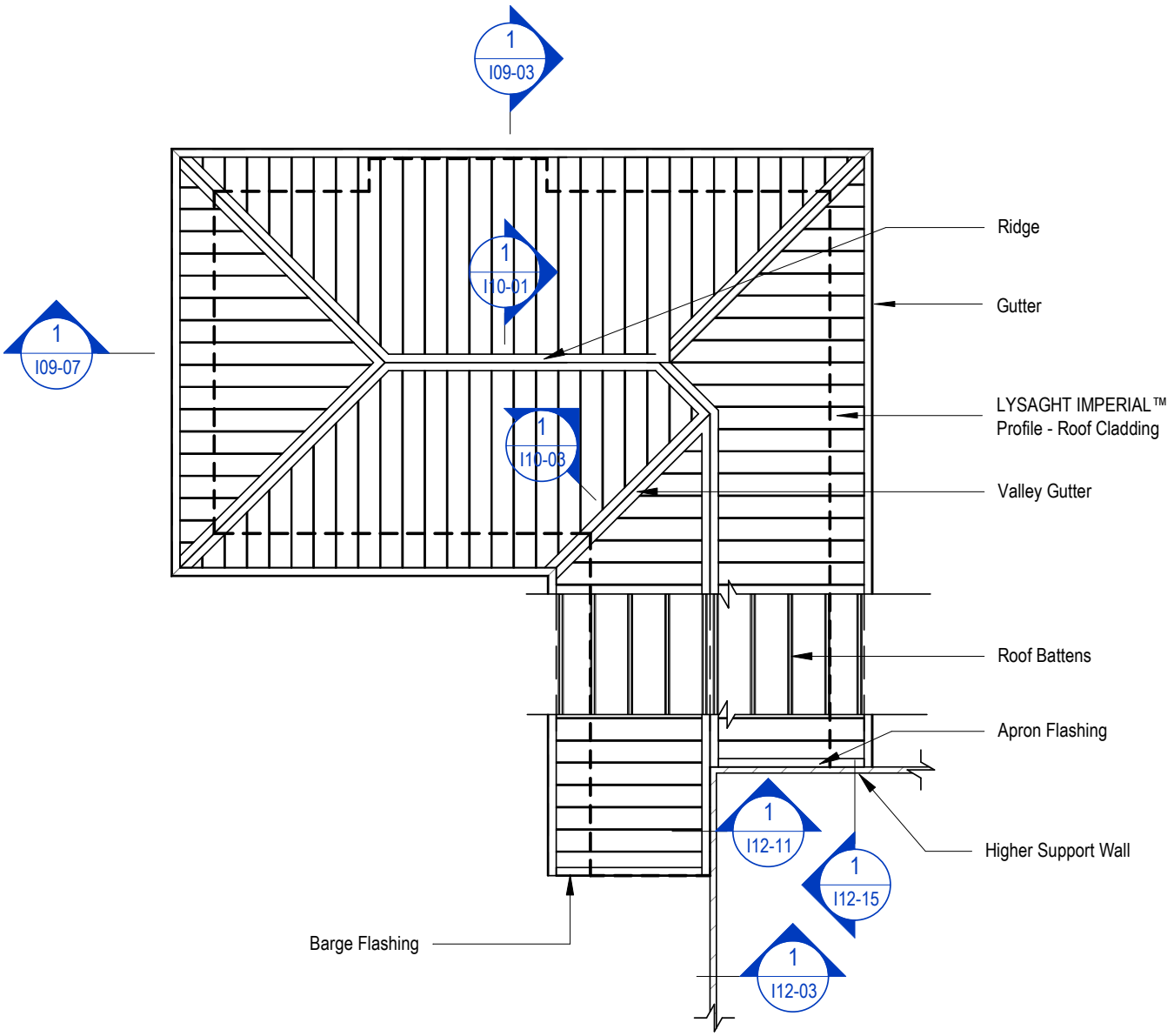


Figure 13.3.1.2:

Top of Wall Eave Detail - Zero Overhang - Unsupported IMPERIAL™ - Vertical Fix - I09-03

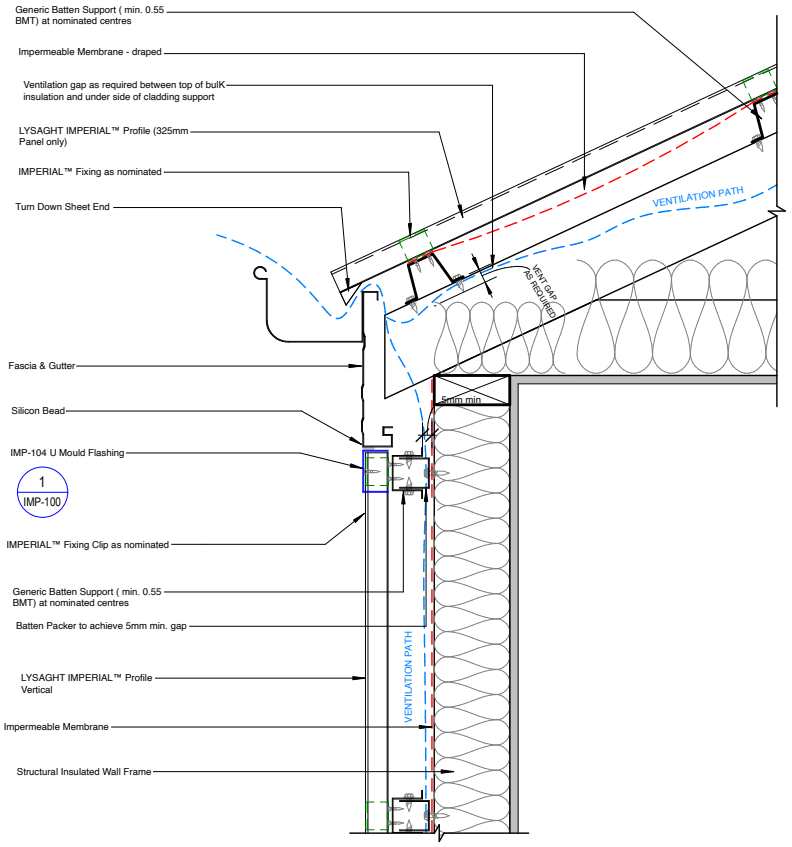


Figure 13.3.1.3:

Top of Wall Eave Detail - Overhang - Unsupported IMPERIAL™ - Vertical Fix - I09-07

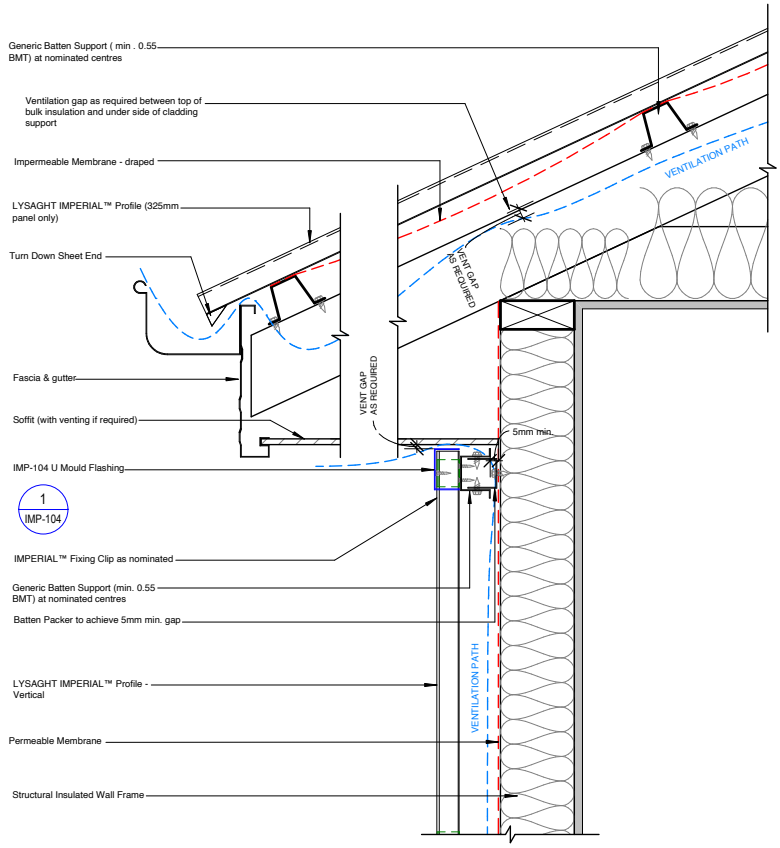


Figure 13.3.1.4:

Ridge Detail - Unsupported IMPERIAL™ - Panel - I10-01

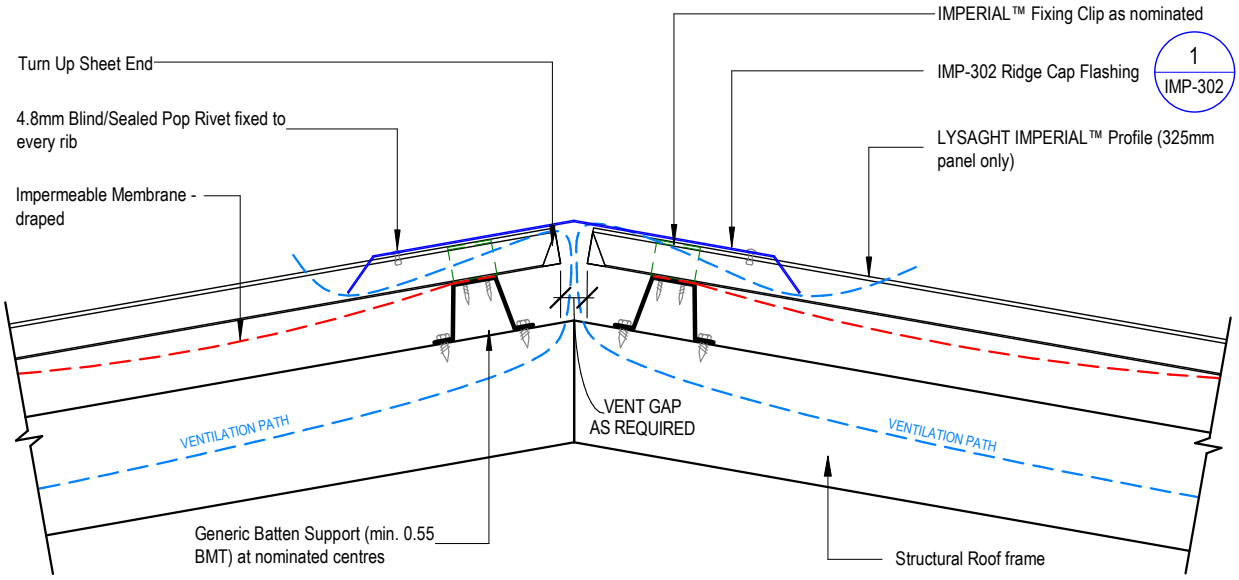


Figure 13.3.1.4a:

Ridge and Hip Cap.

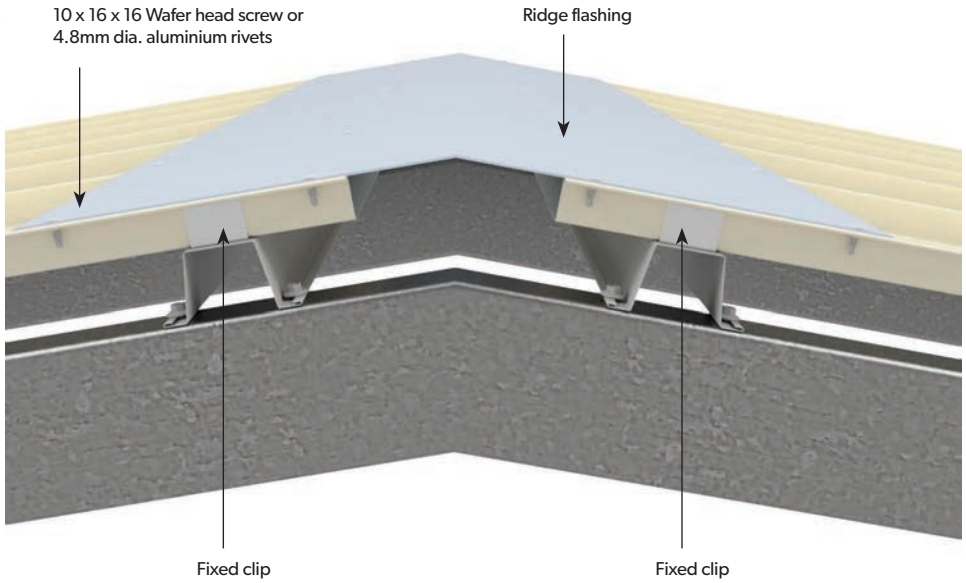


Figure 13.3.1.5:

Valley Detail - Unsupported IMPERIAL™ Panel - I10-03

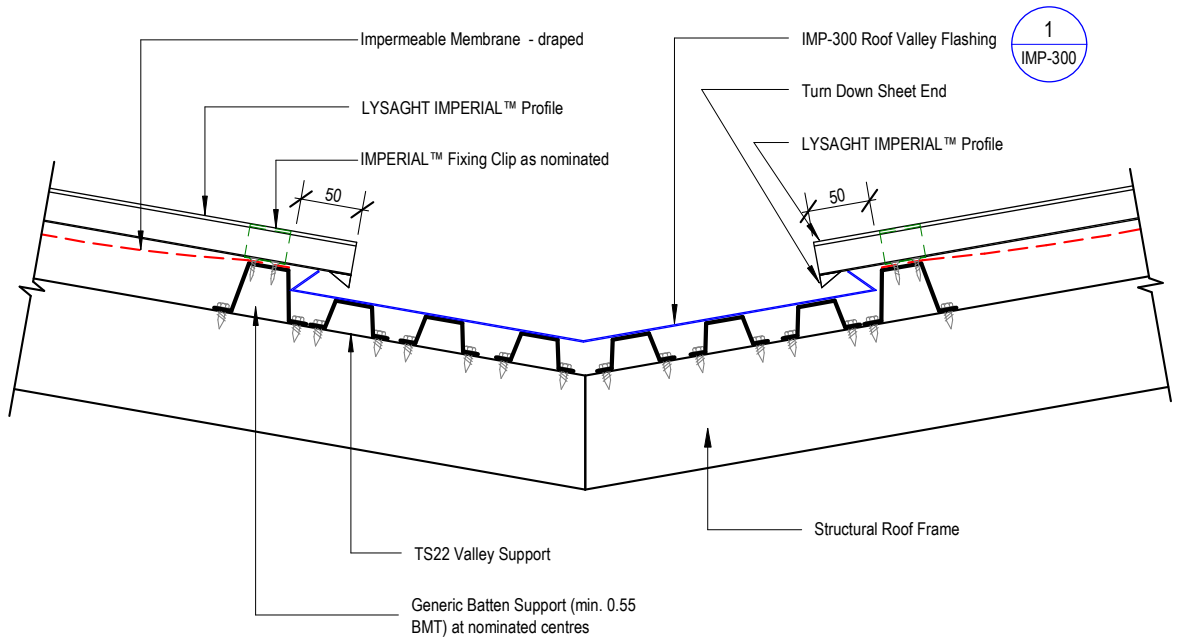


Figure 13.3.1.5a:

Valley Gutter — Battens.

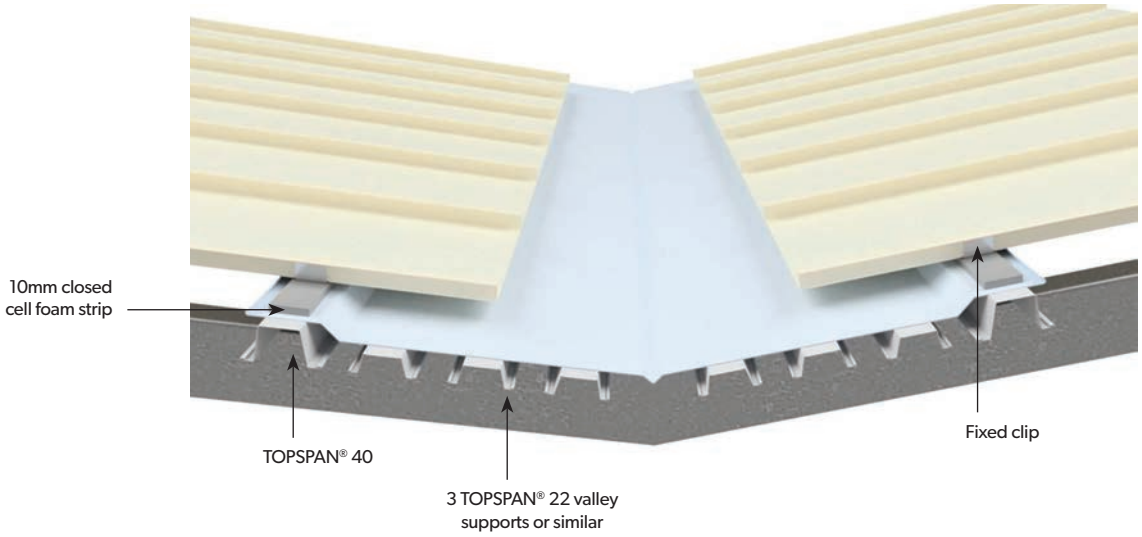


Figure 13.3.1.5b:

Box Gutter.

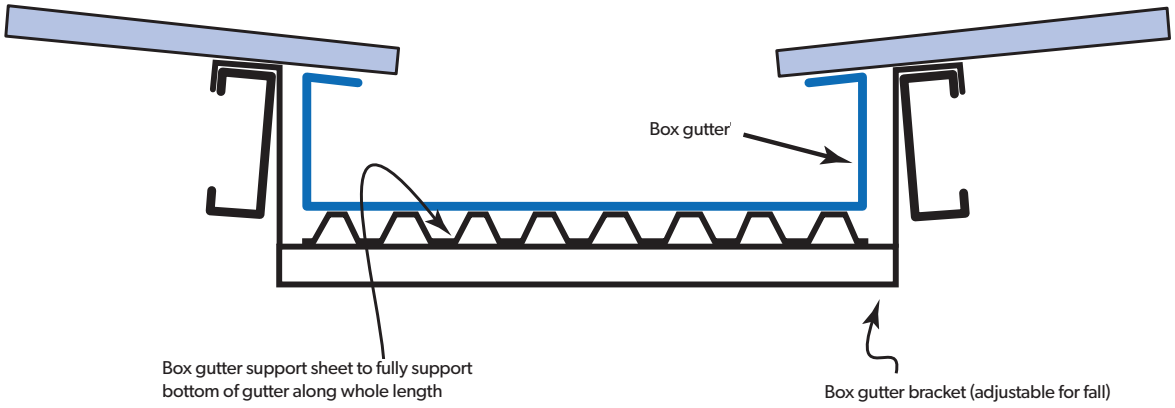


Figure 13.3.1.6:

Gable Detail - Unsupported IMPERIAL™ Roof and Wall - Vertical Fix - I10-05

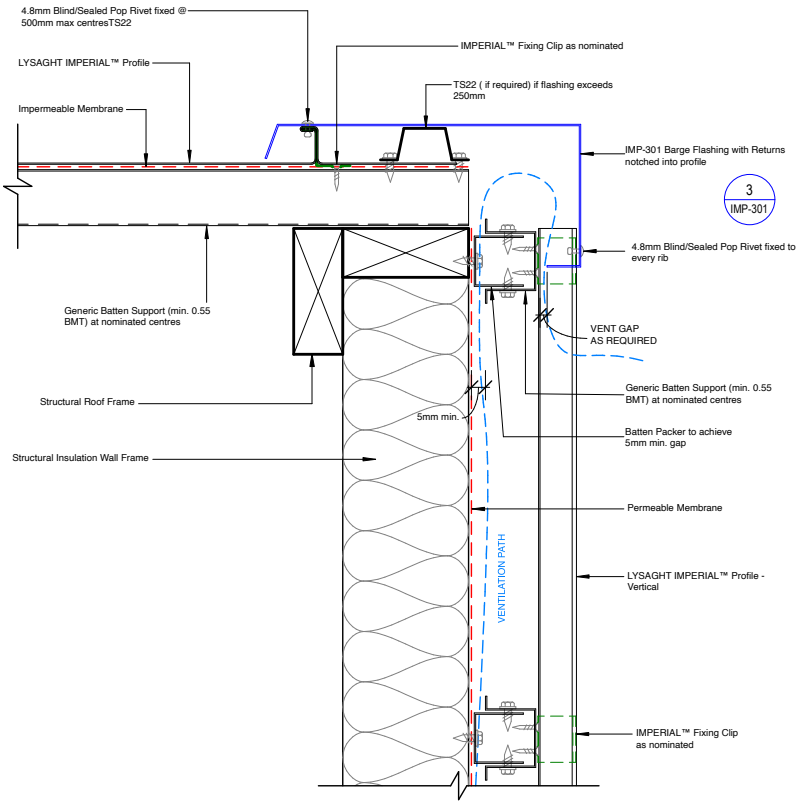


Figure 13.3.1.7:

Parapet Wall Detail - Unsupported IMPERIAL™ Panel - Vertical Fix - I12-03

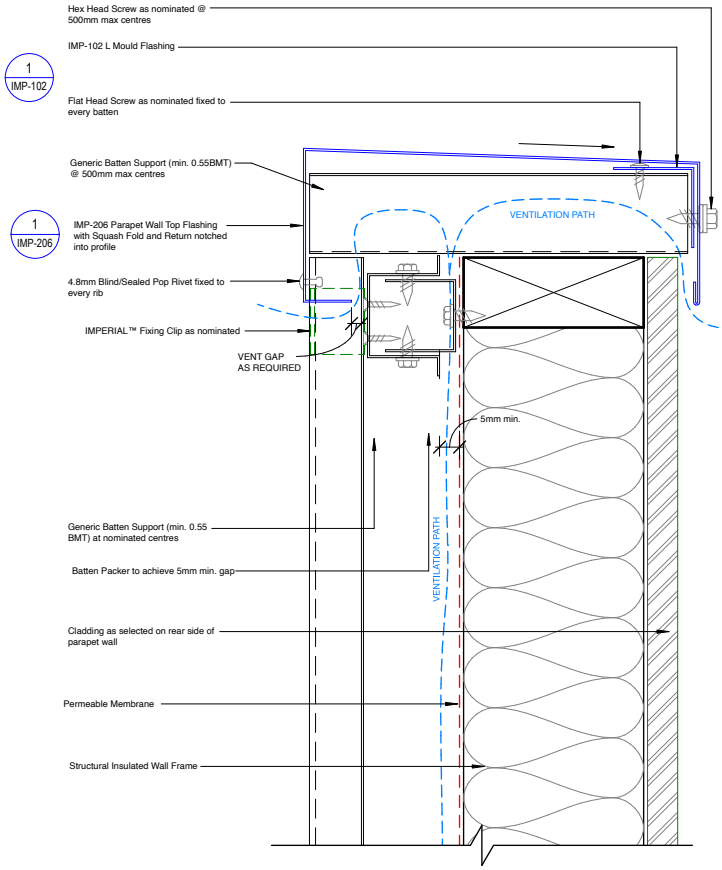


Figure 13.3.1.8:

IMPERIAL™ Vertical Fix Wall to IMPERIAL™ Roof - Unsupported - Side View - I12-11

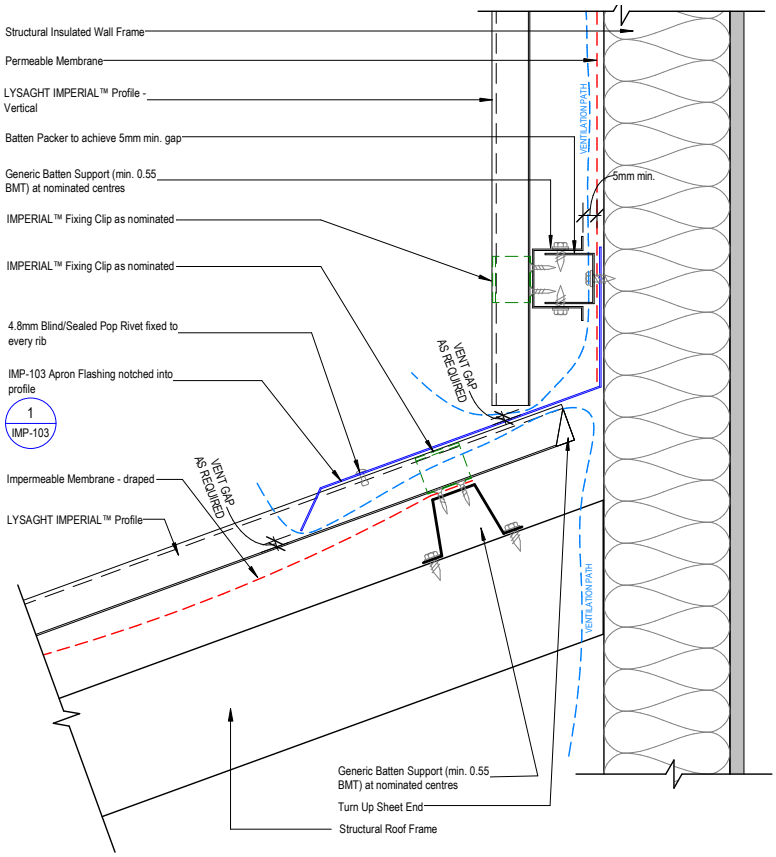
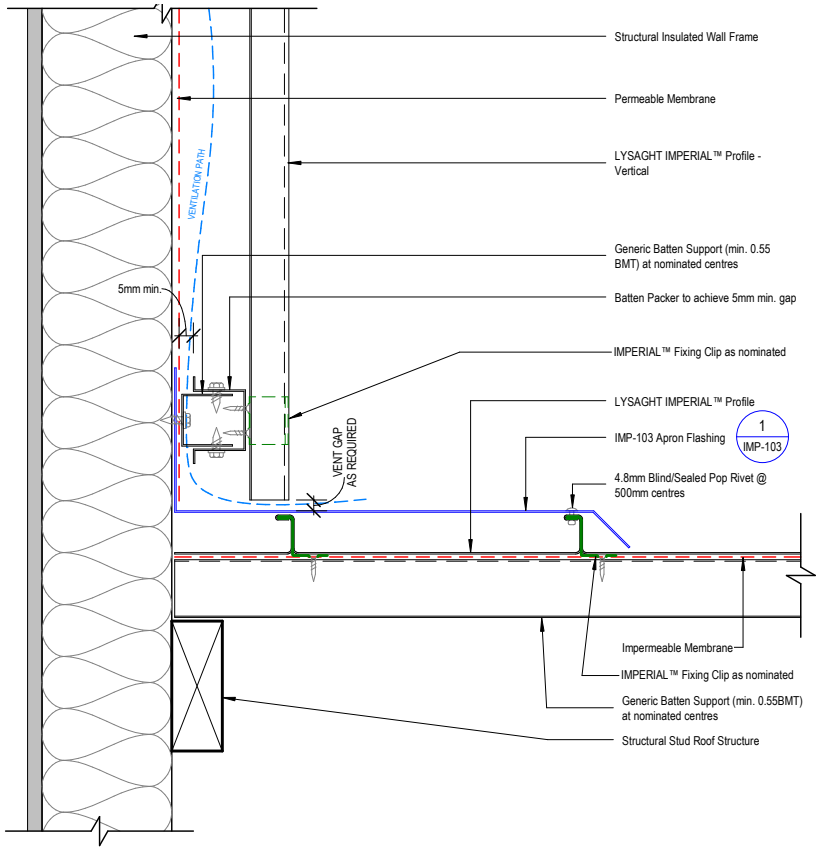


Figure 13.3.1.9:

IMPERIAL™ Vertical Fix Wall to IMPERIAL™ Roof - Unsupported - End View



13.3.2 IMPERIAL™ TYPICAL WALL DETAILS - HORIZONTAL FIX

Figure 13.3.2.1:

Typical Wall Cladding Setout - Unsupported IMPERIAL™ Panel Horizontal Fix - Plan View - I04-01

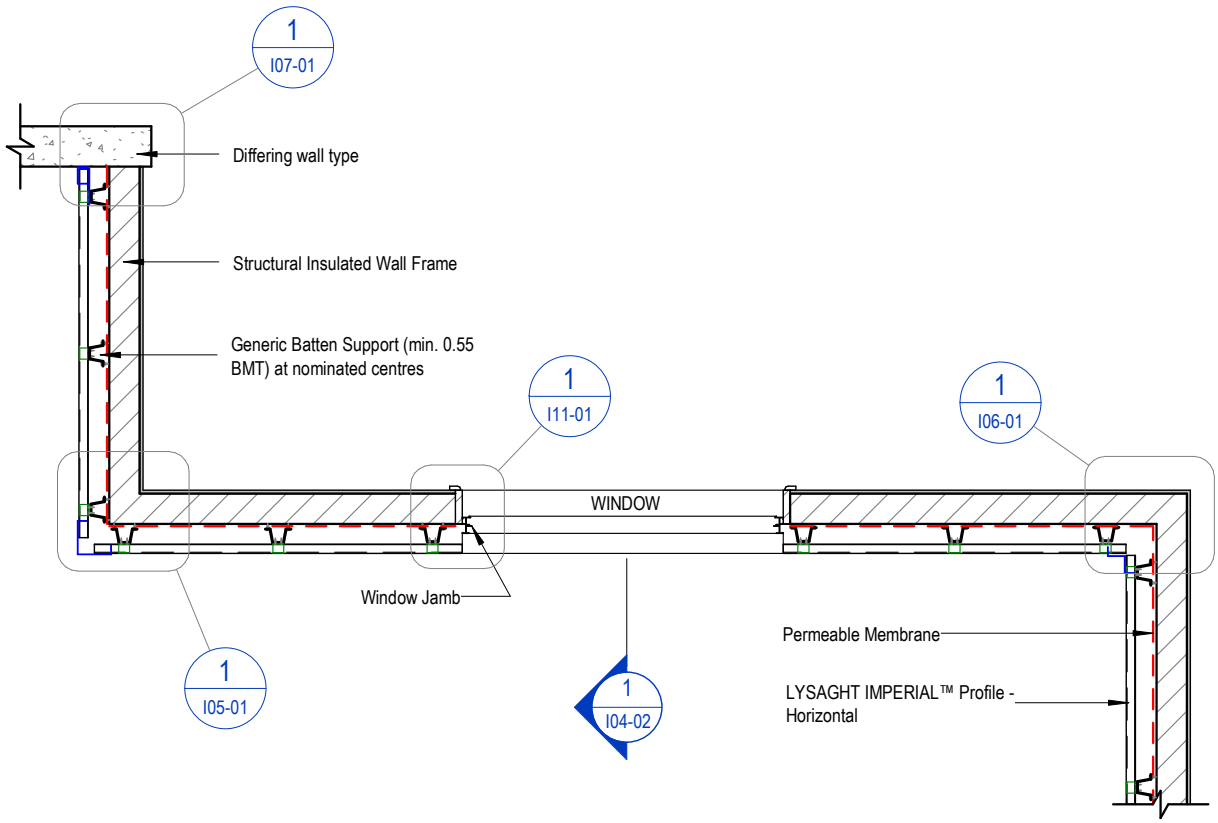


Figure 13.3.2.2:

Typical Wall Cladding Setout - Unsupported IMPERIAL™ - Horizontal Fix - Sectional View - I04-02

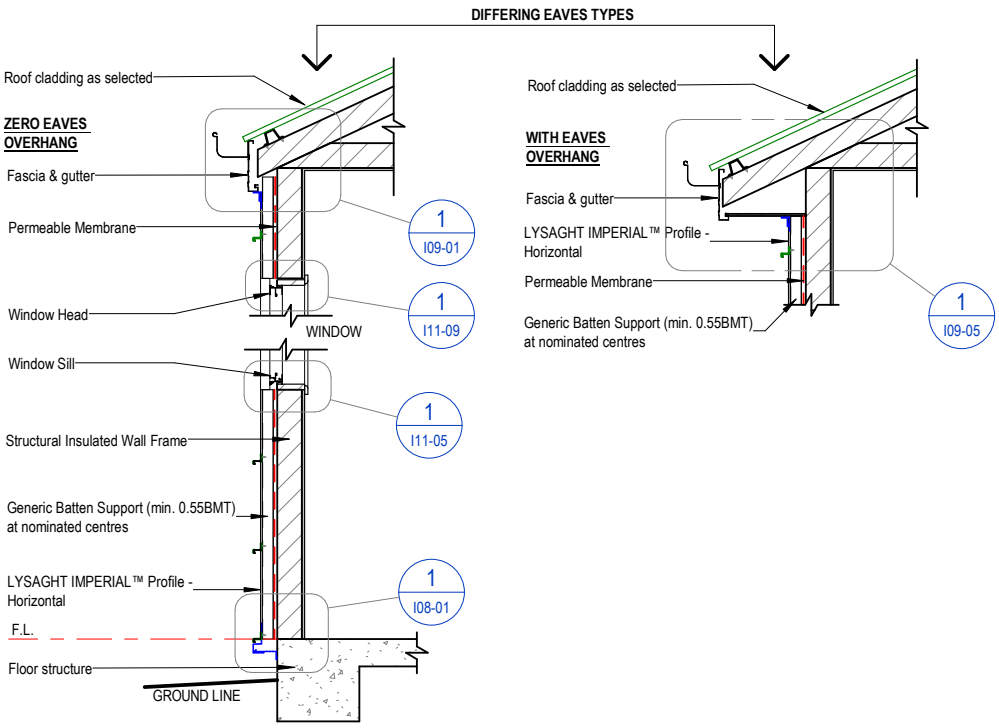


Figure 13.3.2.3:

External Corner Detail - Unsupported IMPERIAL™ Panel - Horizontal Fix - I05-01

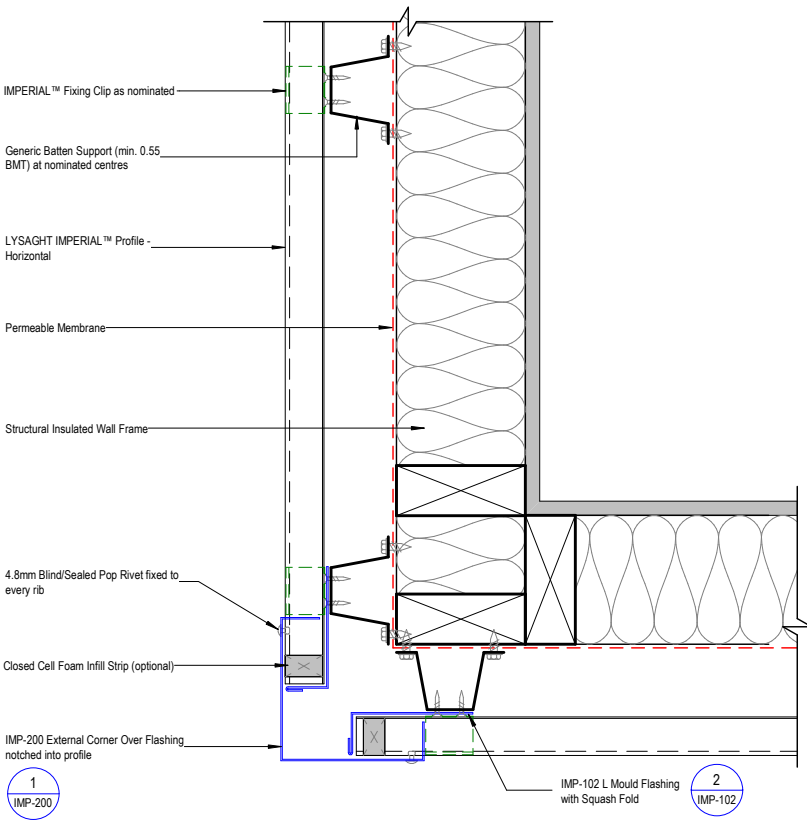


Figure 13.3.2.4:

Internal Corner Detail - Unsupported IMPERIAL™ Panel - Horizontal Fix - I06-01

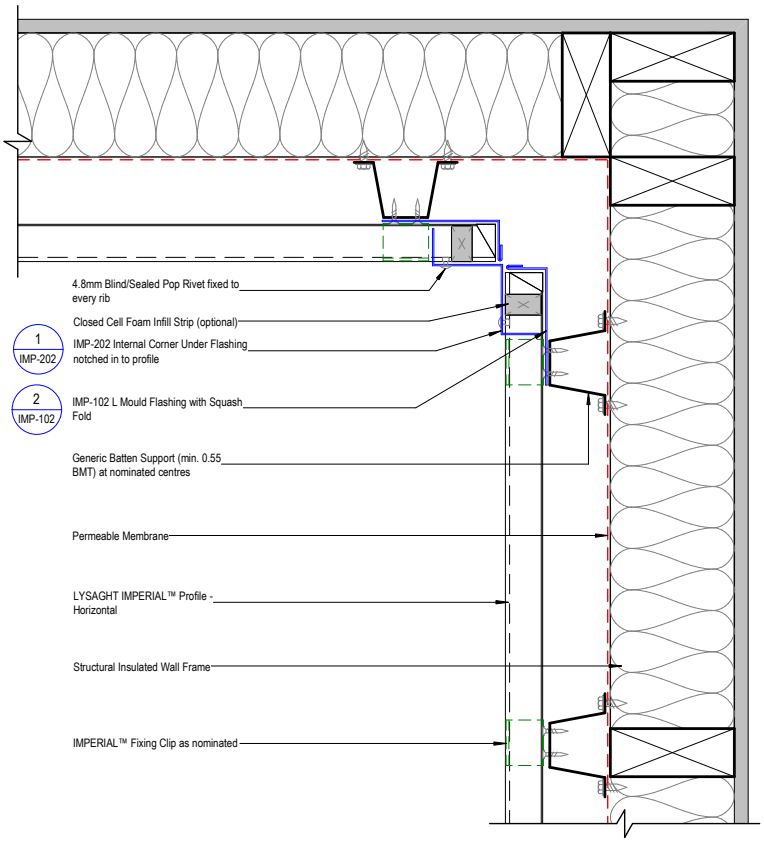


Figure 13.3.2.5:

Wall Closure Detail - Unsupported IMPERIAL™ Panel - Horizontal Fix - I07-01

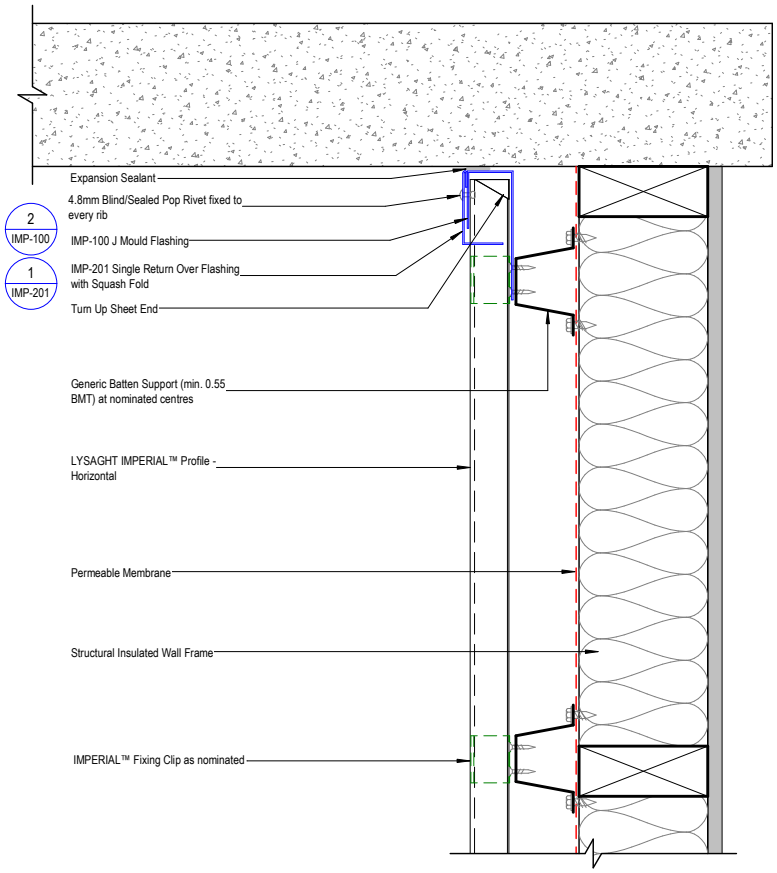


Figure 13.3.2.6:

Window Jamb Detail - Unsupported IMPERIAL™ Panel - Horizontal Fix - I11-01

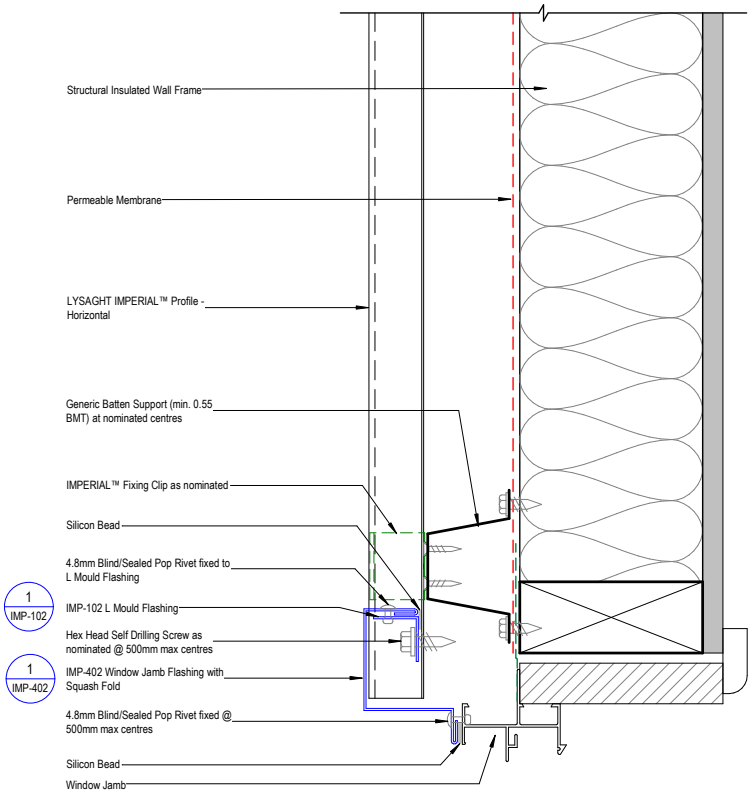


Figure 13.3.2.7:

Wall Base Detail - Unsupported IMPERIAL™ Panel - Horizontal Fix - I08-01

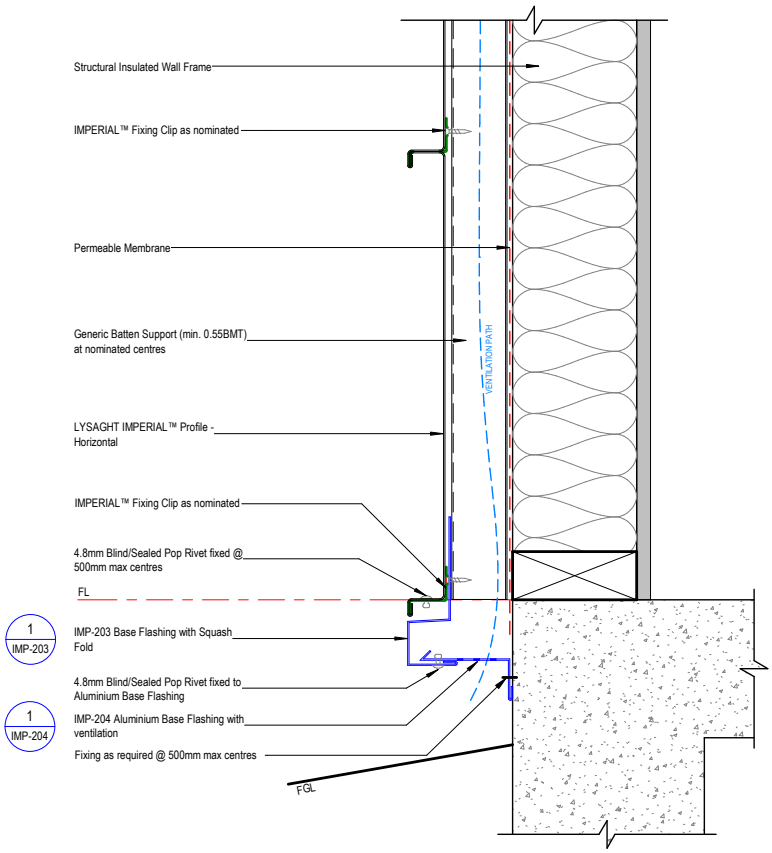


Figure 13.3.2.8:

Top of Wall Eave Detail - Zero Overhang - Unsupported IMPERIAL™ - Horizontal Fix - I09-01

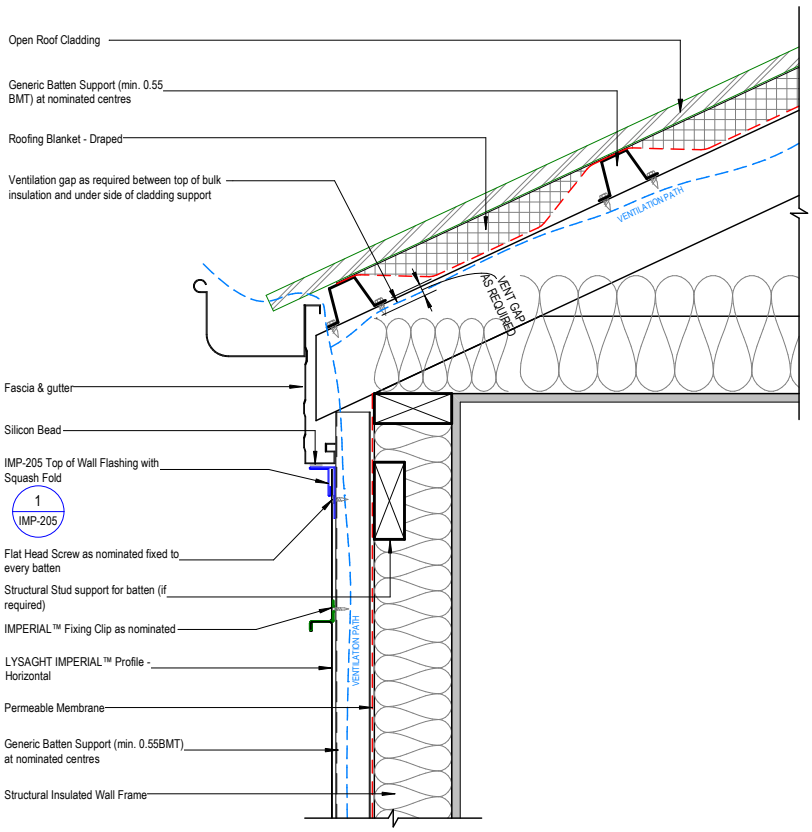


Figure 13.3.2.9:

Top of Wall Eave Detail - Overhang - Unsupported IMPERIAL™ - Horizontal Fix - I09-05

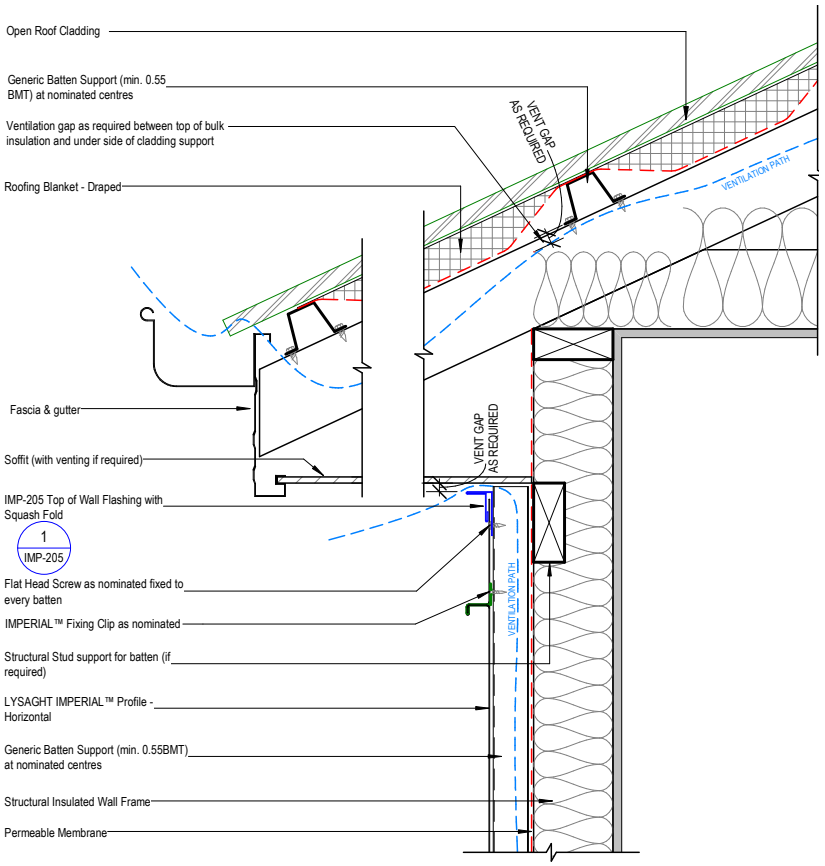


Figure 13.3.2.10:

Window Sill Detail - Unsupported IMPERIAL™ - Horizontal Fix - I11-05

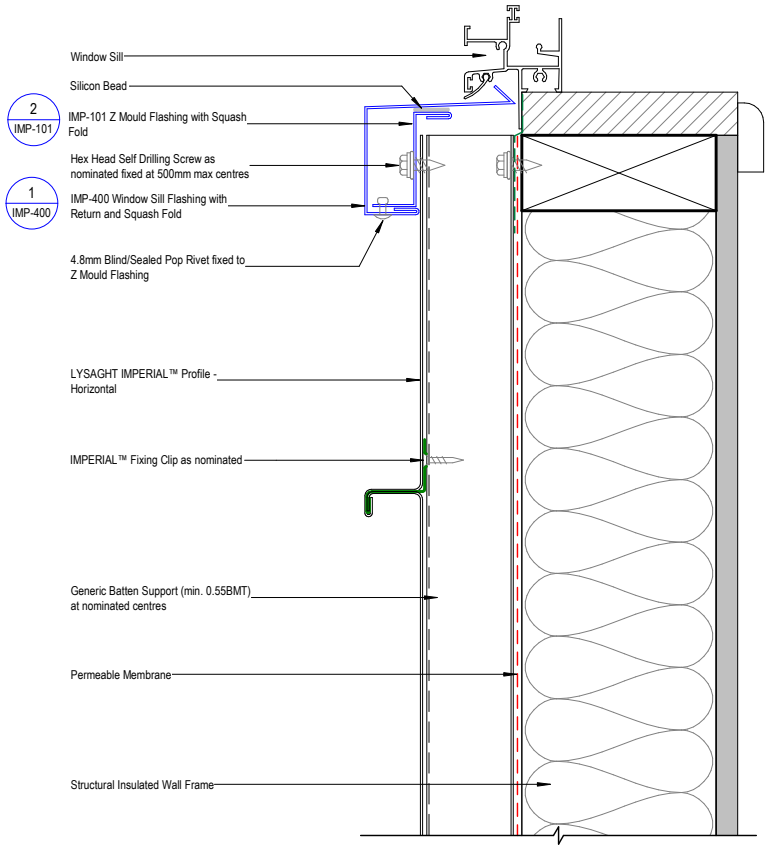
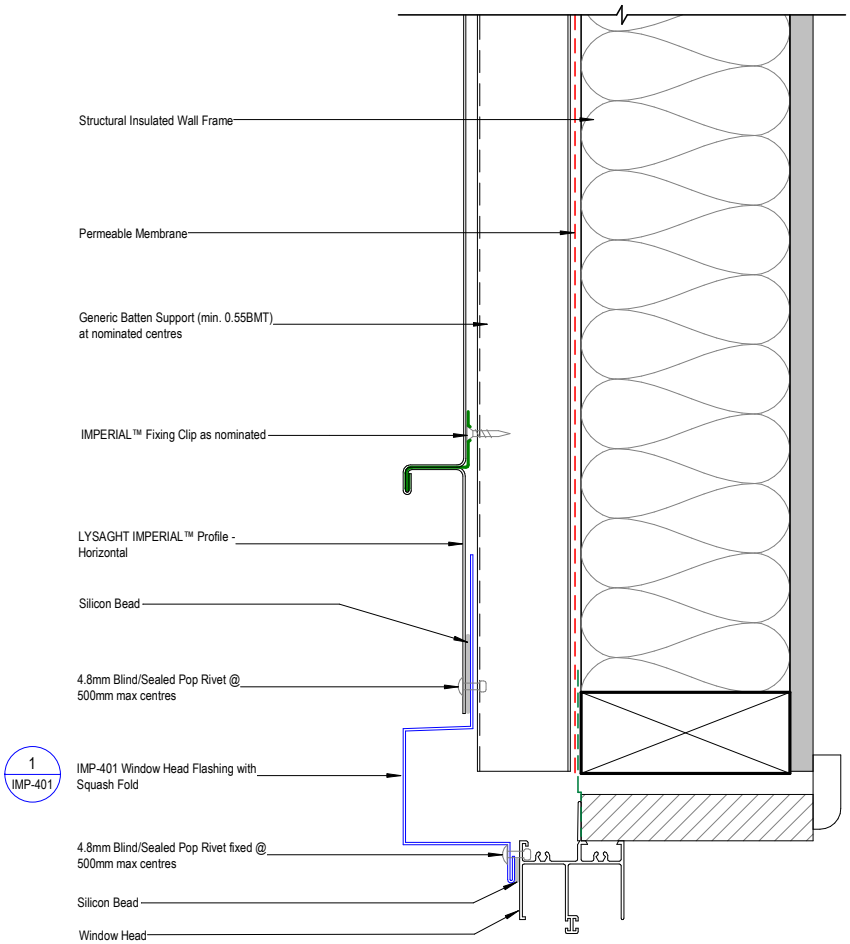


Figure 13.3.2.11:

Window Head Detail - Unsupported IMPERIAL™ Panel - Horizontal Fix - I11-09



13.3.3 IMPERIAL™ TYPICAL WALL DETAILS - VERTICAL FIX

Figure 13.3.3.1:

Typical Wall Cladding Setout - Unsupported IMPERIAL™ Vertical Fix - Plan View - I04-05

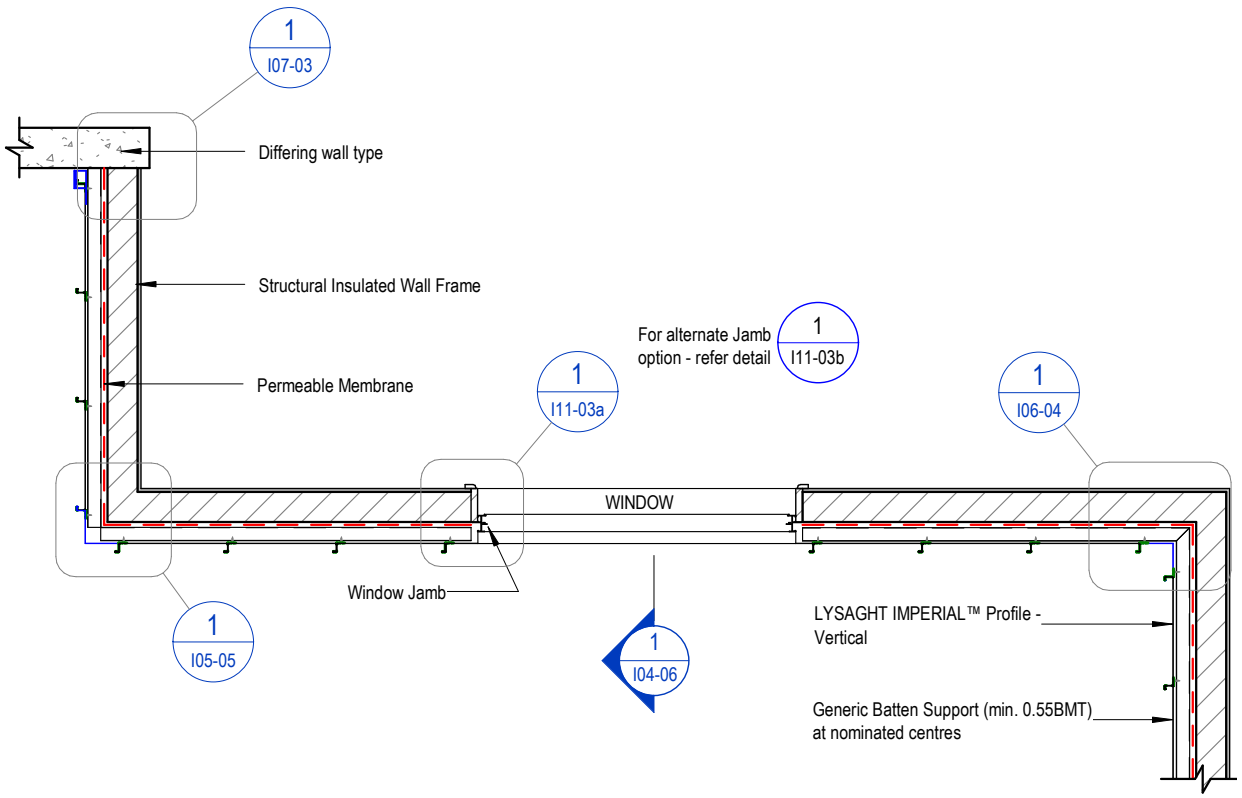


Figure 13.3.3.2:

Typical Wall Cladding Setout - Unsupported IMPERIAL™ - Vertical Fix - Sectional View - I04-06

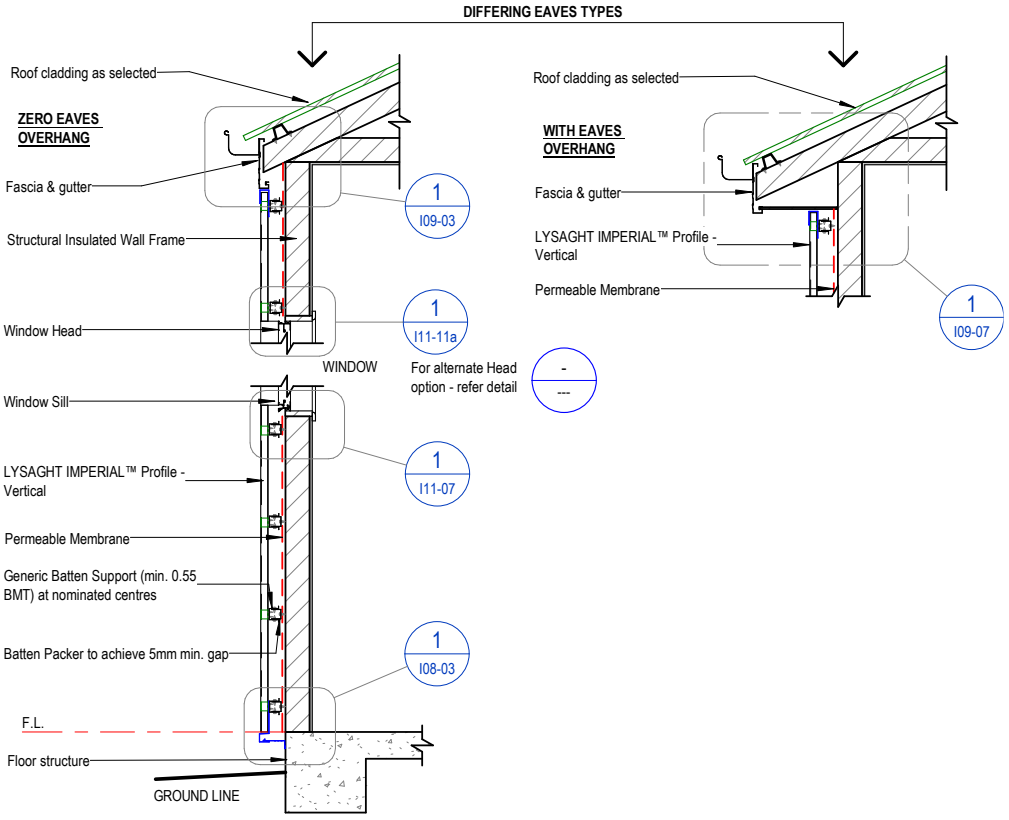


Figure 13.3.3.3:

External Corner Detail - Unsupported IMPERIAL™ Panel - Vertical Underlap Underlap - I05-04

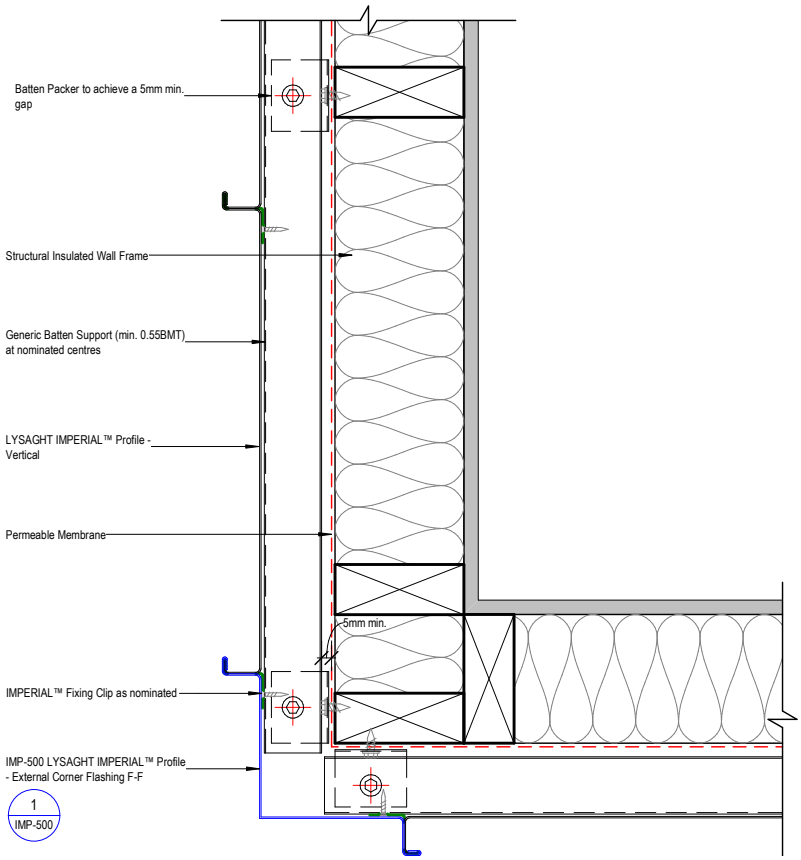


Figure 13.3.3.4:

Internal Corner Detail - Unsupported IMPERIAL™ Panel - Vertical Underlap Underlap - I06-04

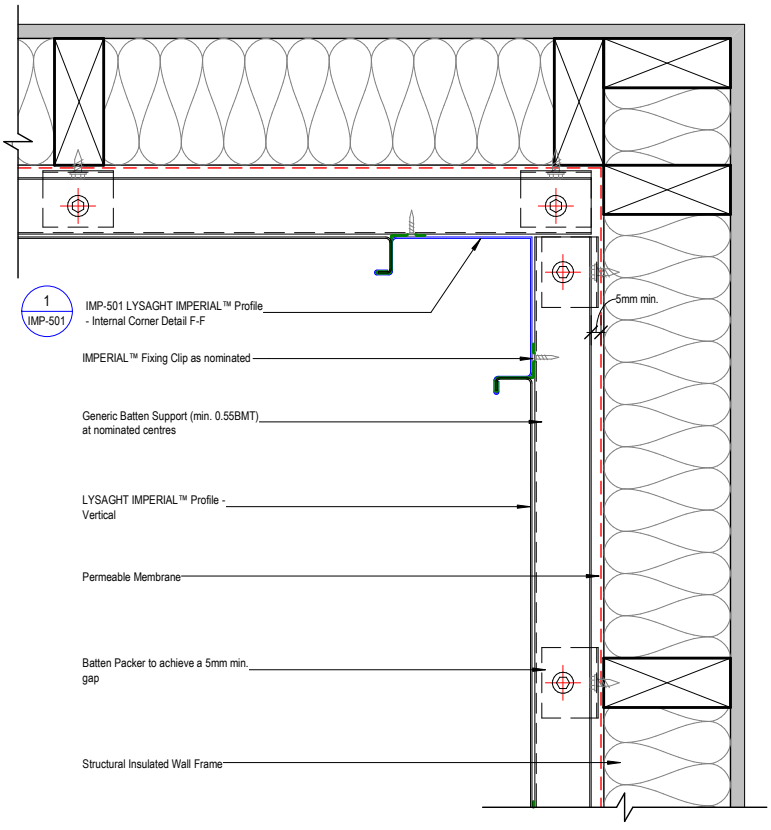


Figure 13.3.3.5:

Wall Closure Detail - Unsupported IMPERIAL™ Panel - Vertical Fix - I07-03

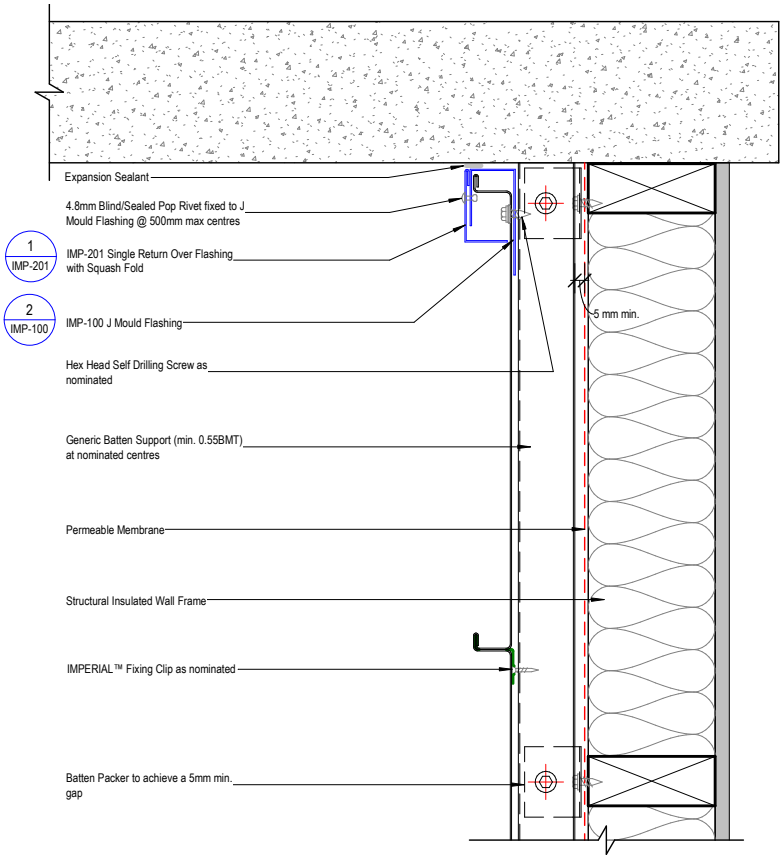


Figure 13.3.3.6:

Window Jamb Detail - Unsupported IMPERIAL™ Panel - Vertical Fix Option 1 - I11-03a

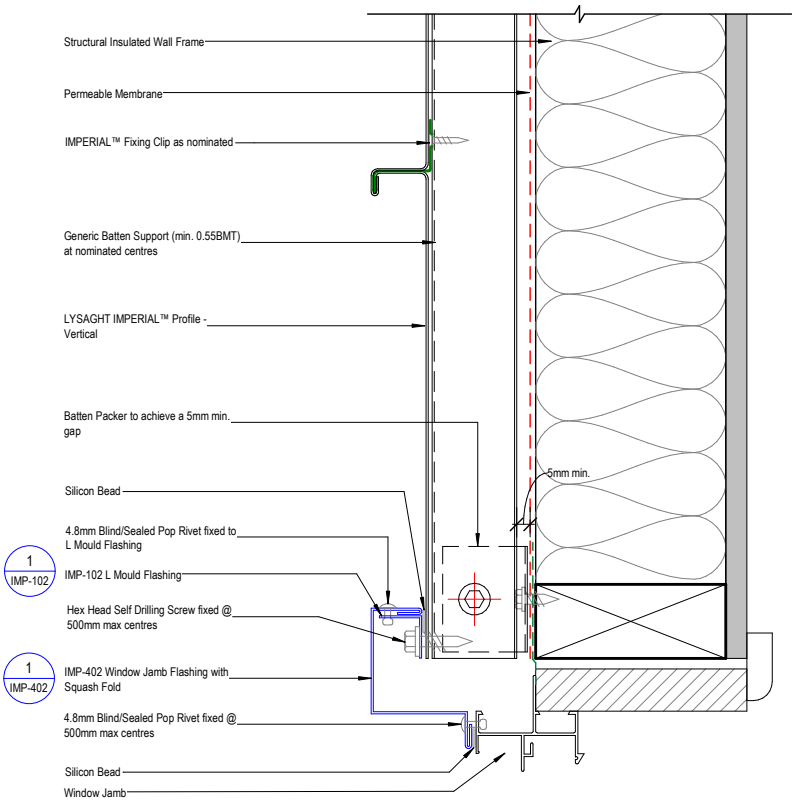


Figure 13.3.3.7:

Window Jamb Detail - Unsupported IMPERIAL™ Panel - Vertical Fix Option 2 - I11-03b

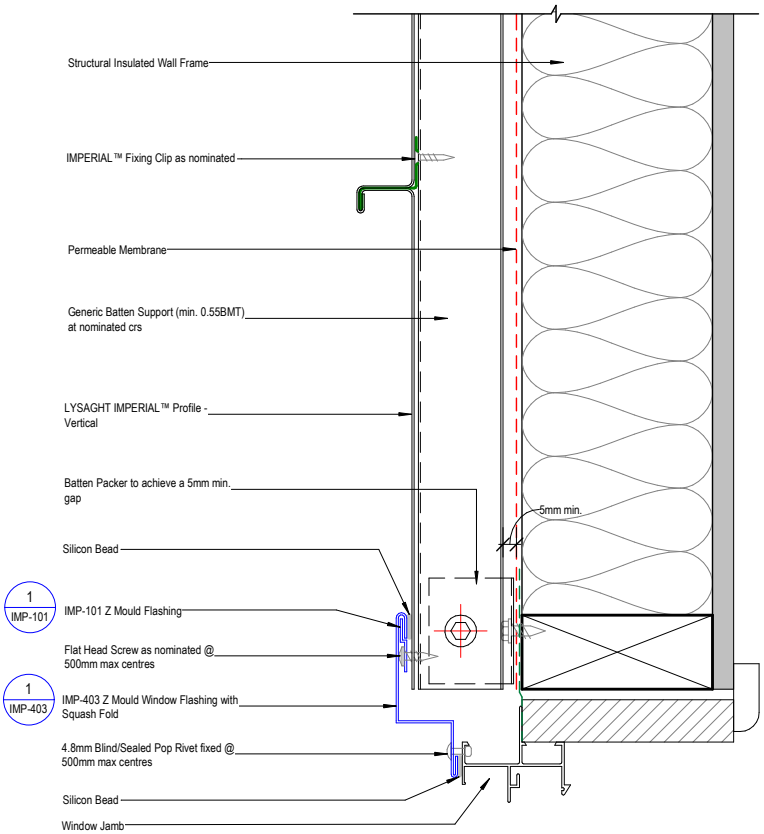


Figure 13.3.3.8:

Wall Base Detail - Unsupported IMPERIAL™ Panel - Vertical Fix - I08-03

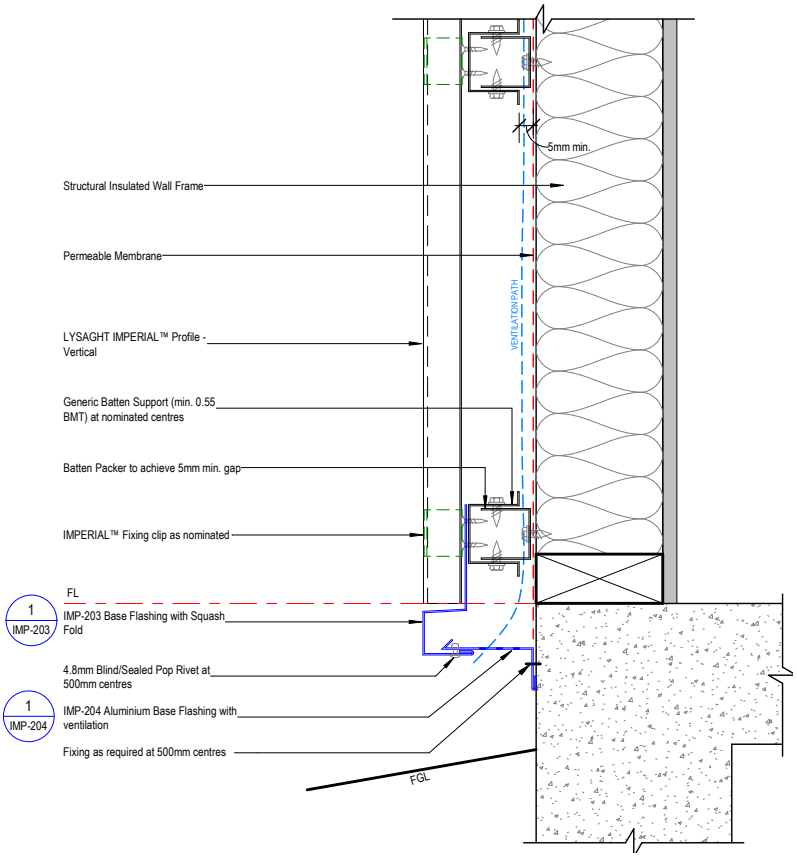


Figure 13.3.3.9:

Top of Wall Eave Detail - Zero Overhang - Unsupported IMPERIAL™ Panel - Vertical Fix - I09-03

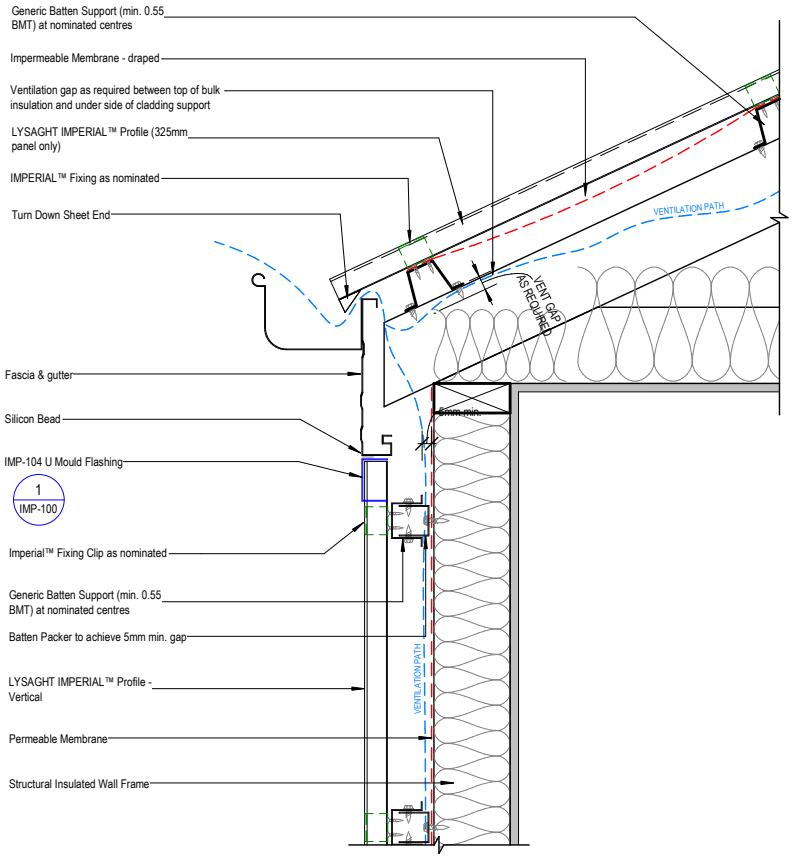


Figure 13.3.3.10:

Top of Wall Eave Detail - Overhang - Unsupported IMPERIAL™ Panel - Vertical Fix - I09-07

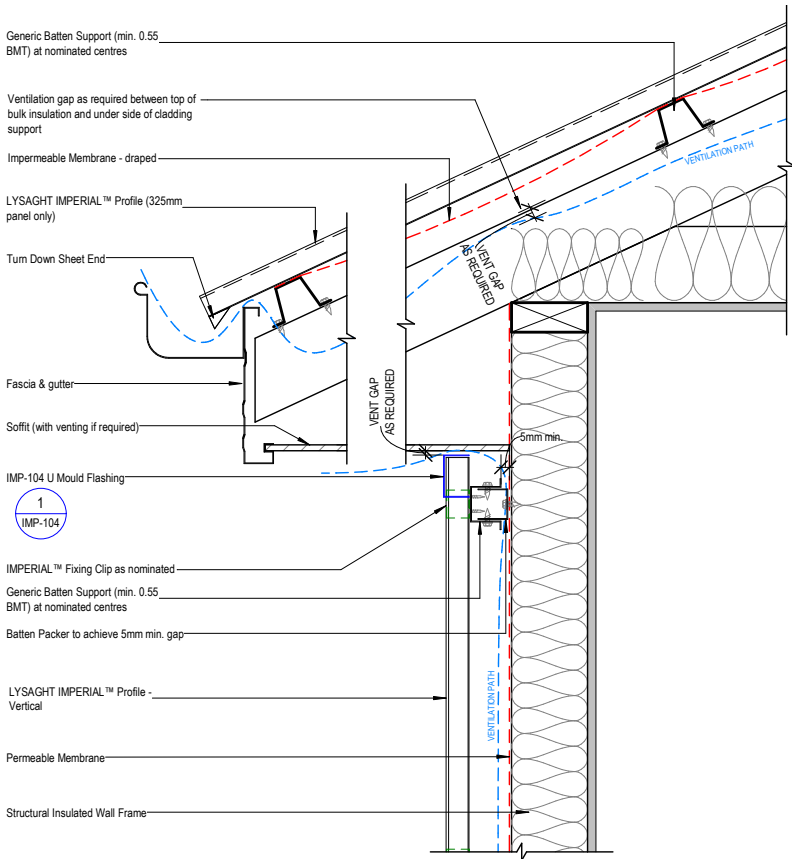


Figure 13.3.3.11:

Window Sill Detail - Unsupported IMPERIAL™ Panel - Vertical Fix - I11-07

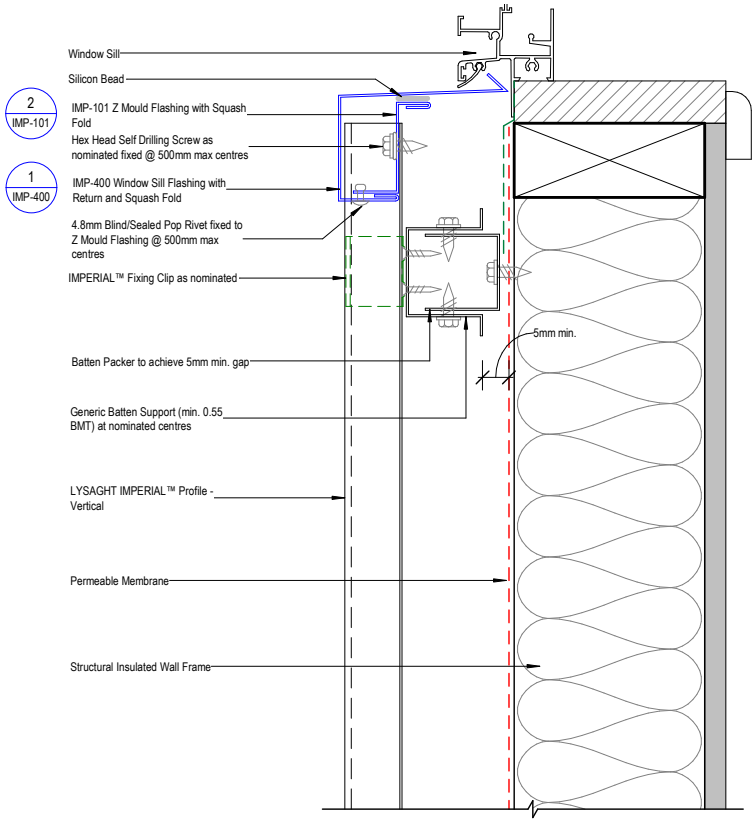
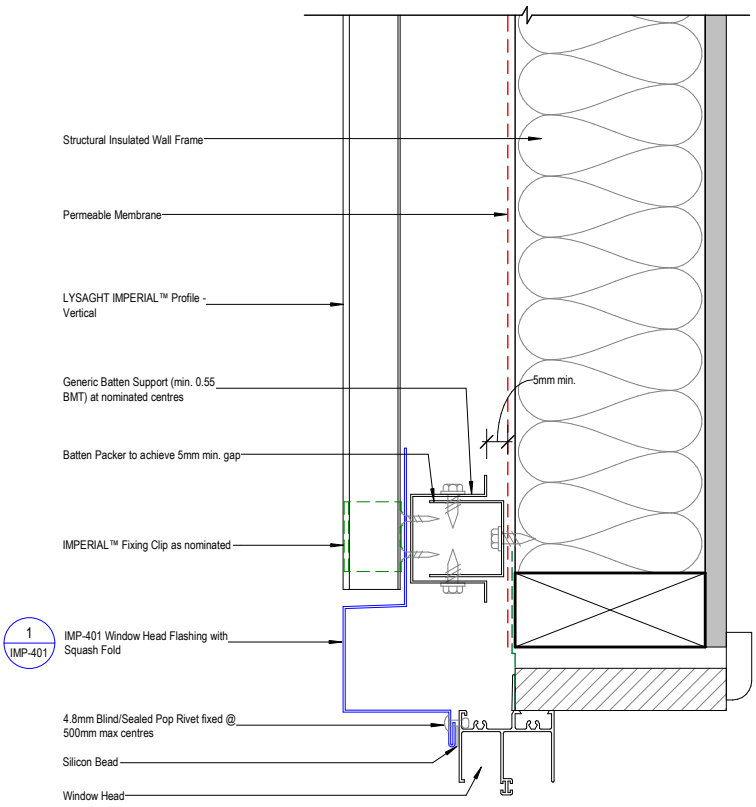


Figure 13.3.3.12:

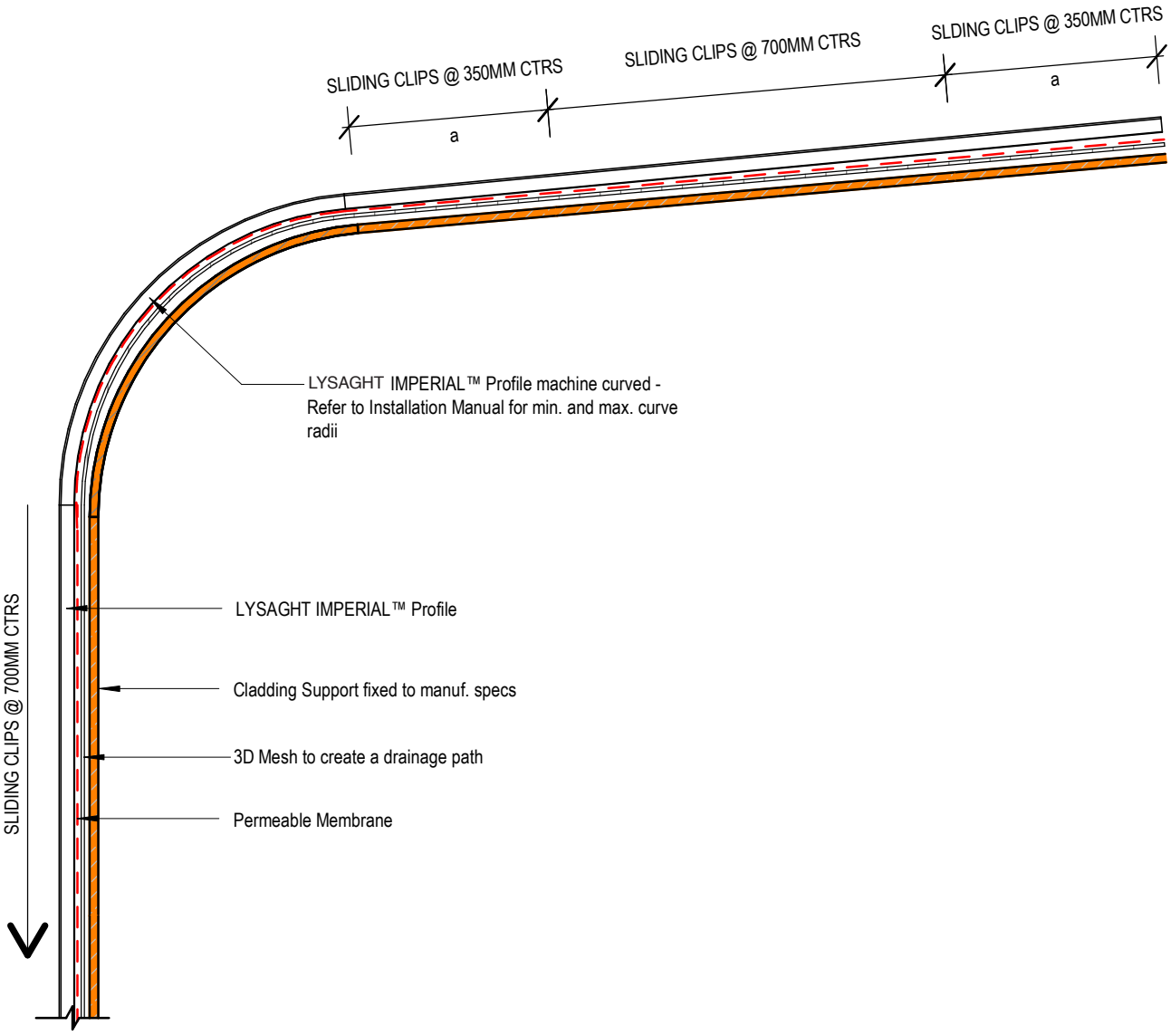
Window Head Detail - Unsupported IMPERIAL™ Panel - Vertical Fix - I11-11a



12.3.4 IMPERIAL™ CURVED ROOF / WALL

Figure 12.3.4.1:

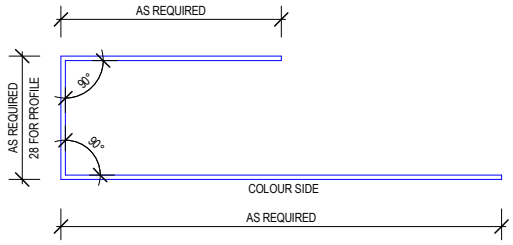
IMPERIAL™ Mansard Roof - I12-20



13.3.5 IMPERIAL™ TYPICAL FLASHINGS

Figure 13.3.5.1:

IMP-100 - J Mould Flashings



IMP-100 - J Mould Flashing with Squash Fold

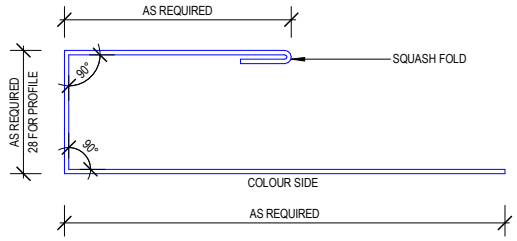
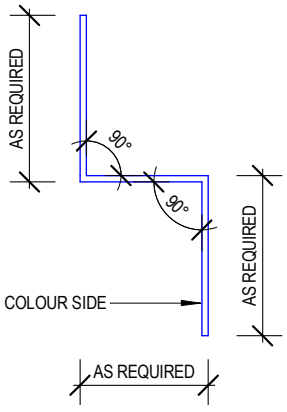


Figure 13.3.5.2:

IMP-101 - Z Mould Flashings



IMP-101 - Z Mould Flashing with 1 Squash Fold

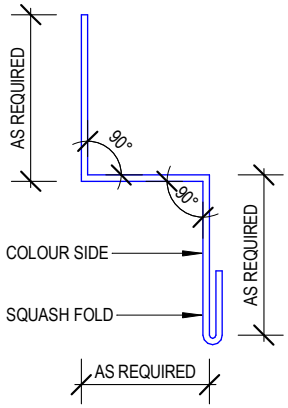
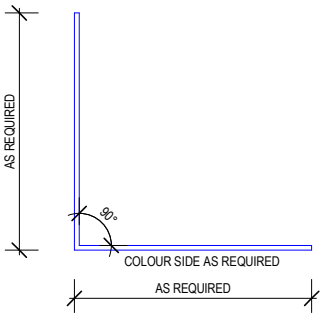
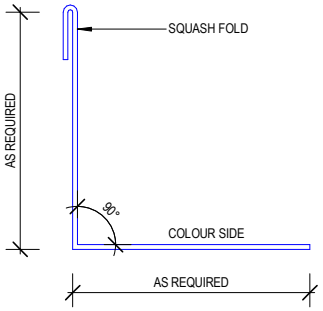


Figure 13.3.5.3:

IMP-102 - L Mould Flashings



IMP-102 - L Mould Flashing with 1 Squash Fold



IMP-102 - L Mould Flashing with Squash Folds

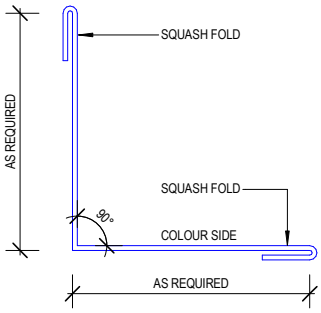


Figure 13.3.5.4:

IMP-103 - Apron Flashings

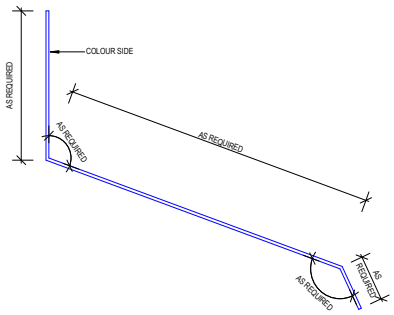


Figure 13.3.5.5:

IMP-104 - U Mould Flashing

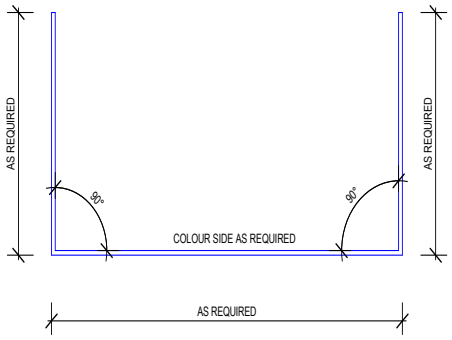


Figure 13.3.5.6:

IMP-200 - External Corner Over Flashing

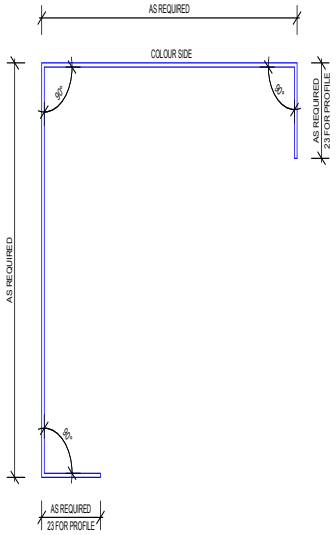


Figure 13.3.5.7:

IMP-201 - Single Return Over Flashing

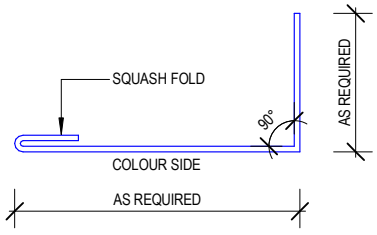


Figure 13.3.5.8:

IMP-202 - Internal Corner Over Flashing

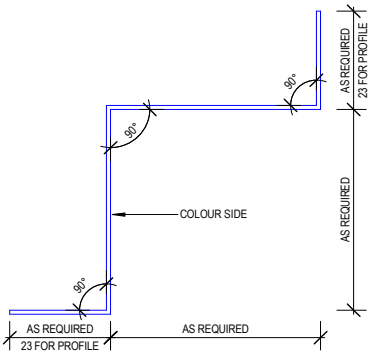
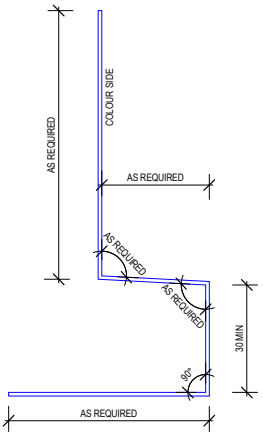


Figure 13.3.5.9:

IMP-203 - Base Flashings



IMP-203 - Base Flashing with Squash Fold

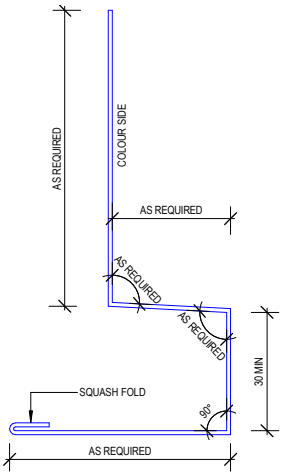


Figure 13.3.5.10:

IMP-204 - Aluminium Base Flashing with Ventilation

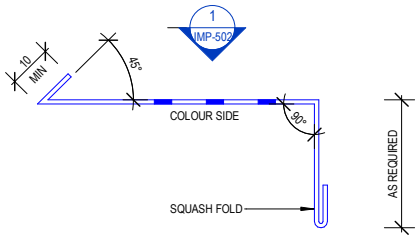


Figure 13.3.5.11:

IMP-205 - Top of Wall Flashing

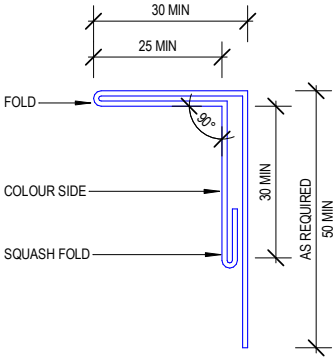
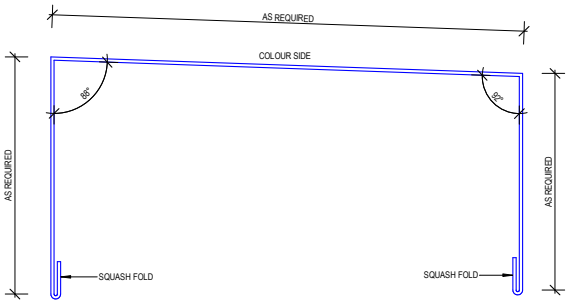


Figure 13.3.5.12:

IMP-206 - Parapet Top Flashing with Squash Folds



IMP-206 - Parapet Top Flashing with Squash Fold and return

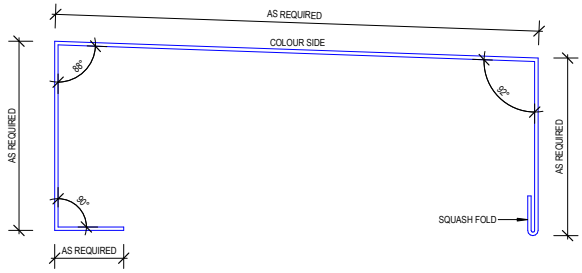


Figure 13.3.5.13:

IMP-300 - Roof Valley Flashing

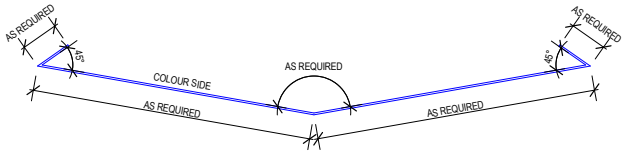
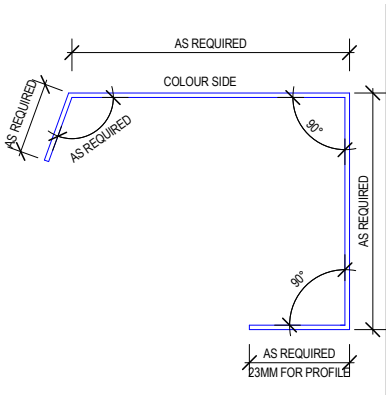
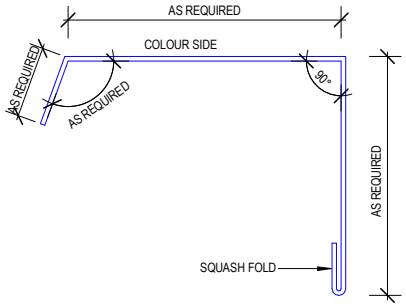


Figure 13.3.5.14:

IMP-301 - Barge Flashing with returns



IMP-301 - Barge Flashing with return and Squash Fold



IMP-301 - Barge Flashing with return and sliding fold

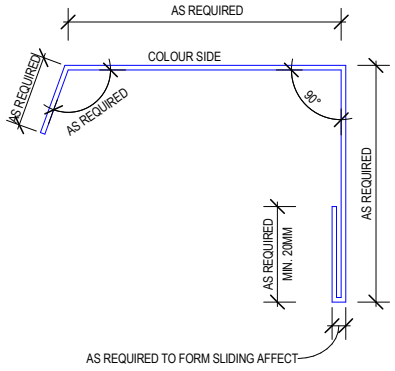


Figure 13.3.5.16:

IMP-302 - Ridge Cap Flashing

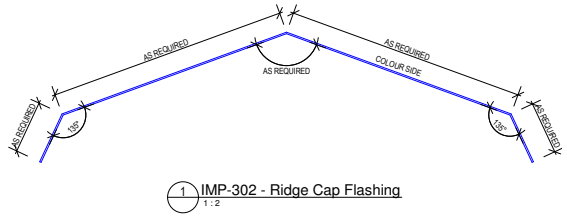


Figure 13.3.5.17:

IMP-400 - Window Sill Flashing with Squash Fold

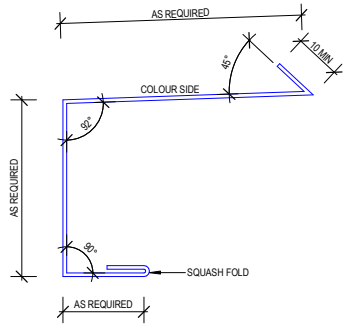


Figure 13.3.5.18:

IMP-401 - Window Head Flashing with Squash Fold

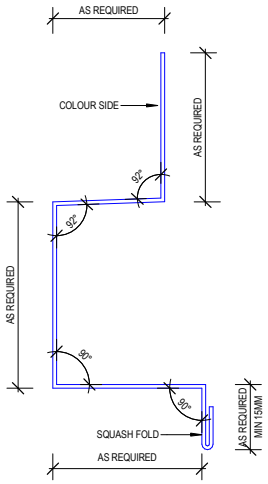


Figure 13.3.5.19:

IMP-402 - Window Jamb flashing with Squash Folds

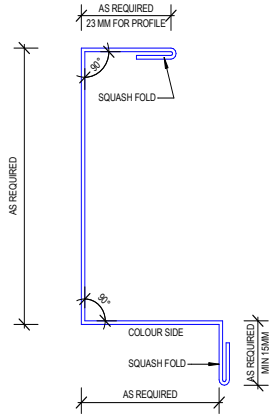


Figure 13.3.5.20:

IMP-403 - Window Z Flashing

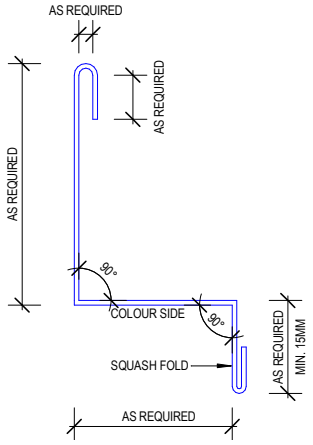


Figure 13.3.5.21:

IMP-500 -External Corner details - female female

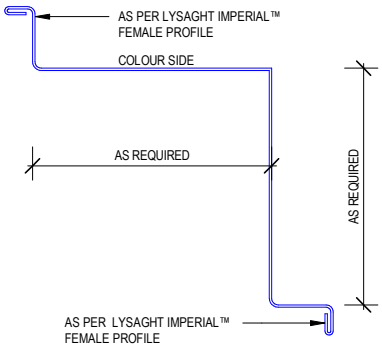
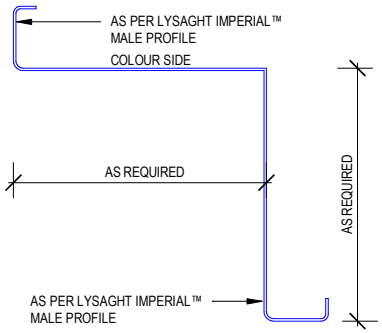


Figure 13.3.5.22:

IMP-500 - External Corner details - male male



IMP-500 - External Corner details - male female

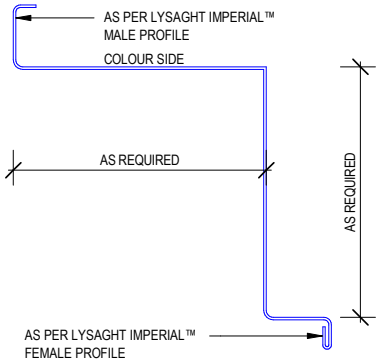
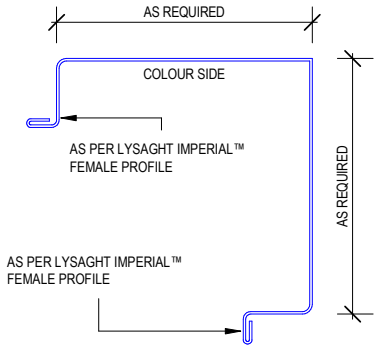
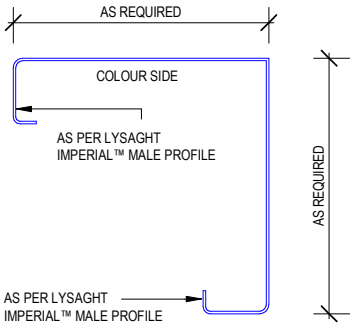


Figure 13.3.5.23:

IMP-501 - Internal Corner details - female female



IMP-501 - Internal Corner details - male male



IMP-501 - Internal Corner details - male female

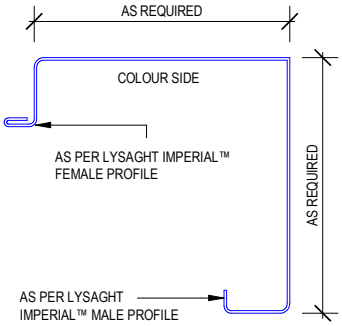


Figure 13.3.5.24:

IMP-502 - Perforation Detail

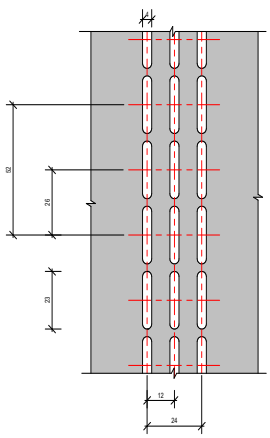
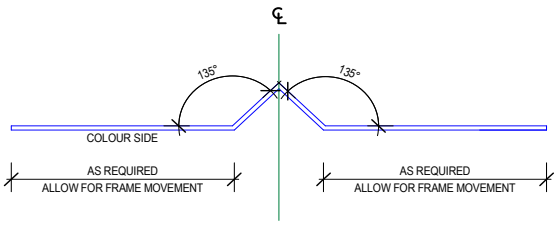


Figure 13.3.5.25:

IMP-503 - Corrosion Resistant Flashing



14.0 DOMINION® wall cladding

DOMINION® architectural panel is a discreet pierce fixed flat panel wall cladding system. DOMINION® is structurally sound for direct fixed to steel battens and can also be fixed onto conventional supporting substrate such as plywood or fibre cement panels.

DOMINION® is a wall cladding system installed with a ventilated air space. It involves laying DOMINION® on a metal framework fixed to the supporting structure. The interlocking groove connecting the panels gives an elegant recessed joint.

DOMINION® can be laid vertically or horizontally. The choice of direction implies different aesthetics and technical solutions for the main flashings.

14.1 MATERIAL SPECIFICATIONS

Coverage (mm)	285			485		
Base Metal Thickness (BMT) (mm)	0.55	0.7*	0.75*	0.55	0.7*	0.75*
Total Coated Thickness[1] (TCT) (mm)	0.6	0.75	0.8	0.6	0.75	0.8
Rib Height (mm)	25					
Sheet Length[2] (mm)						
Minimum	500					
Maximum	8,000 [2]					
Mass / Unit Length (kg/m)						
ZINCALUME® steel	1.76	2.25	2.23	2.65	N/A	3.36
COLORBOND® steel[1]	1.78	2.29	2.24	2.67	N/A	3.37
Mass / Unit Area (kg/m²)						
ZINCALUME® steel	5.94	7.51	8.03	5.34	N/A	7.23
COLORBOND® steel[1]	6.07	7.64	8.17	5.47	N/A	7.35
Minimum Yield Strength	300 (G300)					
Coating Class (See Base Material for detail)	AM125 - ZINCALUME® steel AM100 - COLORBOND® steel AM100 - COLORBOND® METALLIC steel AM150 - COLORBOND® ULTRA steel					
Tolerance	Sheet length: ±3mm Cover width: ±2mm					
Thermal Expansion	2.9mm average per 5m @ 50°C change					

Notes:
1. Based on standard, single sided COLORBOND® steel. For other painted steel options please contact your Lysaght representative.
2. To assist minimising the effects of oil canning in DOMINION® cladding, it is recommended to keep panel length under 8m. Longer length may be available subject to minimum order quantity.

*Please check with your local branch for availability.

MINIMUM ROOF PITCH

DOMINION® is not suitable for roofing.

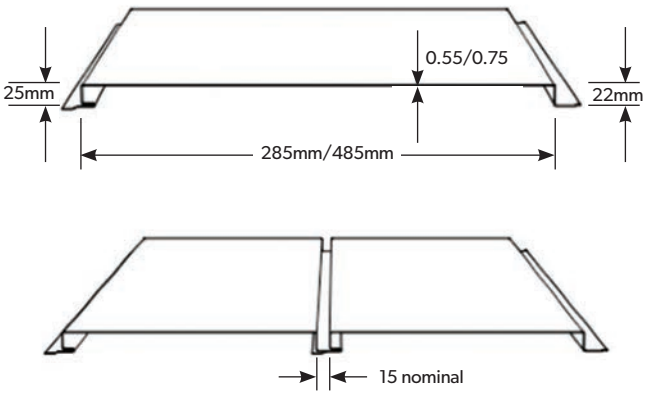
INSULATION

Care needs to be taken when installing insulation with DOMINION® cladding. The screws may need to be increased depending on the thickness and density of the insulation. When the screw is properly tightened into metal there should be a minimum of three (3) threads protruding past the support being fixed in to. For timber the screw must have a min embedment of 25mm into the timber.

For insulation, the use of a spacing system is recommended to help maintain Rw values as well as minimising any bulging in the profile caused by the insulation. Refer to oil canning section for potential visual impacts of insulation on the product.

Figure 14.1.1:

DOMINION® profile



NB DOMINION® panels are available with either open or closed ends. This needs to be specified at order placement.

FASTENING DOMINION® CLADDING TO SUPPORTS

DOMINION® cladding is screw-fixed to supports. Engage the overlap leg into the underlap recess, then fix the nominated fastener through both legs into batten or plywood support. When the screw is properly tightened into metal there should be a minimum of three (3) threads protruding past the support being fixed in to. For timber the screw must have a min embedment of 25mm into the timber.

Table 14.1.1:

Fastener Specification.

Application	Fixing to steel	Fixing to plywood/timber battens
Non-Cyclonic	10g-16x16 wafer or low profile Hex head metal screw with minimum class 3 coating	10g-12x25 wafer or low profile Hex head type 17 metal screw with minimum class 3 coating

MAXIMUM SUPPORT SPACINGS[1]

Type of Span	**285mm cover**			**485mm cover**		
	0.55mm BMT	**0.70mm* BMT**	**0.75mm* BMT**	**0.55mm BMT**	**0.70mm* BMT**	**0.75mm* BMT**
Roofs						
Single span	Use for Walling only			Use for Walling only		
End span						
Internal Span						
Unstiffened eaves overhang						
Walls						
Single span	1200	1300	1300	900	N/A	1000
End span	1200	1200	1200	900	N/A	1000
Internal span	1500	1500	1500	1200	N/A	1300
Overhang	100	100	100	100	N/A	100

1. Refer Section 2.5 - Support Spacing and Overhang for loading parameters applicable to MAXIMUM SUPPORT SPACINGS. For Projects outside these loading parameters (Region B) designers should reference LIMIT STATE WIND CAPACITIES tables to determine appropriate support spacings.

*Please check with your local branch for availability.

DOMINION®: LIMIT STATE WIND PRESSURE CAPACITIES (KPA)

Cover width	Support	Design Pressure (kPa)	
		Serviceability	Strength
285mm x 0.55mm BMT 285mm x 0.70mm BMT 285mm x 0.75mm BMT	Steel batten: 40mm x 0.55mm BMT G550 Batten Spacing : 450mm (max) Batten span: 1500mm (max)	1.35	3.94
	Steel batten: 61mm x 0.75mm BMT G550 Batten Spacing : 600mm (max) Batten span: 2000mm (max)	1.42	4.23
	15mm F11 Structural CD grade ply (for walling applications) Support spacing: 600mm (max) Fastener spacing: 450mm	1.35	3.94
286mm - 484mm x 0.55mm BMT 286mm - 484mm x 0.70mm BMT 286mm - 484mm x 0.75mm BMT	Steel batten 40mm x 0.55mm BMT G550 Batten Spacing : 450mm (max) Batten span: 1500mm (max)	0.59	3.64
	15mm F11 Structural CD grade ply (for walling applications) Support spacing: 600mm (max) Fastener spacing: 450mm	0.59	3.64
485mm x 0.55mm BMT 485mm x 0.70mm BMT 485mm x 0.75mm BMT	Steel batten 40mm x 0.55mm BMT G550 Batten Spacing : 450mm (max) Batten span: 1500mm (max)	0.59	3.64
	15mm F11 Structural CD grade ply (for walling applications) Support spacing: 600mm (max) Fastener spacing: 450mm	0.59	3.64

Minimum support / purlin thickness must be 1mm BMT, G550

Table 14.1.2:

Guide to fastener layout and sheet coverage.

SHEET COVERAGE

285MM

Width of Wall (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	10	14	17	20	24	27	30	34	37	40	44	47	50	54	57	60	64	67	100	134	167

485MM

Width of Wall (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	60	80	100

WIDTH COVERED BY 'X' NUMBERS OF SHEETS (M)

285MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.0	3.30	3.60	3.90	4.20	4.50	4.80	5.10	5.40	5.70	6.0

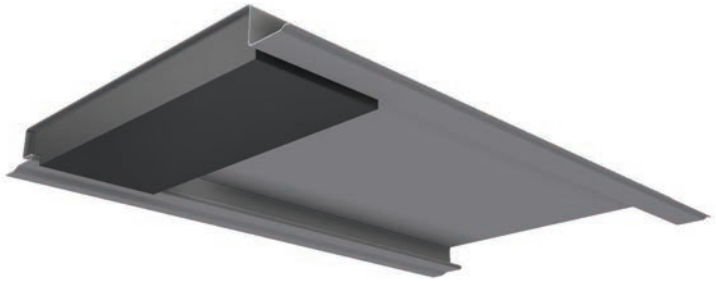
485MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	1.50	2.0	2.50	3.0	3.50	4.0	4.50	5.0	5.50	6.0	6.50	7.0	7.50	8.0	8.50	9.0	9.50	10.0

Figure 14.1.2:

Foam Infill detail.

80mm x 30mm closed cell foam infill cut to size and shape on site as required under parapet, toe mold or corner flashing



14.2 TYPICAL INSTALLATION DETAILS

FIXING OF THE MEMBRANE

DOMINION® is designed to be installed in conjunction with a heavy duty building membrane as an additional weather-proofing measure. Impermeable membranes are preferred for roofing applications with permeable membranes preferred for walling applications. For greater detail on membrane selection and design of ventilation and drainage pathways refer to CONDENSATION CONTROL IN AUSTRALIAN BUILDINGS CONSTRUCTED WITH LYSAGHT® CLADDINGS

1. Check that the steel work or concrete is free of any sharp edges or protrusions that may puncture the membrane.
2. The membrane must be a heavy duty building membrane or equivalent with the non reflective to the outside face.
3. The membrane must be hung and sealed at the top. It must be free of ripples and puckers with holding battens between the 40mm vertical battens securing it to the supporting member. Figure 14.2.3.
4. All laps in the membrane must be made with 150mm lap sealed with double sided tape between the faces of the foil and taped with sisal tape on the outside face.
5. The perimeter of the membrane must be sealed also with premium quality Sisal tape with holding or 40mm battens to secure it. Figure 14.2.5.
6. Note: It is essential that attention is paid to ensuring that membrane is air tight, fixed in a way that it won't flap or tear away at the laps or edges.
7. At the bottom of the façade a flashing is required to direct any water from the membrane external of the façade. This will be done in a way as to allow any water to pass between the flashing and the foot mould. Figure 14.2.4.

Figure 14.2.1:

Standard fixing detail.

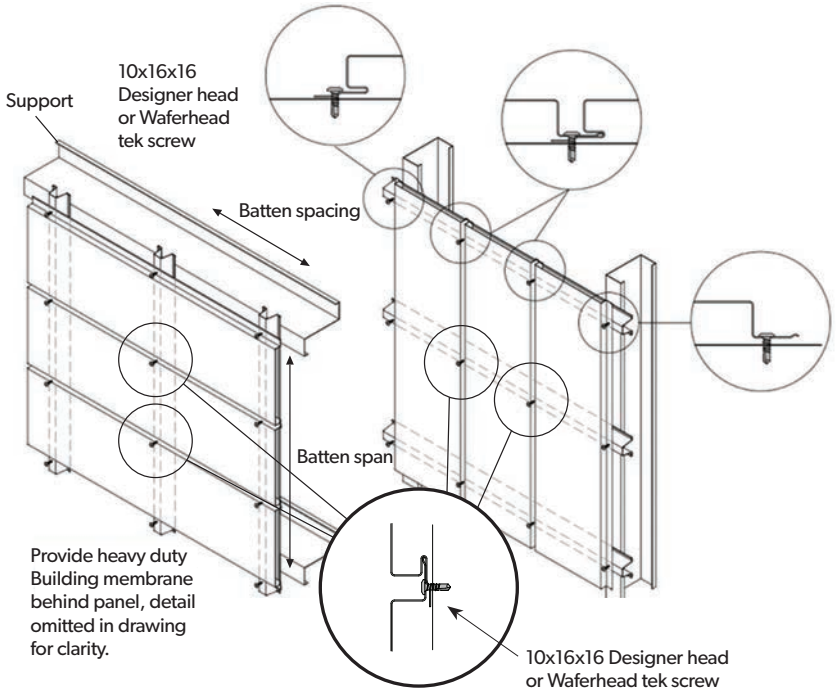
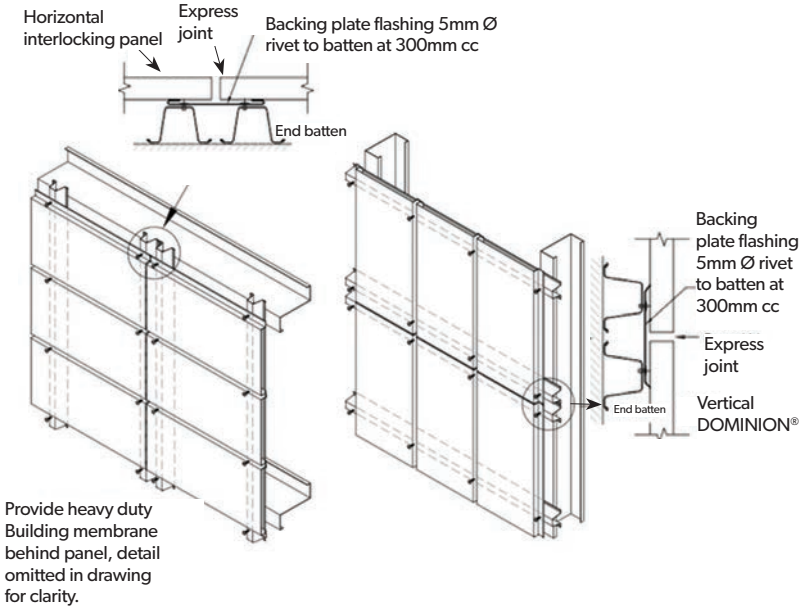


Figure 14.2.2:

Express joint detail.



14.3 TYPICAL CONSTRUCTION DETAILS DOMINION®

The construction details presented here represent potential detailing solutions to common construction situations. These details may not be suitable for all projects / situations and users should use professional judgement in determining suitability of the details for their particular project whilst referencing AS 1562.1 and SA HB39. The full suite of ZENITH® constructions details are available for download from https://bimcontent.com/lysaght/ in both REVIT and PDF format.

14.3.1 DOMINION® TYPICAL WALL DETAILS - HORIZONTAL FIX

Figure 14.3.1.1:

Typical Wall Cladding Setout - Unsupported DOMINION® Panel - Horizontal Fix - Plan View - D04-01

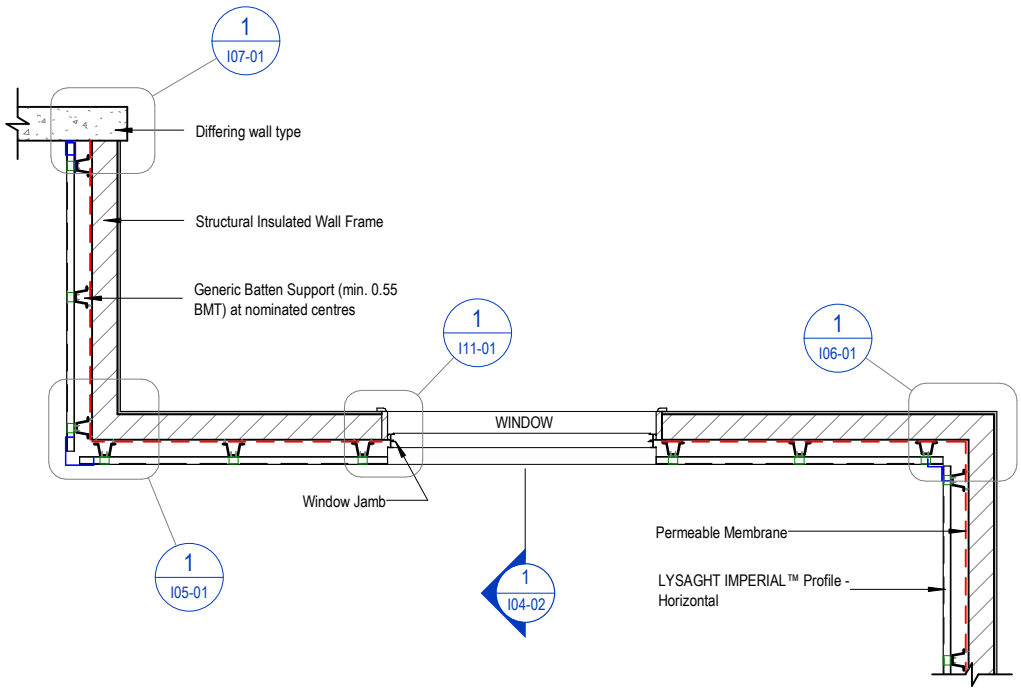


Figure 14.3.1.2:

Typical Wall Cladding Setout - Unsupported DOMINION® - Horizontal Fix - Sectional View - D04-02

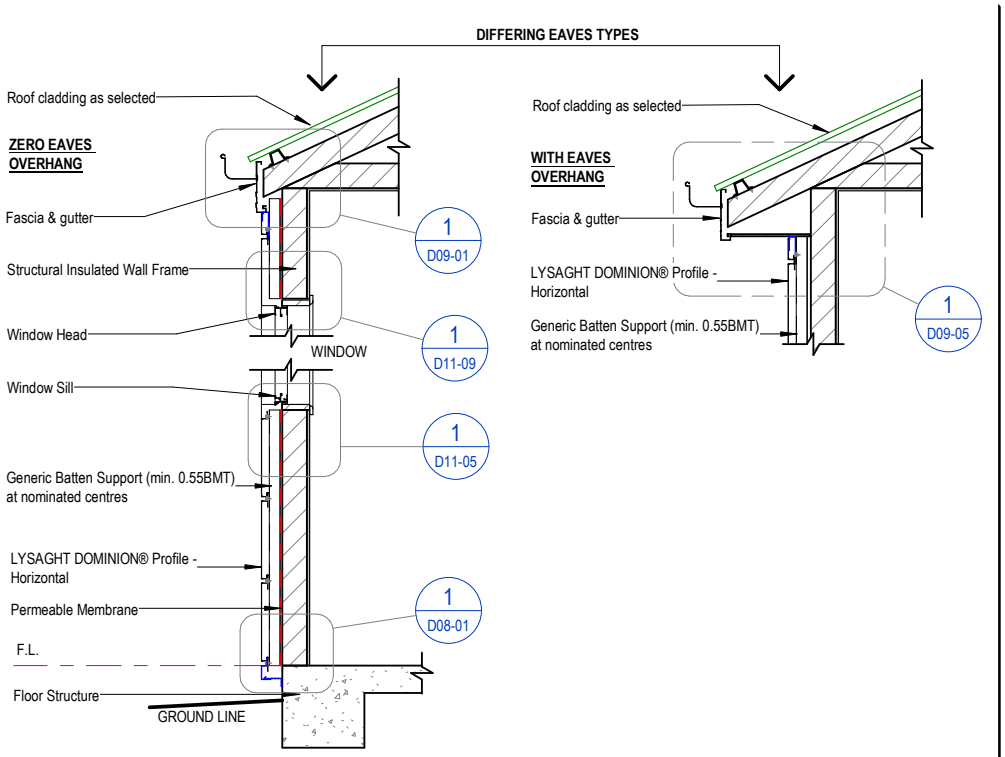


Figure 14.3.1.3:

External Corner - Unsupported DOMINION® Panel - Horizontal Fix - D05-01

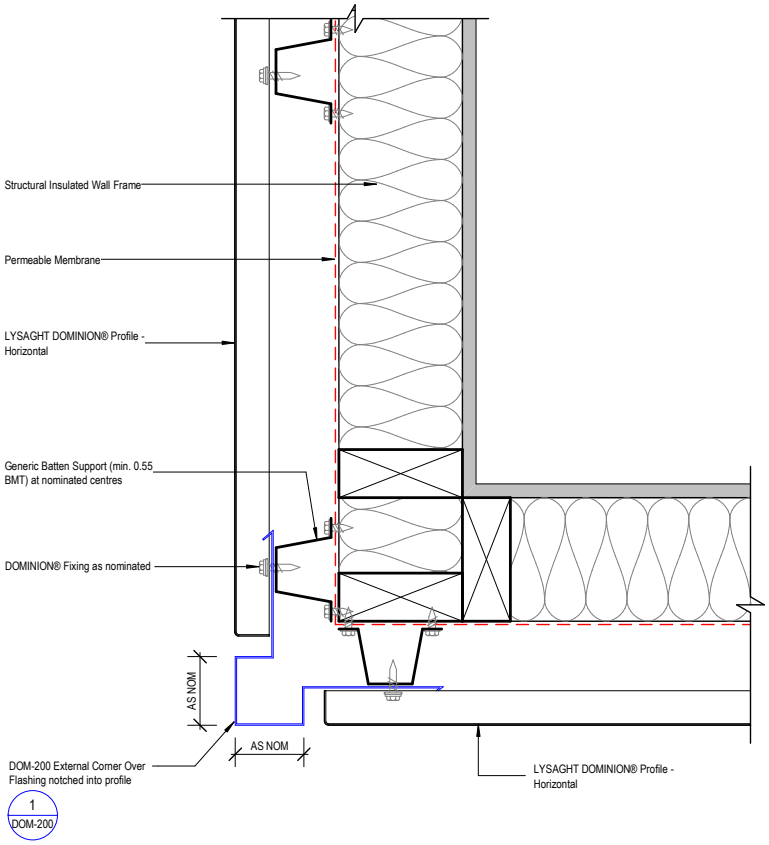


Figure 14.3.1.4:

Internal Corner - Unsupported DOMINION® Panel - Horizontal Fix - D06-01

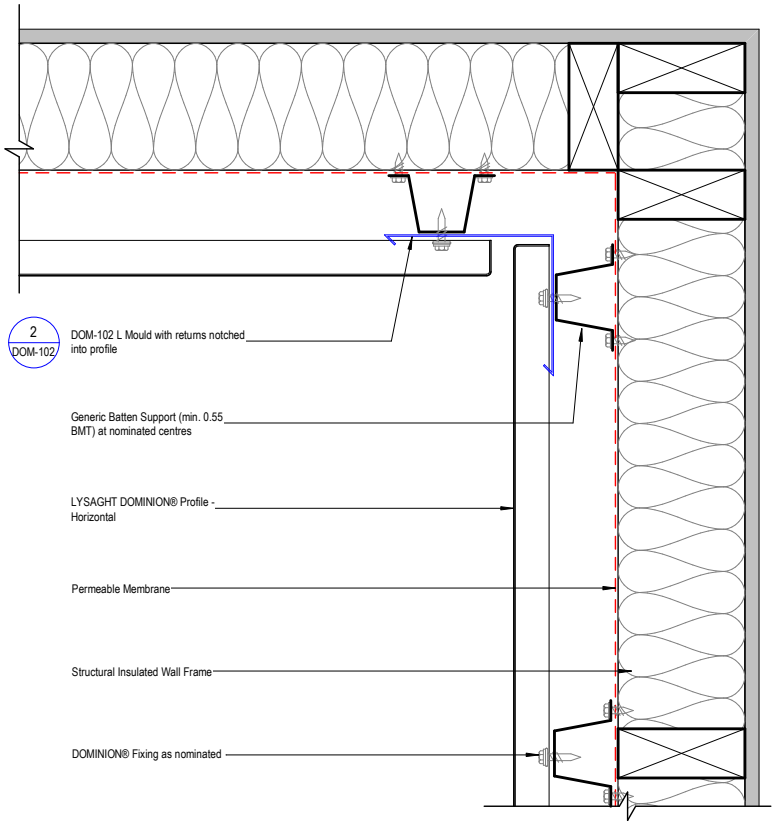


Figure 14.3.1.5:

Wall Closure Detail - Unsupported DOMINION® Panel - Horizontal Fix - D07-01

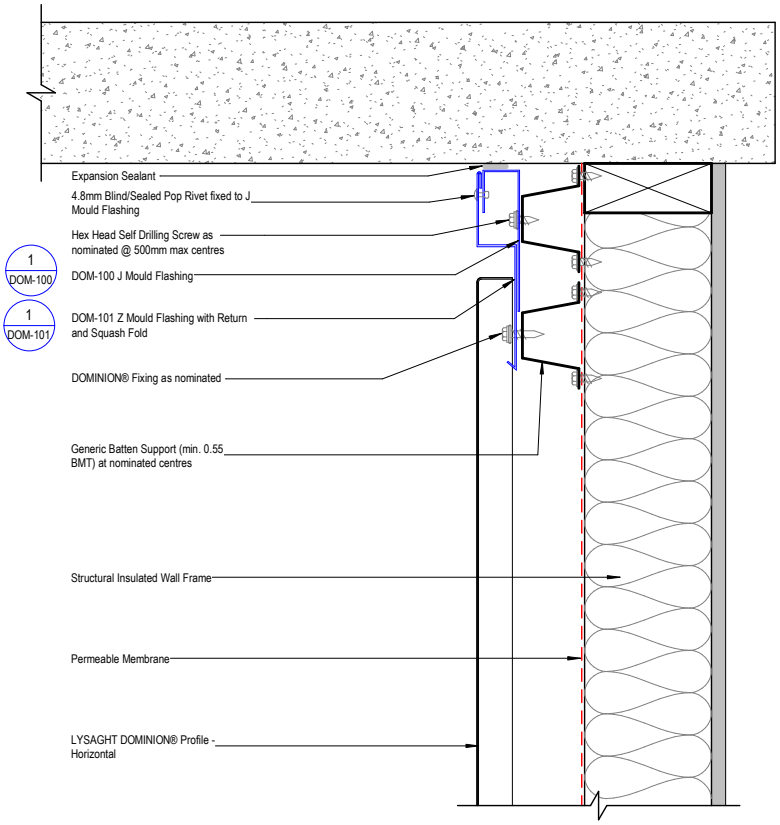


Figure 14.3.1.6

Window Jamb Detail - Unsupported DOMINION® Panel - Horizontal Fix - D11-01

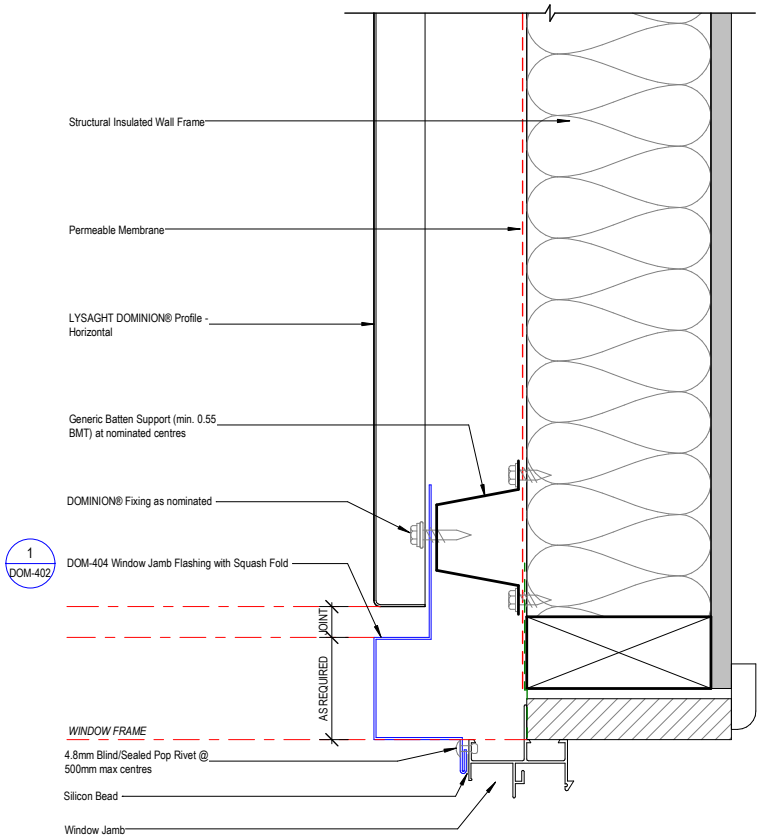


Figure 14.3.1.7:

Wall Base Detail - Unsupported DOMINION® Panel - Horizontal Fix - D08-01

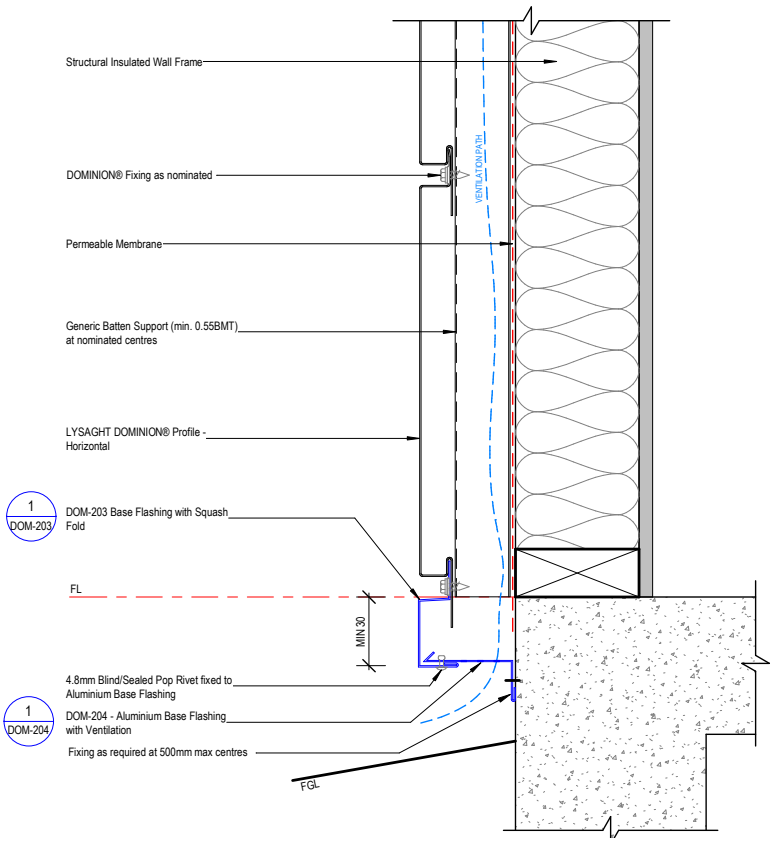


Figure 14.3.1.8:

Top of Wall Eave - Zero Overhang - Unsupported DOMINION® - Horizontal Fix - D09-01

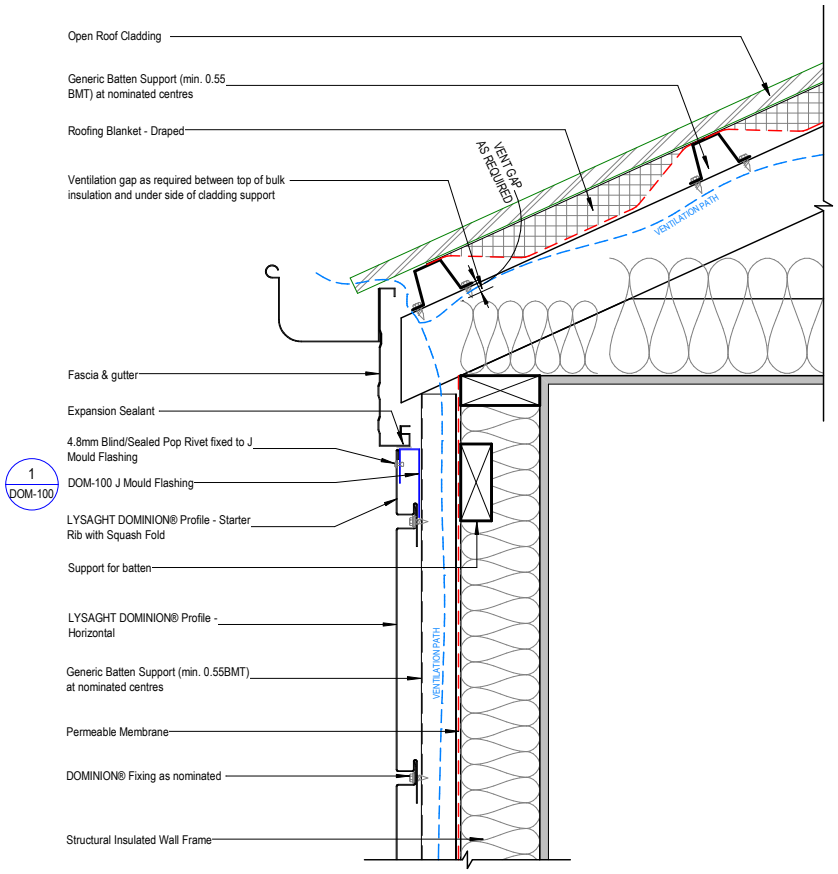


Figure 14.3.1.9:

Top of Wall Eave - Overhang - Unsupported DOMINION® - Horizontal Fix - D09-05

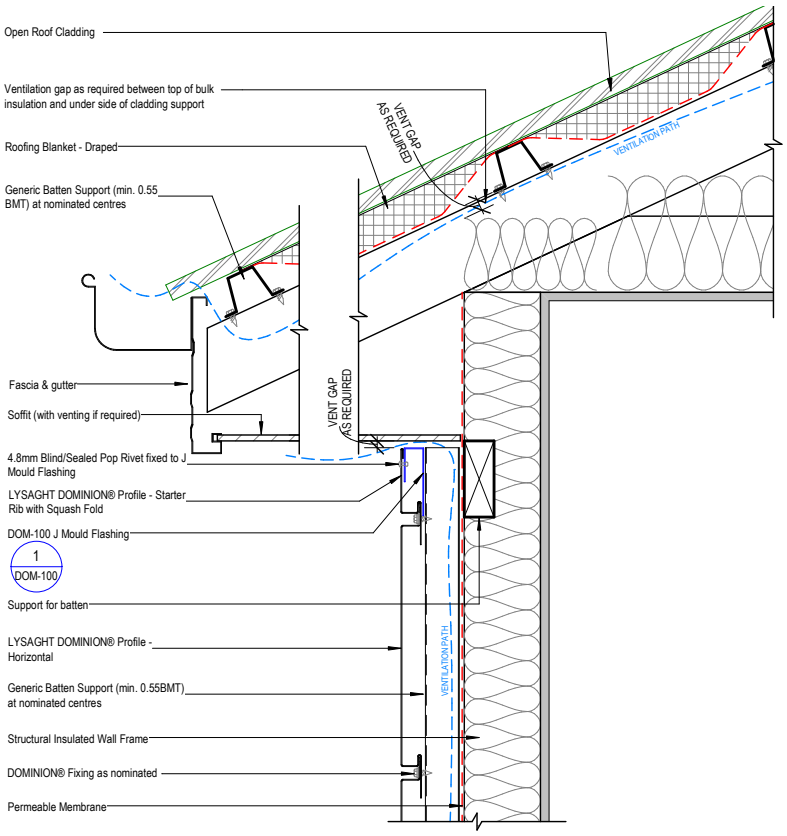


Figure 14.3.1.10

Window Sill Detail - Unsupported DOMINION® Panel - Horizontal Fix - D11-05

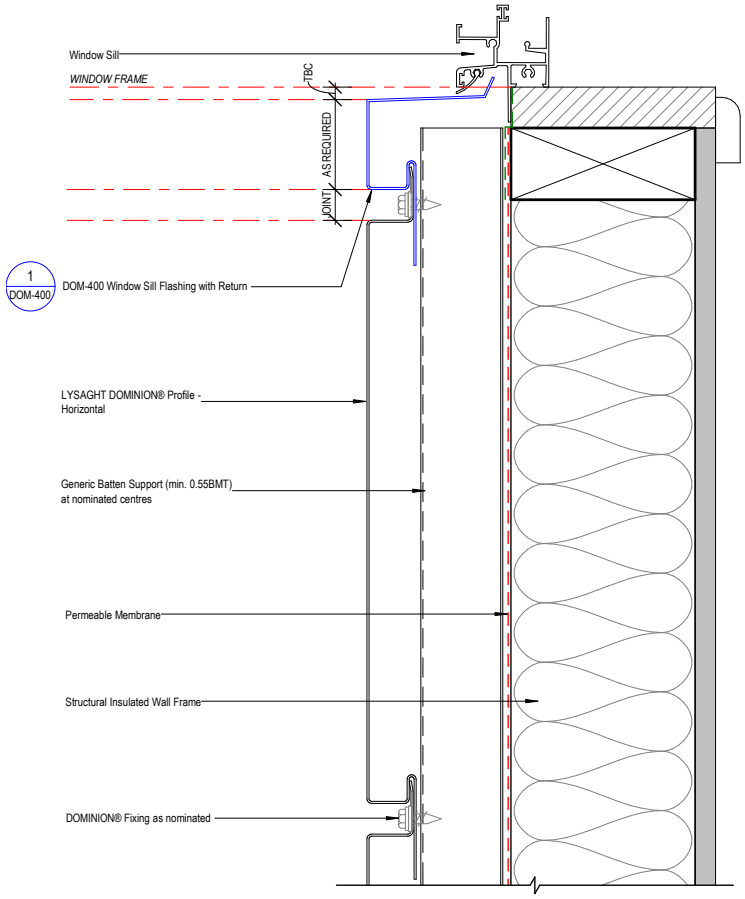
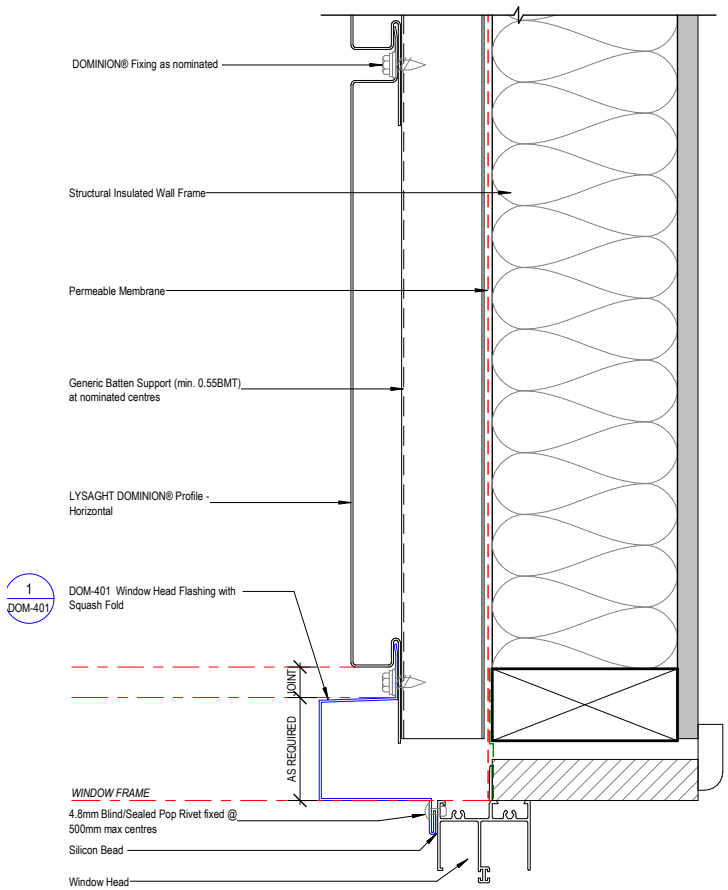


Figure 14.3.1.11:

Window Head Detail - Unsupported DOMINION® Panel - Horizontal Fix - D11-09



14.3.2 DOMINION® TYPICAL WALL DETAILS - VERTICAL FIX

Figure 14.3.2.1:

Typical Wall Cladding Setout - Unsupported DOMINION® Vertical Fix - Plan View - D04-05

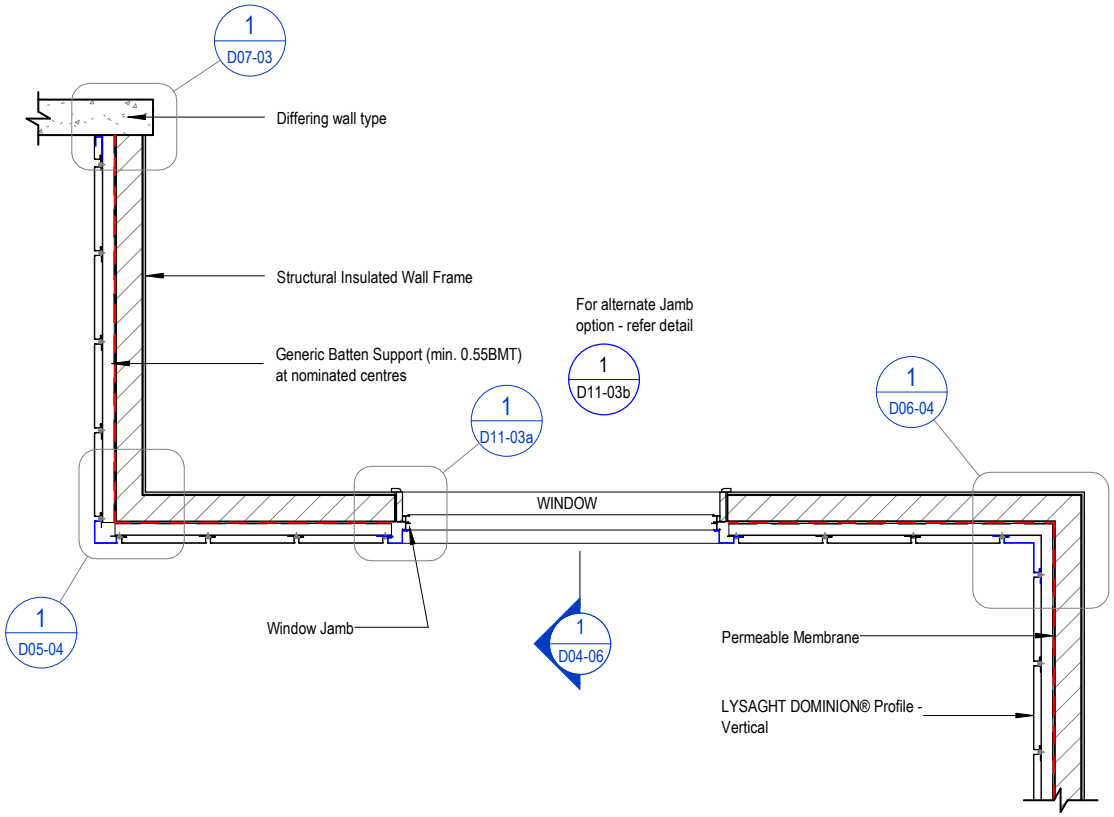


Figure 14.3.2.2:

Typical Wall Cladding Setout - Unsupported DOMINION® - Vertical Fix - Sectional View - D04-06

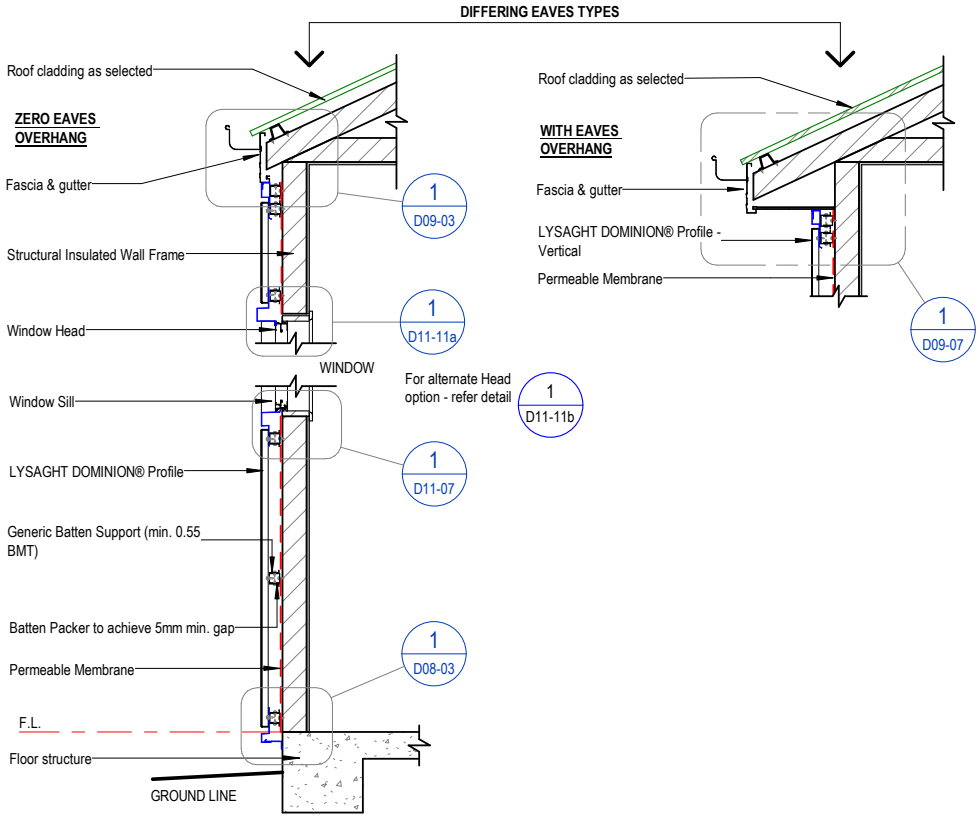


Figure 14.3.2.3:

External Corner - Unsupported DOMINION® Panel - Vertical Fix - D05-04

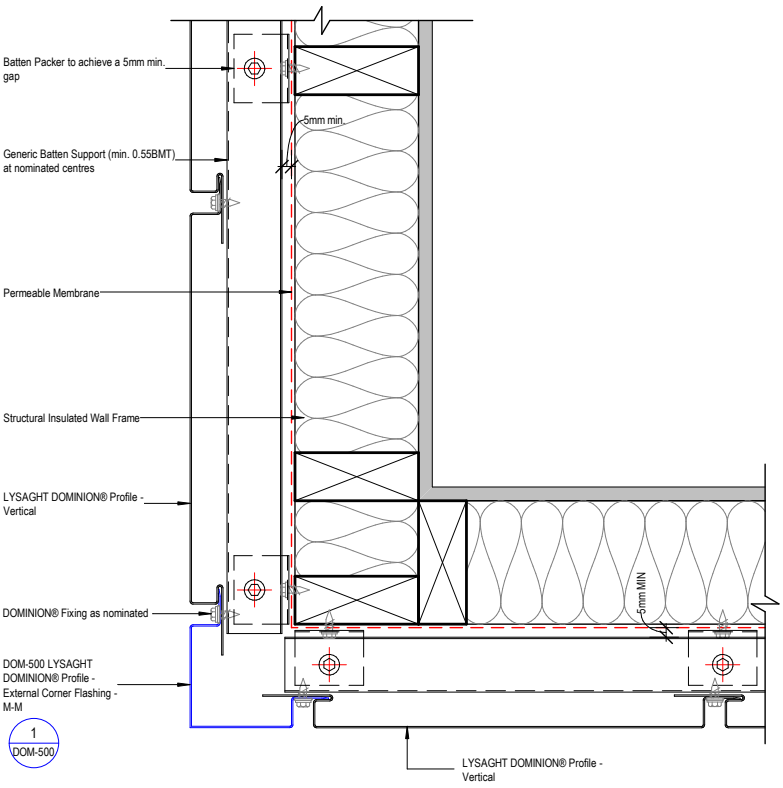


Figure 14.3.2.4:

Internal Corner - Unsupported DOMINION® Panel - Vertical Fix - D06-04

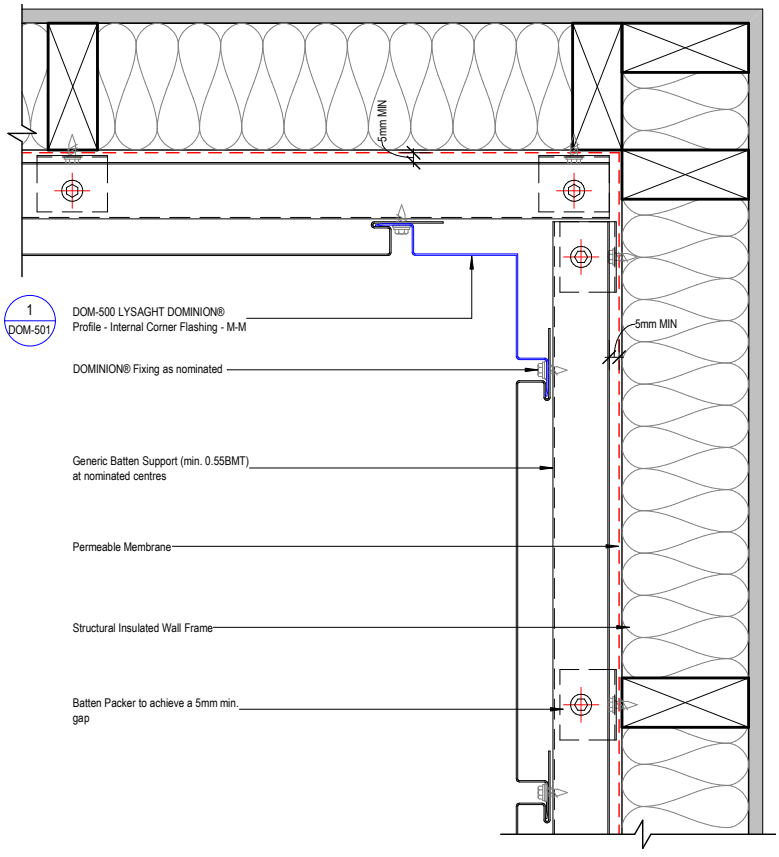


Figure 14.3.2.5:

Wall Closure Detail - Unsupported DOMINION® Panel - Vertical Fix - D07-03

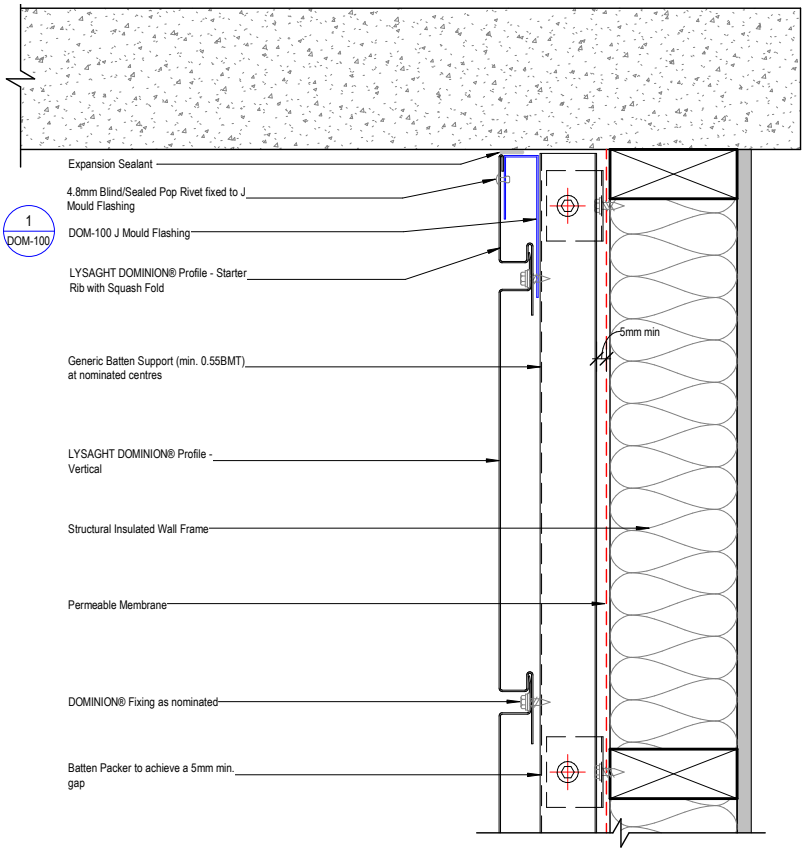


Figure 14.3.2.6

Window Jamb Detail - Unsupported DOMINION® Panel - Vertical Fix - Male - D11-03a

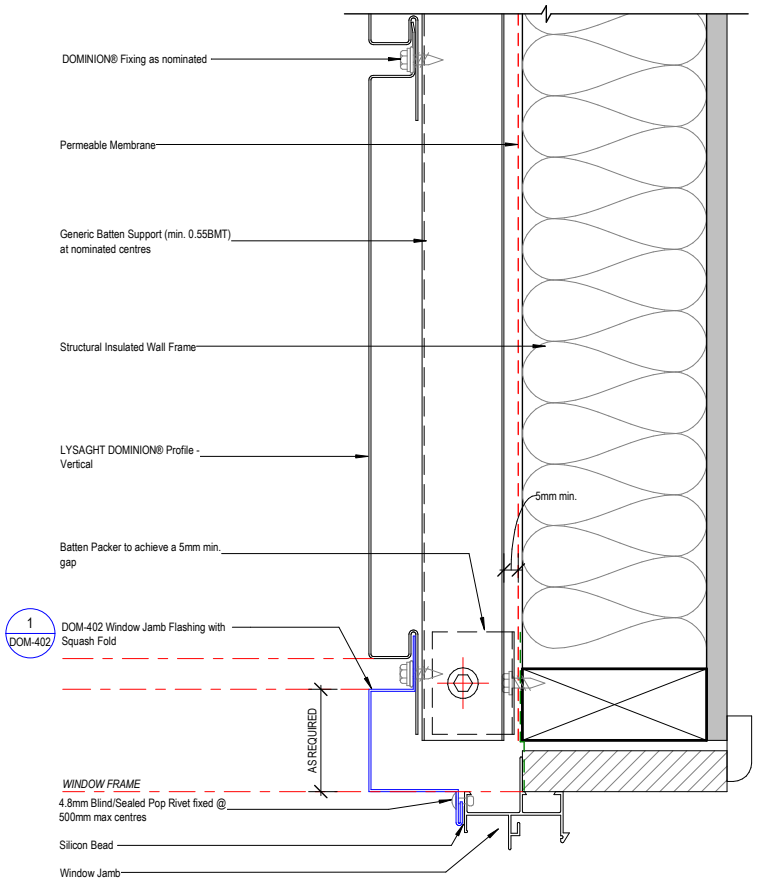


Figure 14.3.2.7:

Window Jamb Detail - Unsupported DOMINION® Panel - Vertical Fix - Female - D11-03b

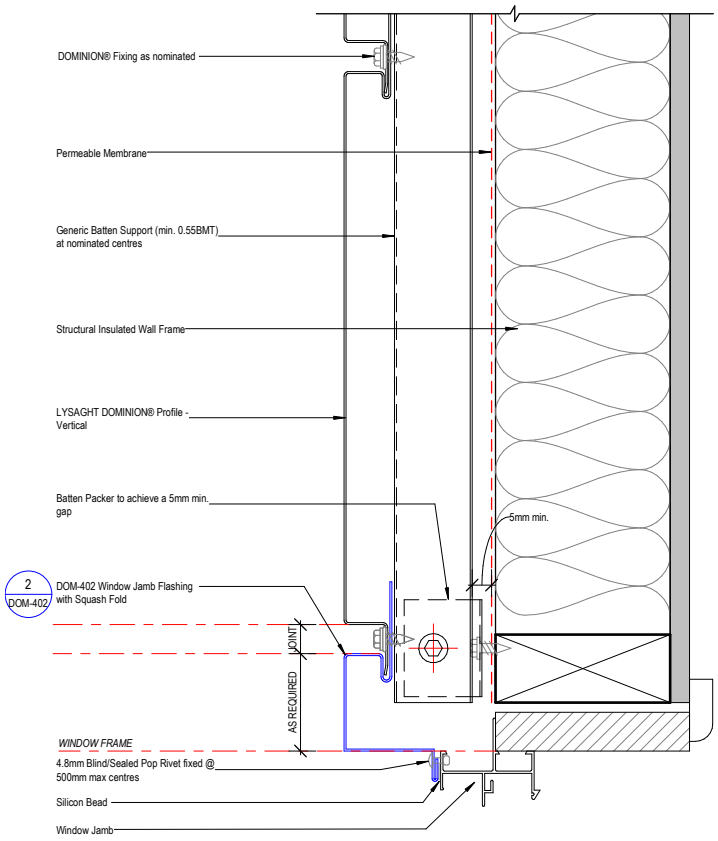


Figure 14.3.2.8:

Wal Base Detail - Unsupported DOMINION® Panel - Vertical Fix - D08-03

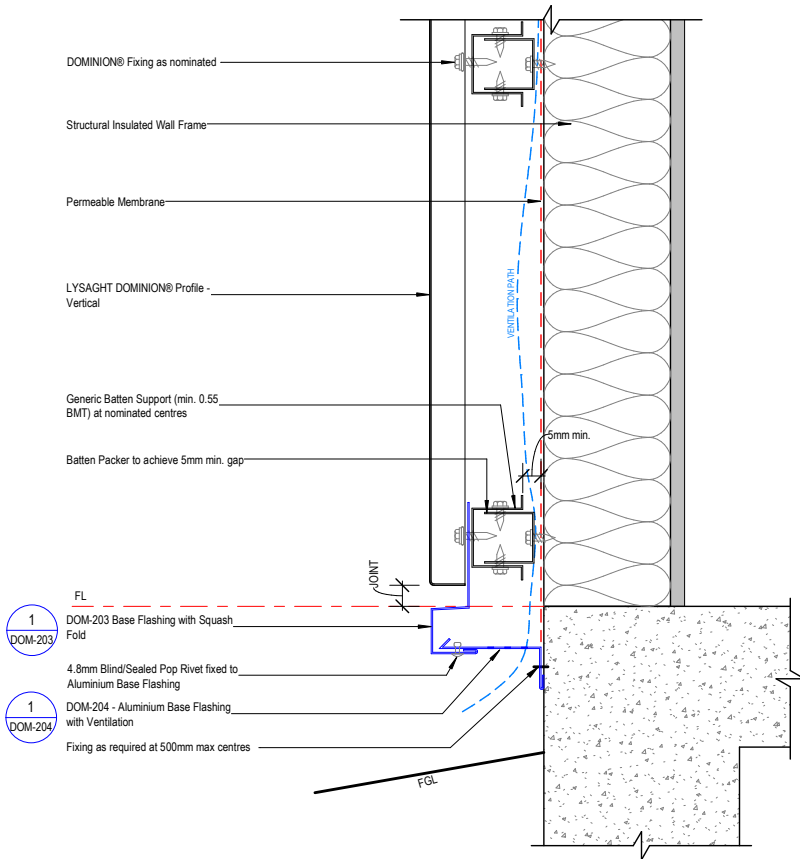


Figure 14.3.2.9:

Top of Wall Eave - Zero Overhang - Unsupported DOMINION® Panel - Vertical Fix - D09-03

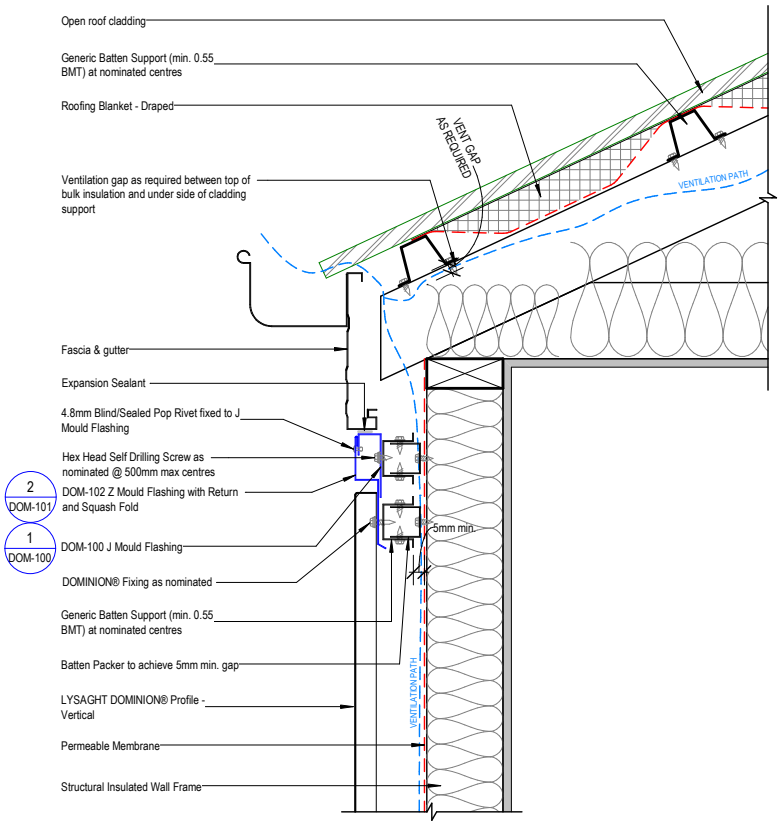


Figure 14.3.2.10

Top of Wall Eave - Overhang - Unsupported DOMINION® Panel - Vertical Fix - D09-07

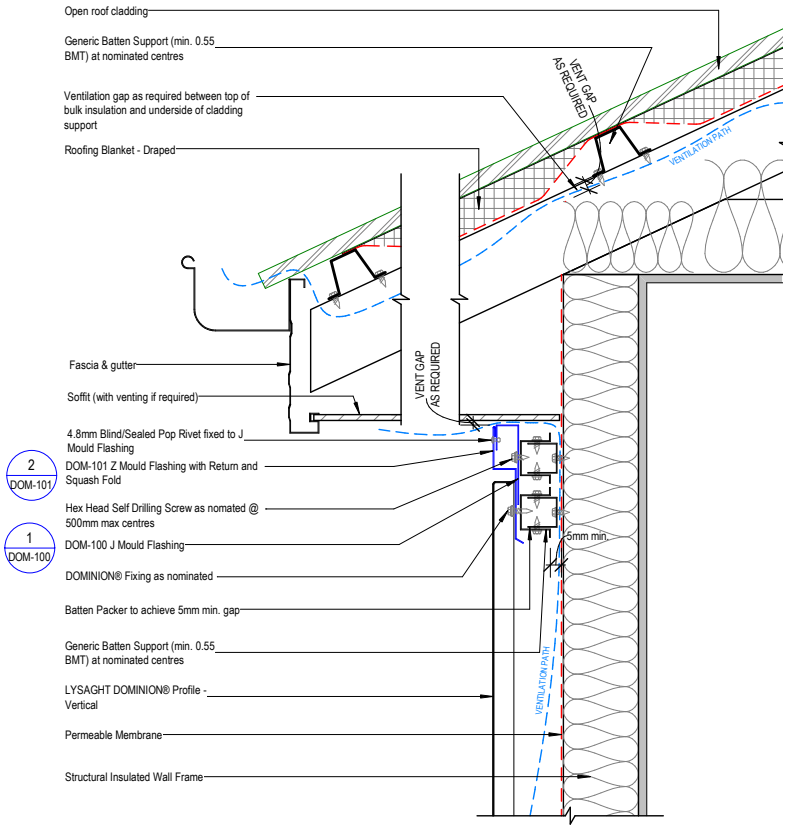


Figure 14.3.2.11:

Window Sill Detail - Unsupported DOMINION® Panel - Vertical Fix - D11-07

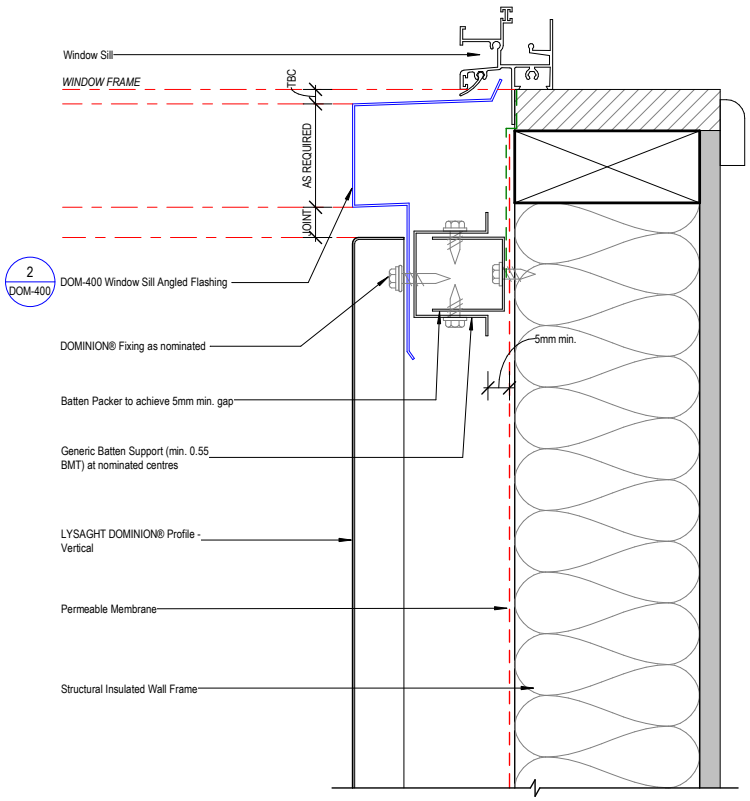


Figure 14.3.2.12:

Window Head Detail - Unsupported DOMINION® Panel - Vertical Fix Option 1 - D11-11a

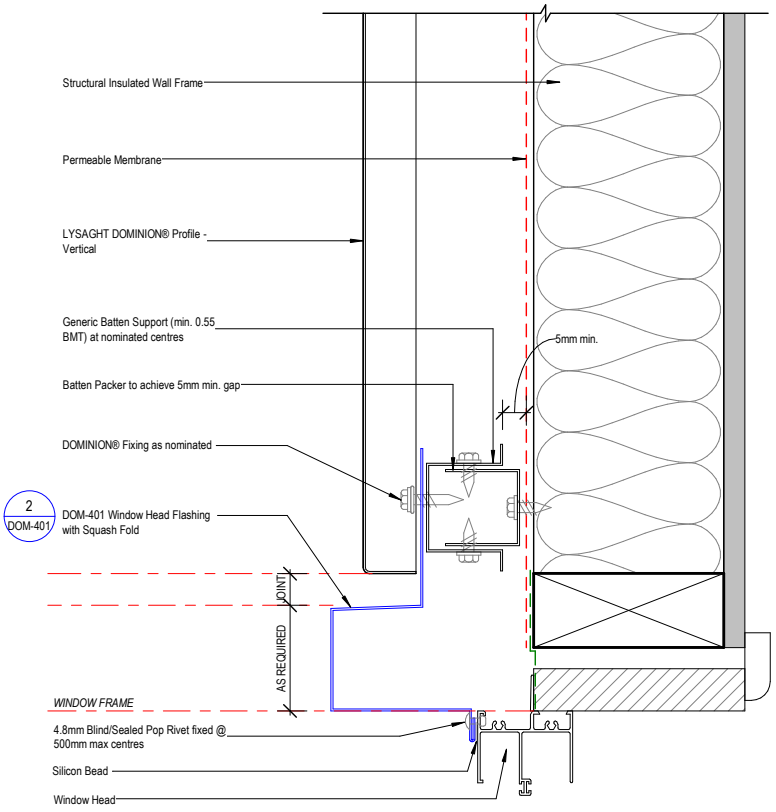


Figure 14.3.2.13:

Window Head Detail - Unsupported DOMINION® Panel - Vertical Fix Option 2 - D11-11b

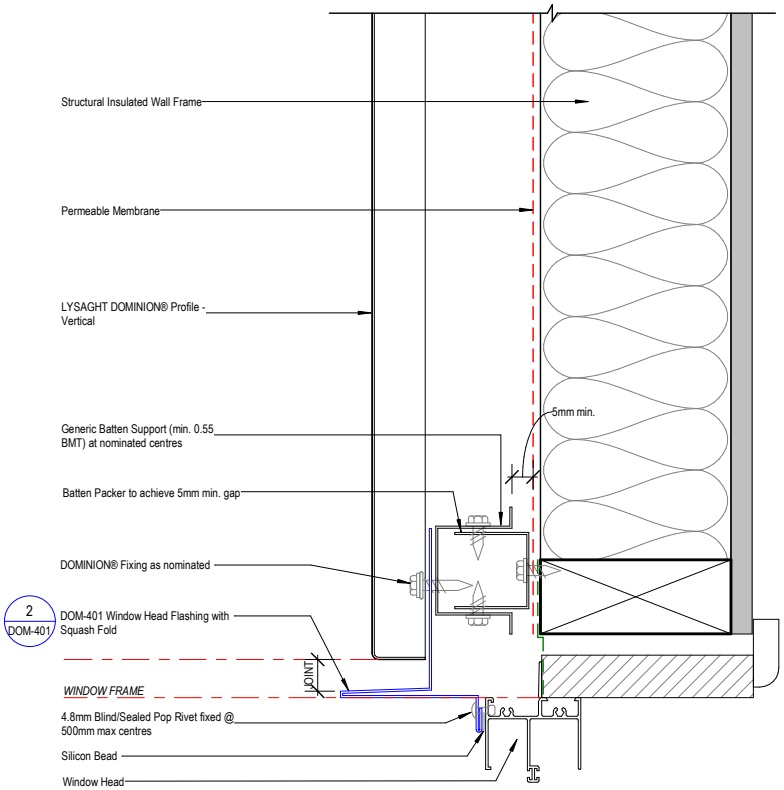
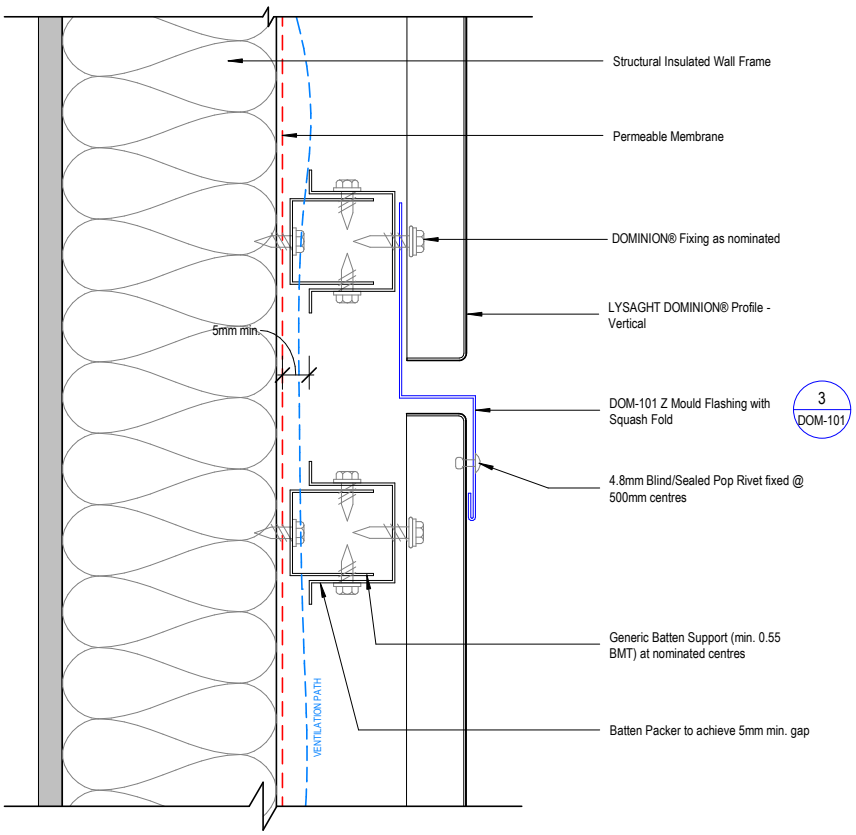


Figure 14.3.2.14

Wall Sheet Joint Detail - Unsupported DOMINION® Panel - Vertical Fix - Sectional View - D12-18



14.3.3 DOMINION® TYPICAL FLASHINGS

Figure 14.3.3.1:

DOM-100 - J Mould Flashings

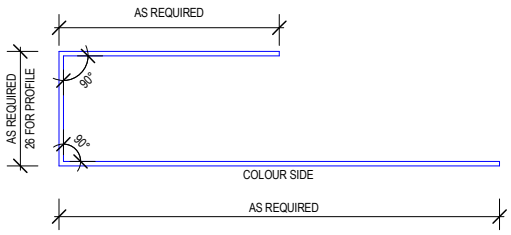
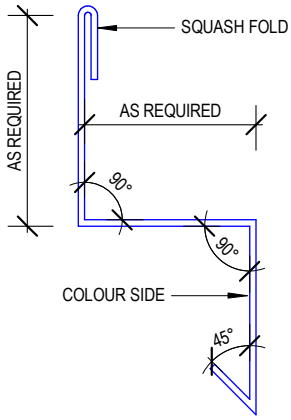
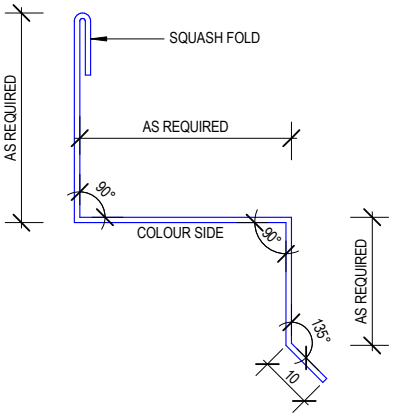


Figure 14.3.3.2:

DOM-101 - Z Mould with Squash Fold and return (left)



DOM-101 - Z Mould with Squash Fold and return (right)



DOM-101 - Z Mould Flashing with Squash Fold

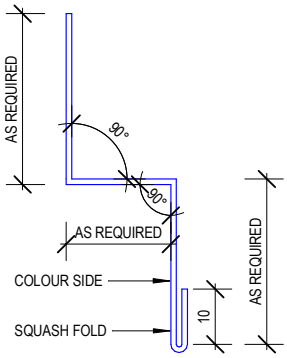
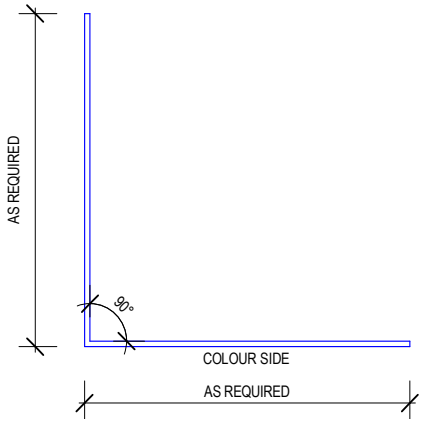
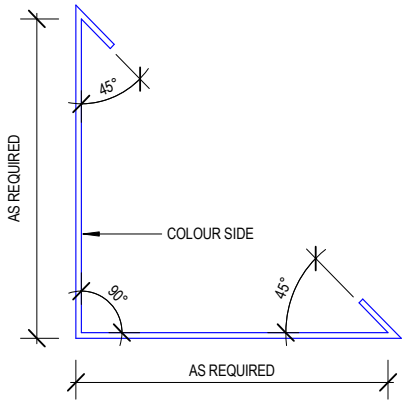


Figure 14.3.3.3:

DOM-102 - L Mould Flashing



DOM-102 - L Mould Flashing with Returns



DOM-102 - L Mould Flashing with Squash Folds

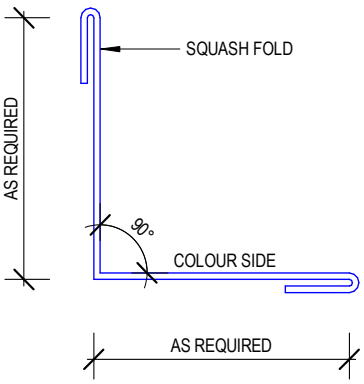


Figure 14.3.3.4:

DOM-103 - Apron Flashing

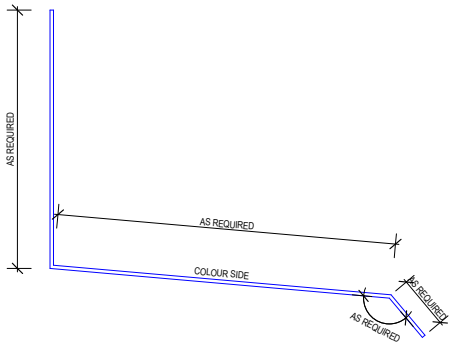


Figure 14.3.3.5:

DOM-104 - U Mould Flashing

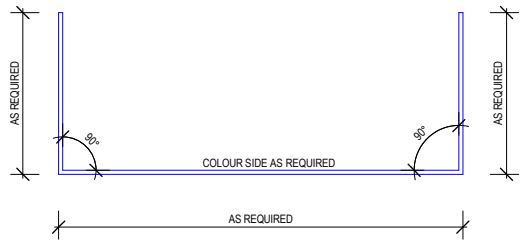


Figure 14.3.3.6:

DOM-200 - External Corner Over Flashing

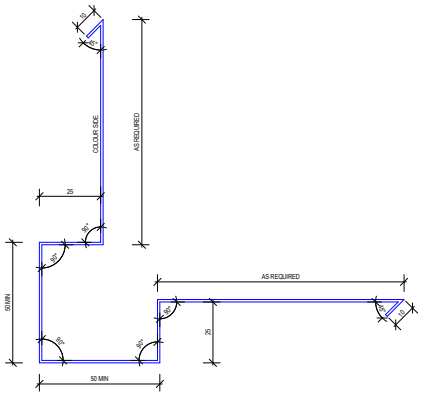


Figure 14.3.3.7:

DOM-201 - Single Return Over Flashing

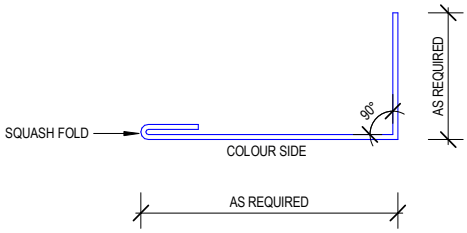
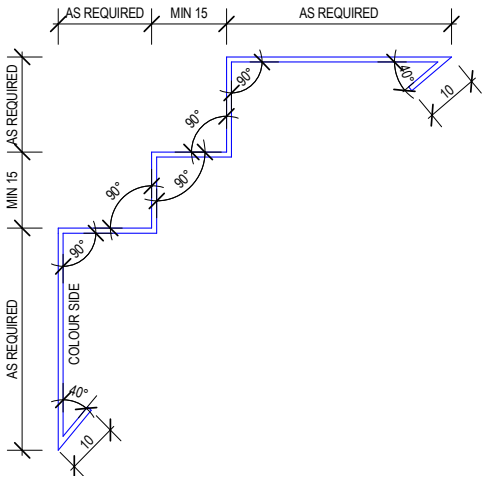


Figure 14.3.3.8:

DOM-202 - Internal Corner Flashings with Returns



DOM-202 - Internal Corner Flashings with Squash Folds

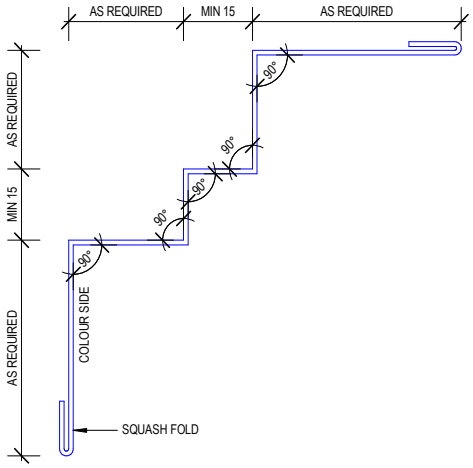


Figure 14.3.3.9:

DOM-203 - Base flashing with Squash Fold

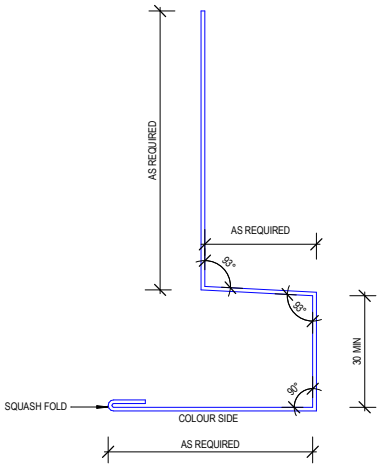


Figure 14.3.3.10:

DOM-204 - Aluminium Base Flashing with Ventilation

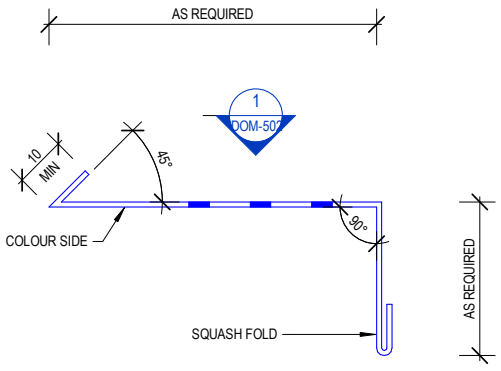


Figure 14.3.3.11:

DOM-205 - Top of Wall Flashing

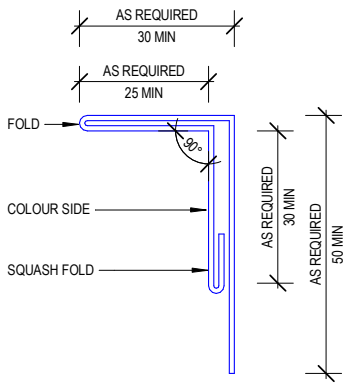
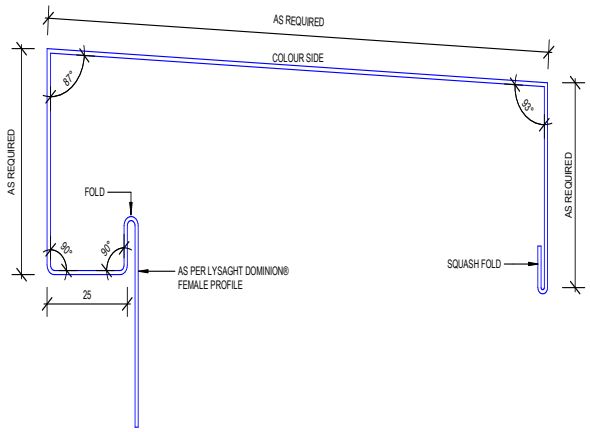


Figure 14.3.3.12:

DOM-206 - Parapet Top Flashing with female return & Squash Fold



DOM-206 - Parapet Top Angled Flashing with return & Squash Fold

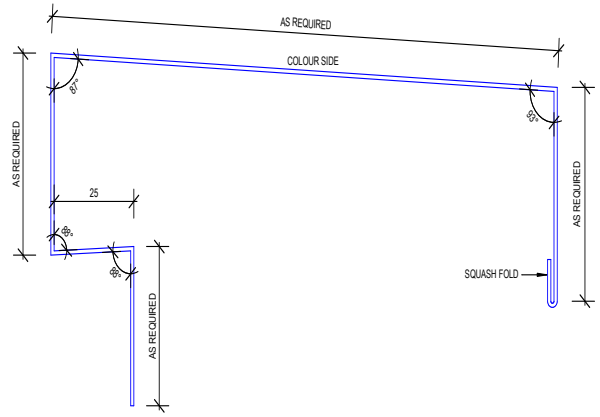
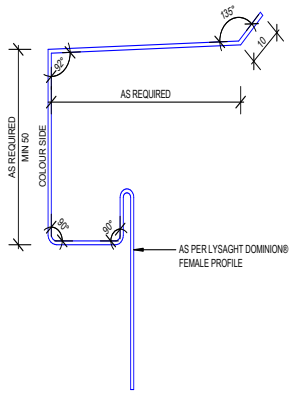


Figure 14.3.3.13:

DOM-400 - Window Sill Flashing with female return



DOM-400 - Window Sill Angled Flashing with return

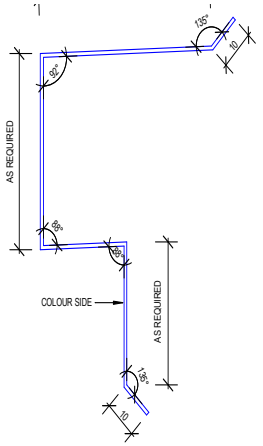
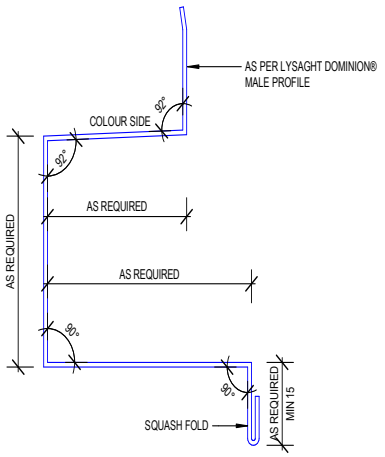


Figure 14.3.3.14:

DOM-401 - Window Head Male Profile Flashing with Squash Fold



DOM-401 - Window Head Flashing with Squash Fold

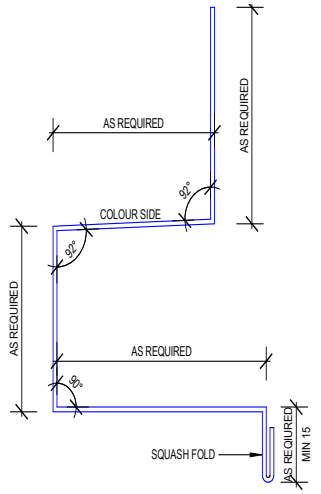
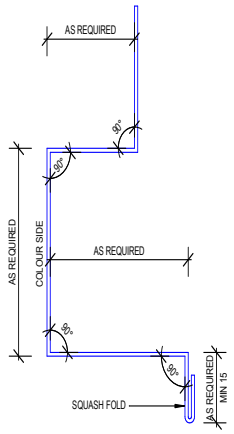


Figure 14.3.3.15:

DOM-402 - Window Jamb Flashing with Squash Fold



DOM-402 - Window Jamb Female Flashing with Squash Fold

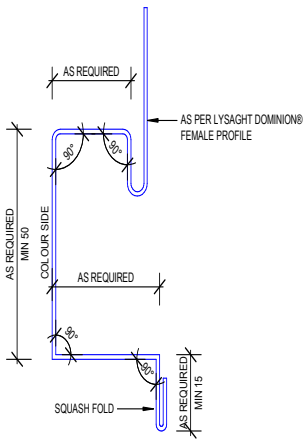
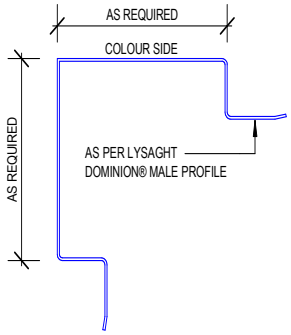
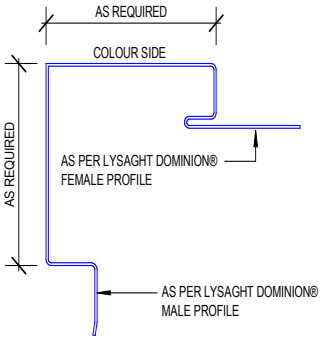


Figure 14.3.3.16:

DOM-500 - External Corner Details - male male



DOM-500 - External Corner Details - female male



DOM-500 - External Corner Details - female female

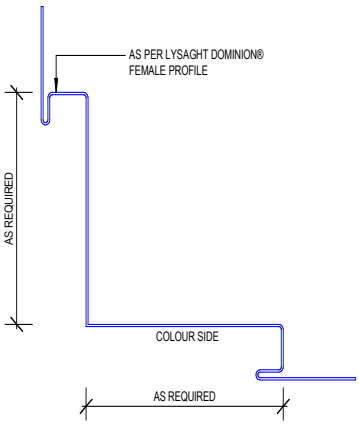
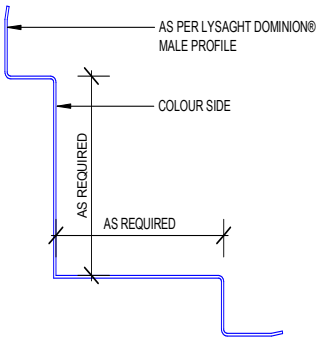
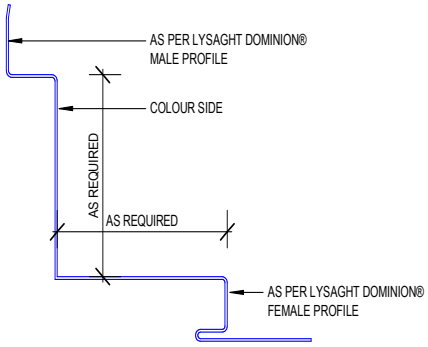


Figure 14.3.3.17:

DOM-501 - Internal Corner Details - male male



DOM-501 - Internal Corner Details - female male



DOM-501 - Internal Corner Details - female female

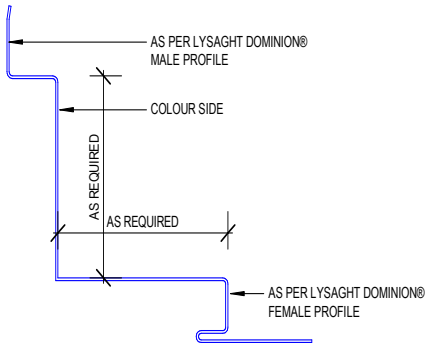


Figure 14.3.3.18:

DOM-502 - Perforation Detail

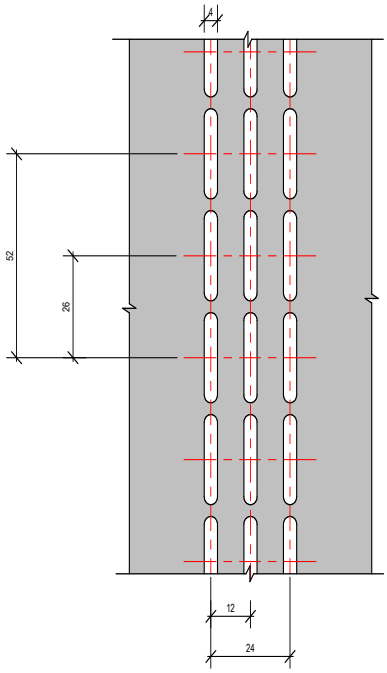


Figure 14.3.3.19:

DOM-504 - Corrosion Resistant Flashing

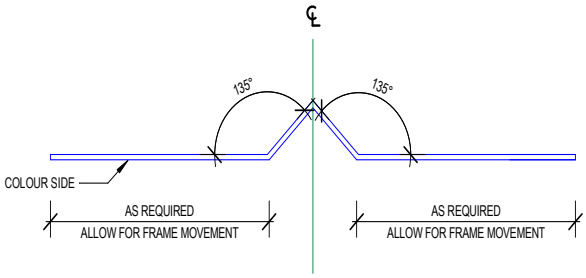
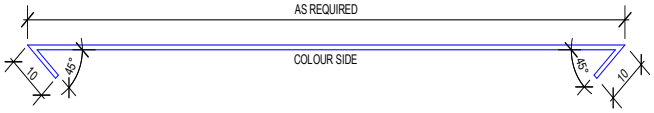


Figure 14.3.3.20:

DOM-505 - Backing Plate Flashing with returns



15.0 BAROQUE™ roof and wall cladding

A heritage-inspired profile, BAROQUE™ features wide, flat pans defined by generous semi-circular ribs. At once delivering a strong linear visual which is gentled by the unusual, rounded rib-form, this profile offers a most unique visual character which sits easily with both traditional and contemporary architecture.

BAROQUE™ is installed on a ply substrate with the profile being able to be used as either a roof or wall cladding. It can be made with both ribs and pan Figure 15.2.1 in the one piece or alternatively with only one rib Figure 15.2.3. The profile comes in a maximum sheet length of 4000mm with the double rib profile fixed through the crest of the rib.

15.1 MATERIAL SPECIFICATIONS

Coverage (mm)	275		475	
Base Metal Thickness (mm)	0.55	0.75	0.55	0.75
Total Coated Thickness[1] (mm)	0.60	0.80	0.60	0.80
Rib Height (mm)	25			
Sheet Length (mm)				
Minimum	800			
Maximum	4000			
Mass / Unit Length (kg/m)				
ZINCALUME® steel	1.83	2.41	2.75	3.61
COLORBOND® steel[1]	1.86	2.44	2.80	3.66
Mass / Unit Area (kg/m²)				
ZINCALUME® steel	6.65	8.76	5.79	7.61
COLORBOND® steel[1]	6.76	8.87	5.90	7.71
Minimum Yield Strength	300 (G300)			
Coating Class (See Base Material for detail)	AM125 - ZINCALUME® steel AM100 - COLORBOND® steel AM150 - COLORBOND® ULTRA steel			
Tolerance	Sheet length: ±7mm Cover width: ±4mm			
Thermal Expansion	2.9mm average per 5m @ 50°C change			

Notes:
1. Based on standard, single sided COLORBOND® steel. For other painted steel options please contact your Lysaght representative.

MINIMUM ROOF PITCH

The minimum recommended roof pitch for BAROQUE™ cladding is 5 degrees.

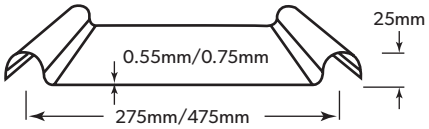
INSULATION

Care needs to be taken when installing insulation with BAROQUE™ roof sheeting. The screws may need to be increased depending on the thickness and density of the insulation. When the screw is properly tightened into metal there should be a minimum of three (3) threads protruding past the support being fixed in to. For timber the screw must have a minimum embedment of 25mm into the timber.

For insulation, the use of roof spacing system is recommended to help maintain Rw values as well as minimising any bulging in the profile caused by the insulation. Refer to oil canning section for potential visual impacts of insulation on the product.

Figure 15.1.1:

BAROQUE™ profile.



FASTENING BAROQUE™ CLADDING TO SUPPORTS

BAROQUE™ cladding utilises pierce-fixing as the method of fixing sheets to ply substrate.

Pierce-fixing is the method of fixing sheets using fasteners which pass through the sheet. This is different from the alternative method called concealed-fixing.

You can place screws through the crests or in the pans/valleys, however, to maximise watertightness, always place roof screws through the crests. For walling, you may fix through either the crest or valley/pan (Figure 15.1.1).

Always drive the screws perpendicular to the cladding, and in the centre of the corrugation or rib. The following procedures are described for roofs, but the same general principles apply to walls.

Table 15.1.1:

Fastener Specification.

Application	Fixing to plywood
Non-Cyclonic Roofing & Walling	14G 10x50 Type 17 Hi Grip Hex head with seal Crest fix 14G 10x 25 type 17 hex head with seal Pan fix. Additionally 4.8mm aluminium blind rivets to rib brackets for the single rib profile

MAXIMUM SUPPORT SPACINGS

Type of Span	275mm cover		475mm cover	
	0.55mm BMT	**0.75mm BMT**	**0.55mm BMT**	**0.75mm BMT**
Roofs				
Single span				
End Span				
Internal Span				
Unstiffened eaves overhang				
Stiffened eaves overhang				
Walls				
Single				
End span				
Internal span				
Overhang				

BAROQUE™ cladding must be fixed to 19mm F11 Structural CD grade plywood for roofing applications or 15mm F11 Structural CD plywood for walling applications at max 600mm c/c only for wind region A and terrain category 3 For higher wind regions, check with your Lysaght representative

Table 15.1.2:

Guide to fastener layout and sheet coverage.

SHEET COVERAGE

275MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	11	15	19	22	26	30	33	37	40	44	48	51	55	59	62	66	70	73	110	146	182

475MM

Width of Roof (m)	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50
Number of Sheets	7	9	11	13	15	17	19	22	24	26	28	30	32	34	36	38	40	43	64	85	106

WIDTH COVERED BY 'X' NUMBERS OF SHEETS (M)

275MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	0.83	1.10	1.38	1.65	1.93	2.20	2.48	2.75	3.03	3.30	3.58	3.85	4.13	4.40	4.68	5.00	5.20	5.50

475MM

Number of Sheets	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Coverage (m)	1.43	1.90	2.38	2.85	3.33	3.80	4.28	4.75	5.23	5.70	6.18	6.65	7.10	7.60	8.08	8.55	9.00	9.50

15.2 TYPICAL INSTALLATION DETAILS

Figure 15.2.1:

Double Rib.

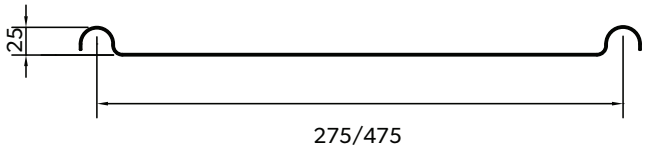


Figure 15.2.2:

End Lap.

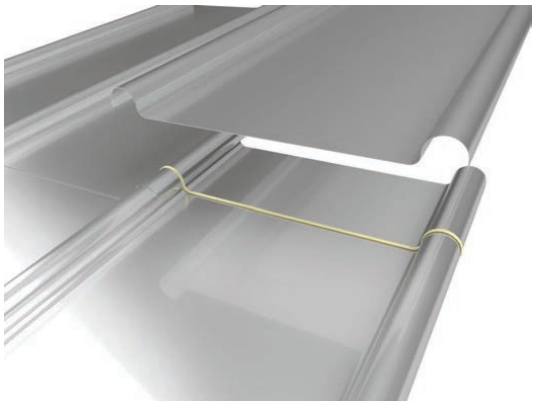


Figure 15.2.3:

Single Rib.

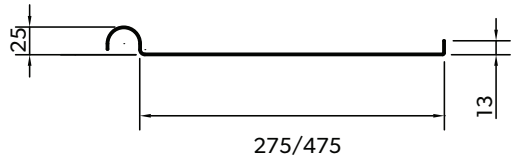
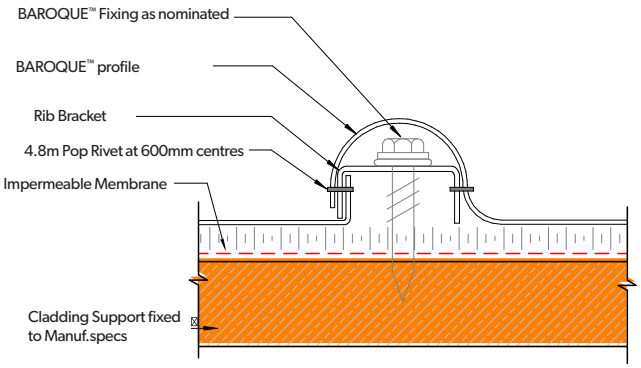
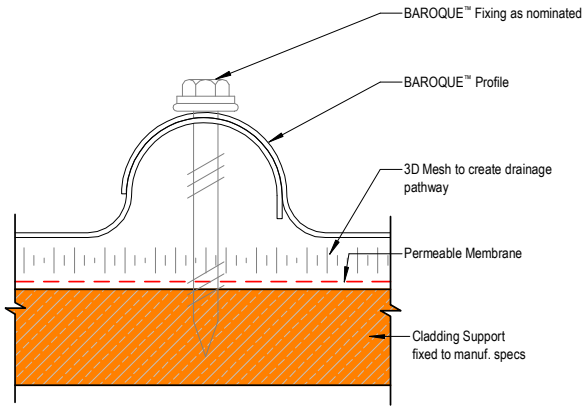


Figure 15.2.4:

Single Rib.



Double Rib Crest Wall Fixing - End View



Double Rib Pan Wall Fixing - End View

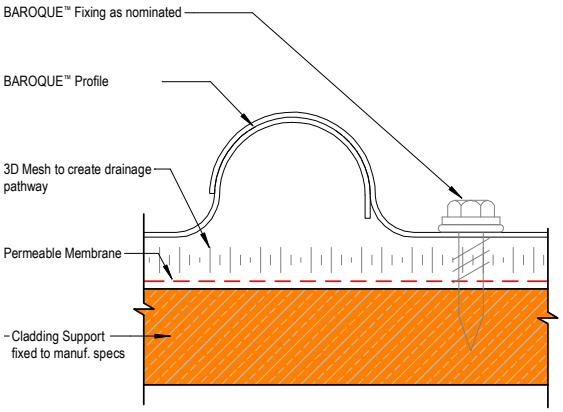


Figure 15.2.13:

Field Hem.

1. Place pan into the panel hemming tool. The front edge of the tool must rest against the panel edge on both sides.

2. While maintaining pressure against the panel joints, rotate the hemming tool 45°.

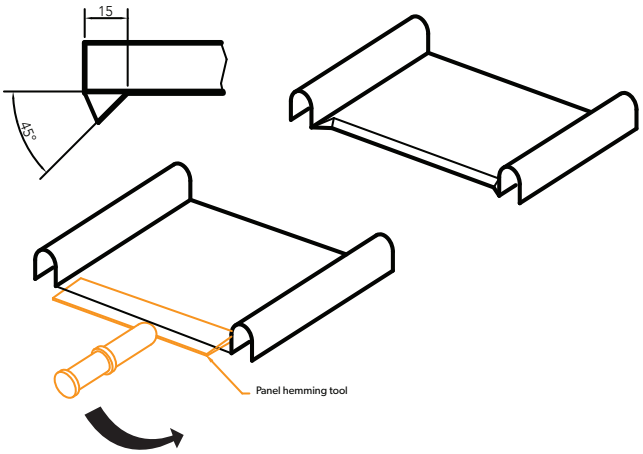


Figure 15.2.14:

Stop End.

1. Place pan into the panel stop end tool. The front edge of the tool must rest between the ribs.

2. While maintaining pressure against the panel, rotate the stop end tool as close to 90 degrees as possible.

3. Inspect completed bend.

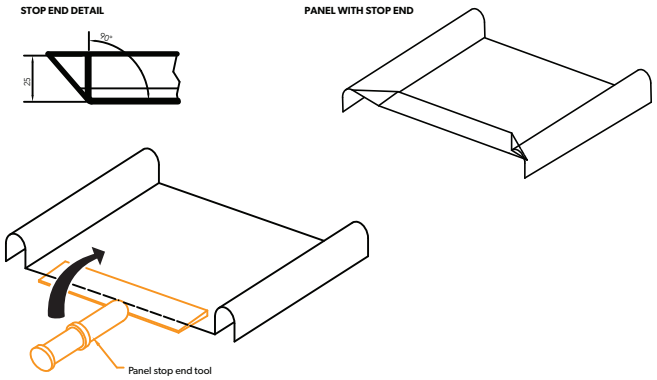
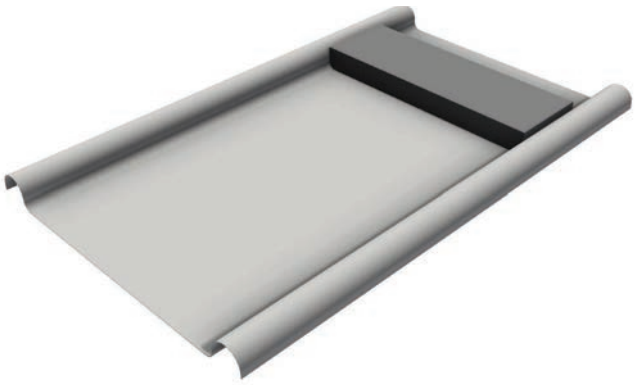


Figure 15.2.15:

Foam Infill detail.

80mm x 30mm closed cell foam infill cut to size and shape on site as required under ridge, hip or corner flashing



15.3 TYPICAL CONSTRUCTION DETAILS BAROQUE™

The construction details presented here represent potential detailing solutions to common construction situations. These details may not be suitable for all projects / situations and users should use professional judgement in determining suitability of the details for their particular project whilst referencing AS 1562.1 and SA HB39. The full suite of ZENITH® constructions details are available for download from https://bimcontent.com/lysaght/ in both REVIT and PDF format.

15.3.1 BAROQUE™ TYPICAL ROOF DETAILS

Figure 15.3.1.1:

Typical Roof Cladding Setout - Supported BAROQUE™ - Plan View - B04-10

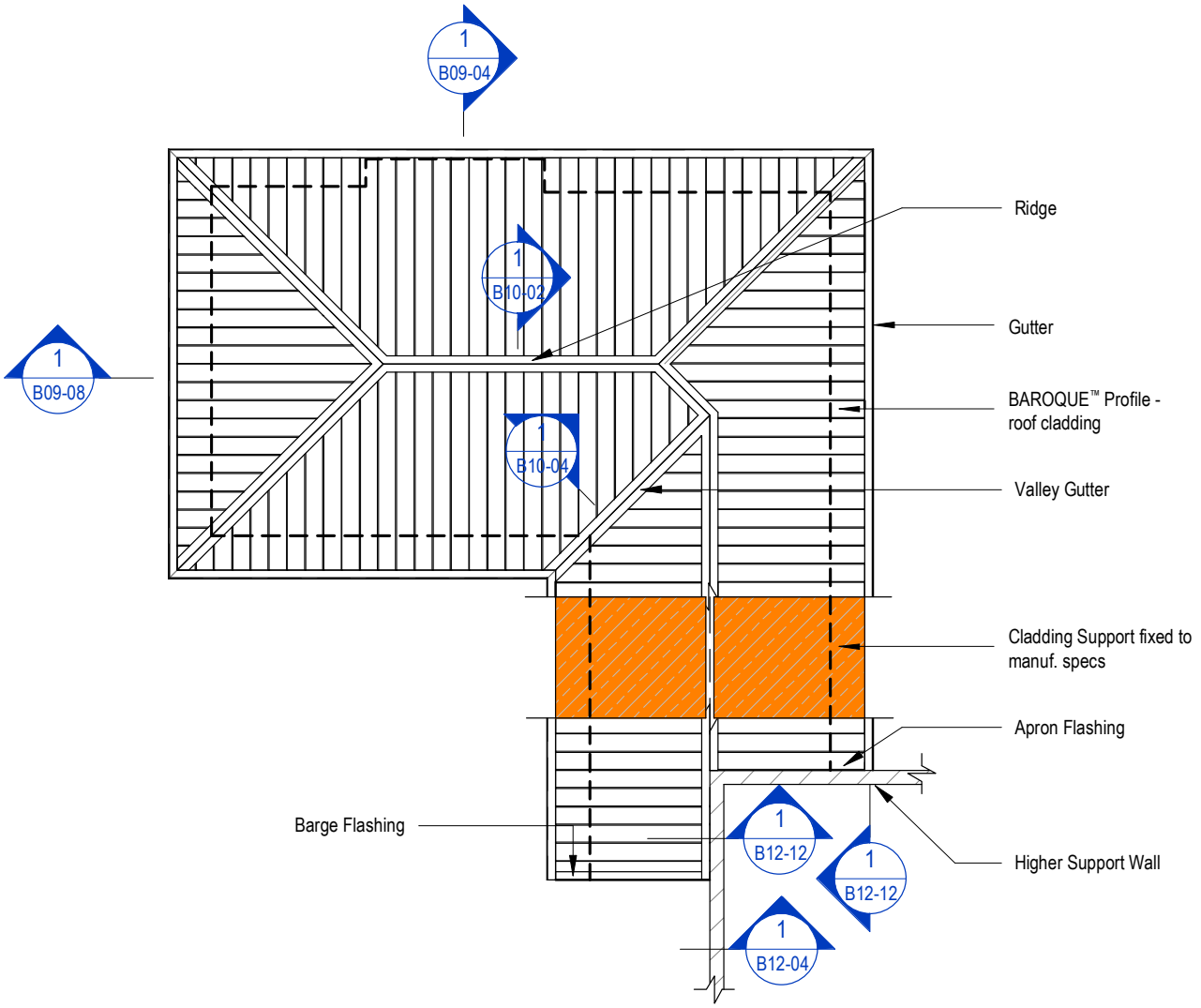


Figure 15.3.1.2:

Top of Wall Eave Detail - Zero Overhang - Supported BAROQUE™ - Vertical Fix - B09-04

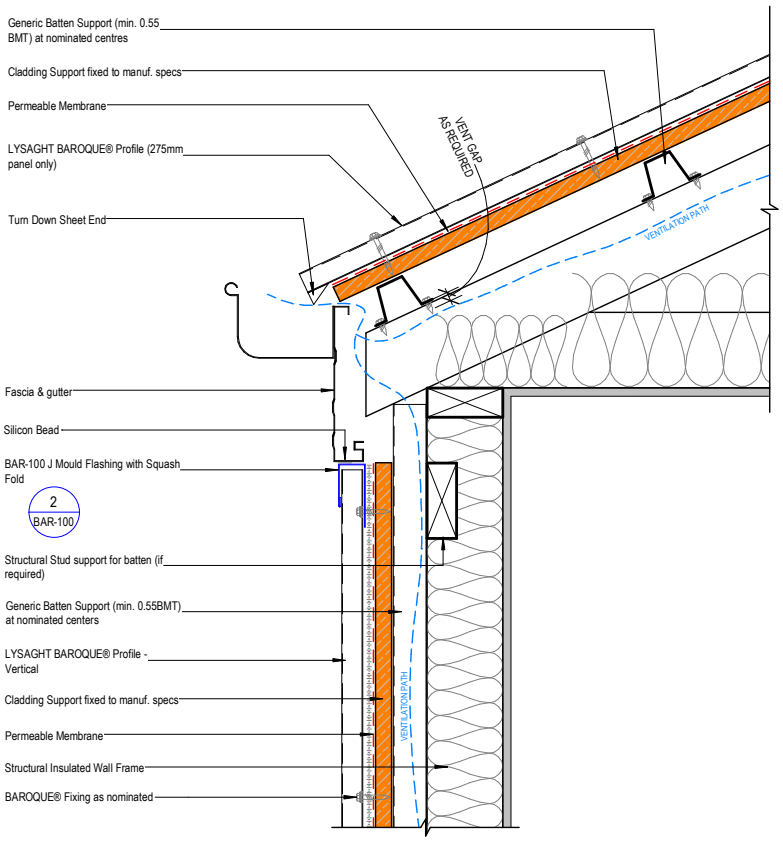


Figure 15.3.1.3:

Top of Wall Eave Detail - Overhang - Supported BAROQUE™ - Vertical Fix - B09-08

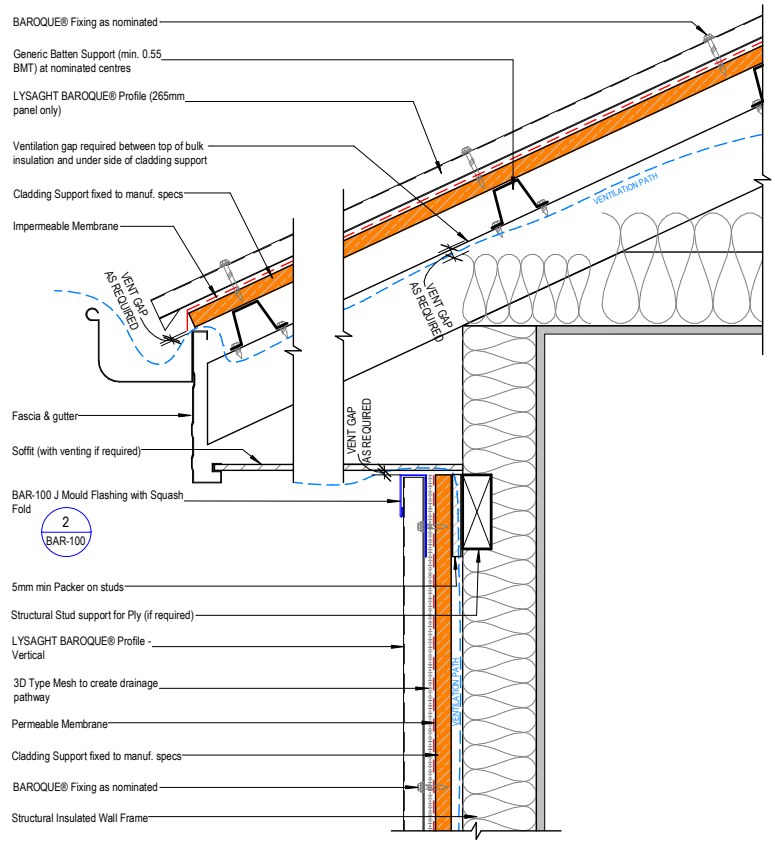


Figure 15.3.1.4:

Ridge Detail - Supported BAROQUE™ - Panel - B10-02

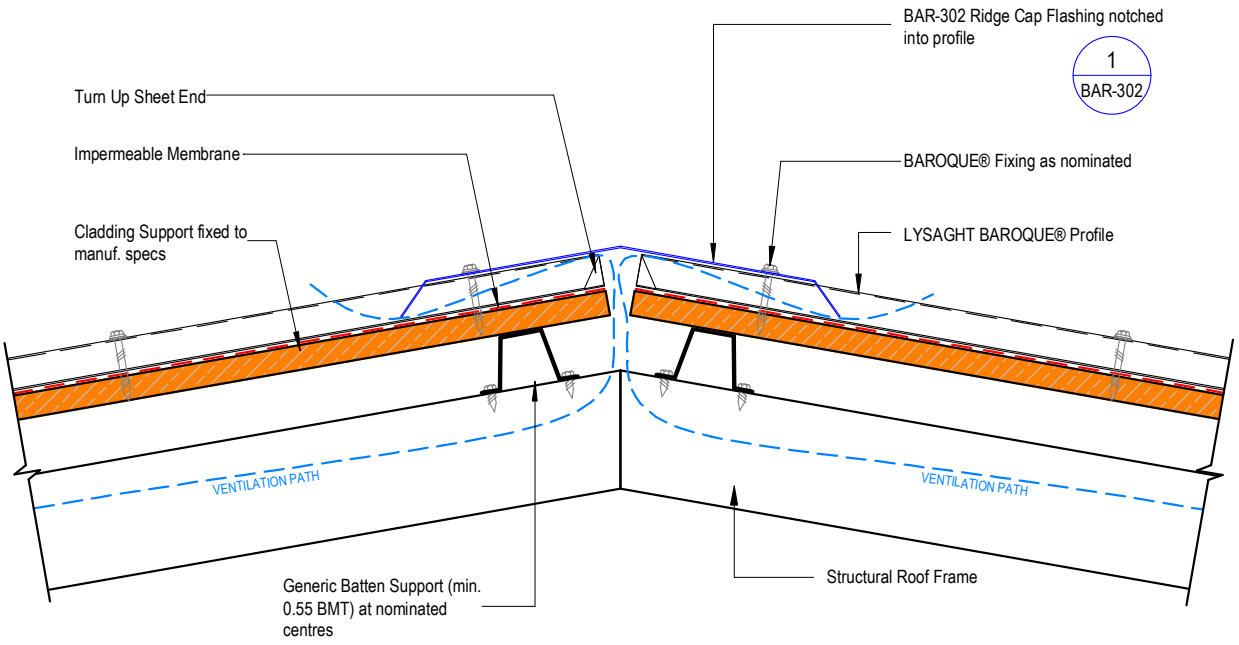


Figure 15.3.1.5:

Valley Detail - Supported BAROQUE™ Panel - B10-04

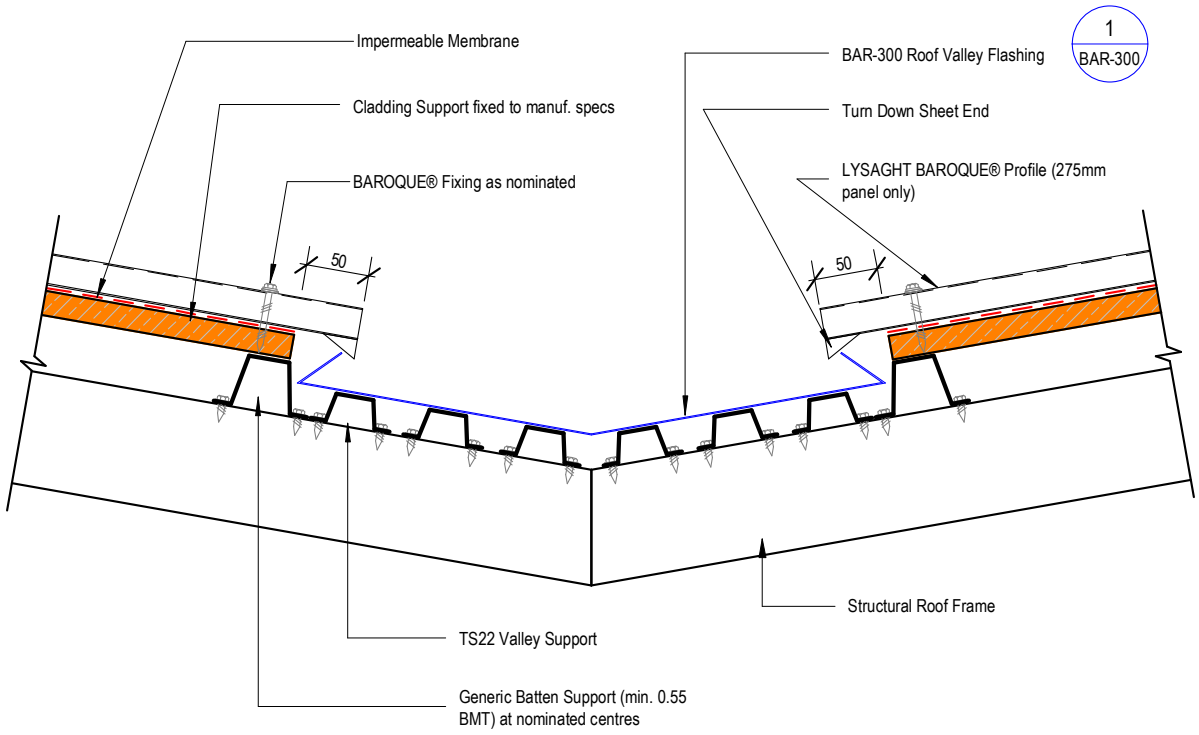


Figure 15.3.1.6:

Gable Detail - Supported BAROQUE™ Roof and Wall - Vertical Fix - B12-04

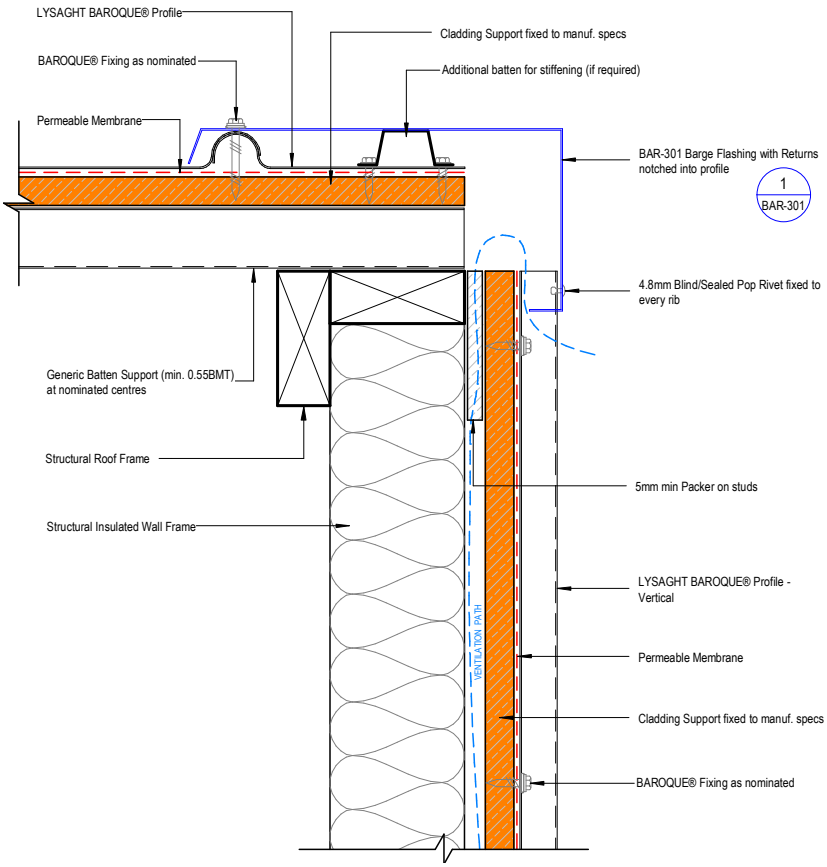


Figure 15.3.1.7:

Parapet Detail - Supported BAROQUE™ Panel - Vertical Fix - B12-11

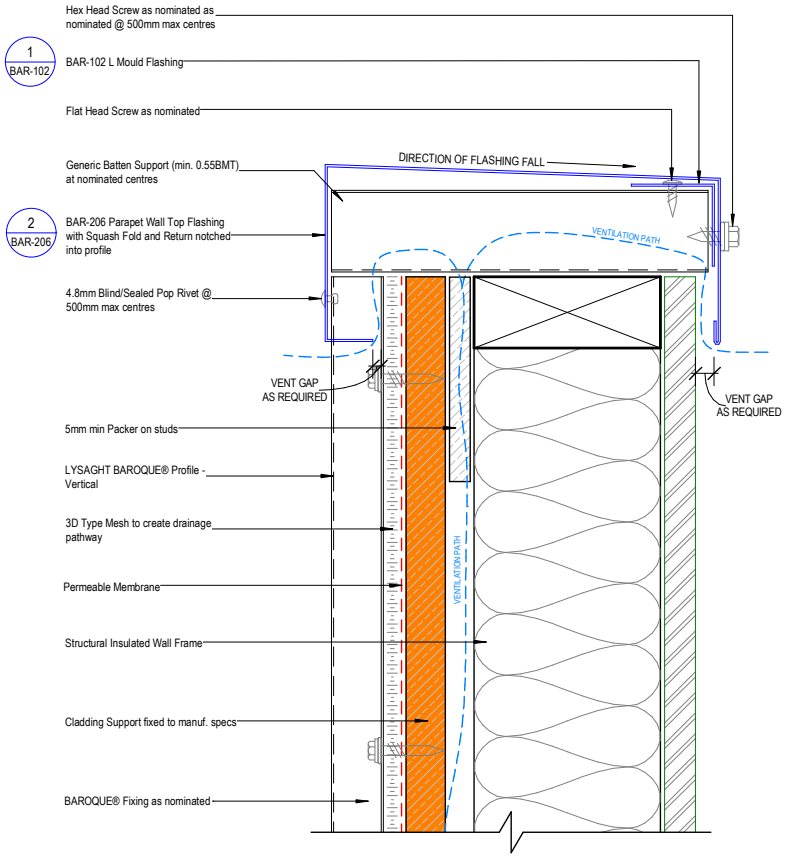


Figure 15.3.1.8:

Wall to Typical Roof Transition Detail - Supported BAROQUE™ Panel - Vertical Fix - Side View - B12-15

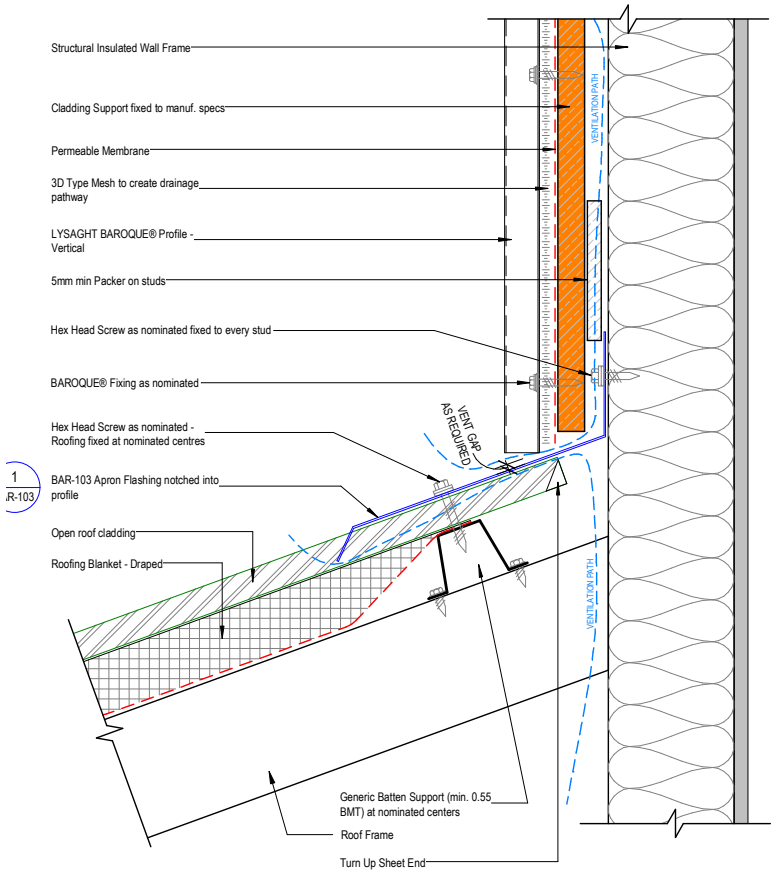
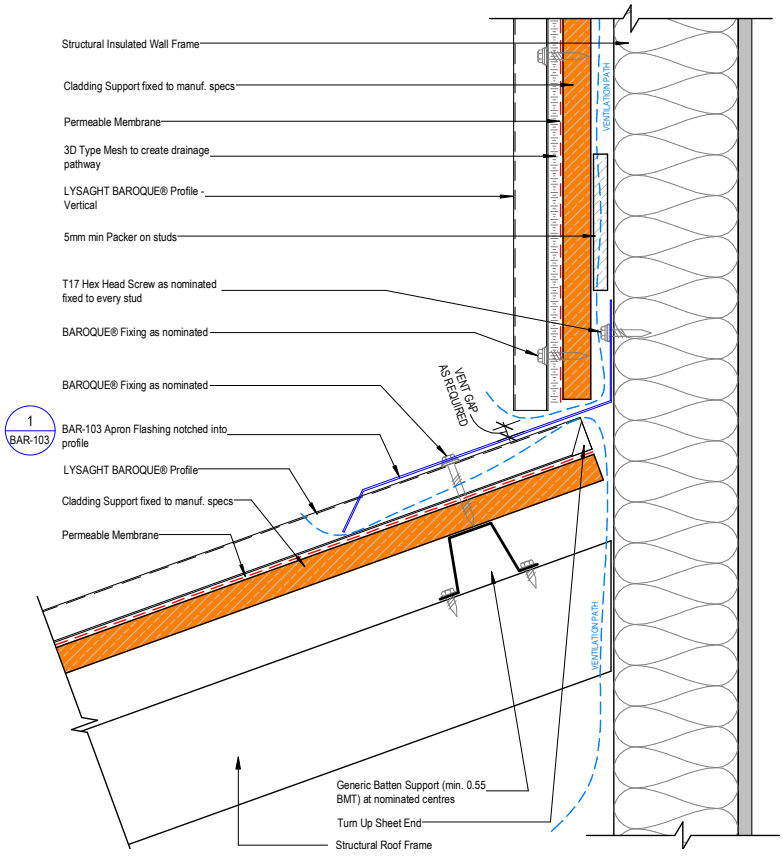


Figure 15.3.1.9:

BAROQUE™ Vertical Fix to Wall to BAROQUE™ Roof - Supported - Side View



15.3.2 BAROQUE™ TYPICAL WALL DETAILS - HORIZONTAL FIX

Figure 15.3.2.1:

Typical Wall Cladding Setout - Supported BAROQUE™ Panel - Horizontal Fix - Plan View - B04-03

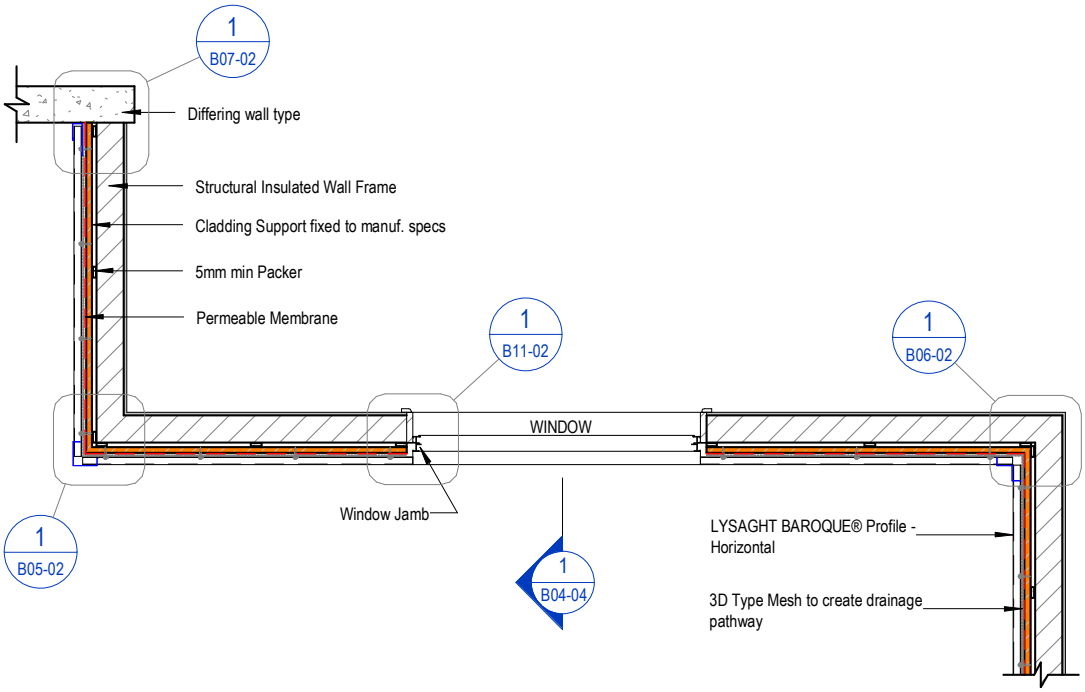


Figure 15.3.2.2:

Typical Wall Cladding Setout - Supported BAROQUE™ - Horizontal Fix - Sectional View - B04-04

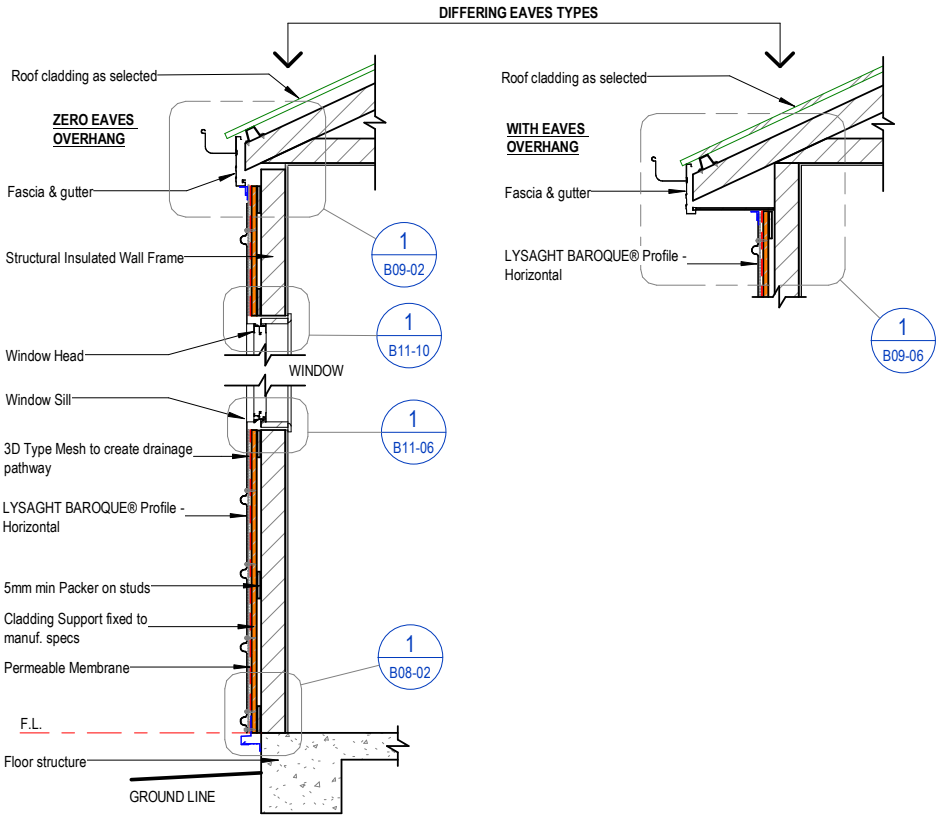


Figure 15.3.2.3:

External Corner Detail - Supported BAROQUE™ Horizontal Hard Fix - B05-02

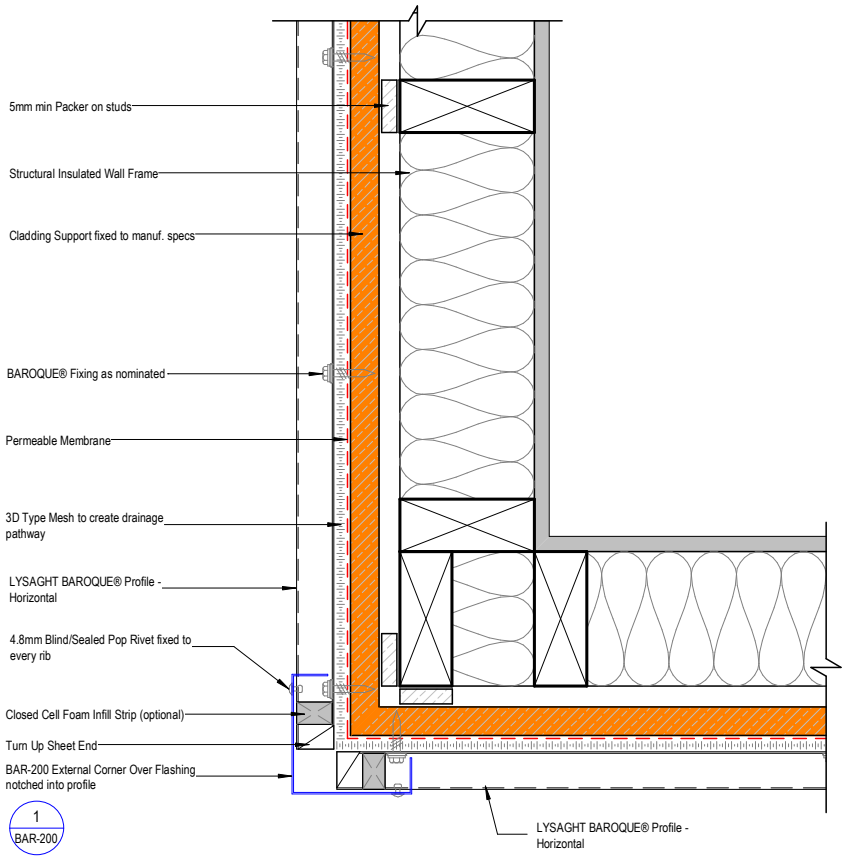


Figure 15.3.2.4:

Internal Corner Detail - Supported BAROQUE™ Horizontal Fix - B06-02

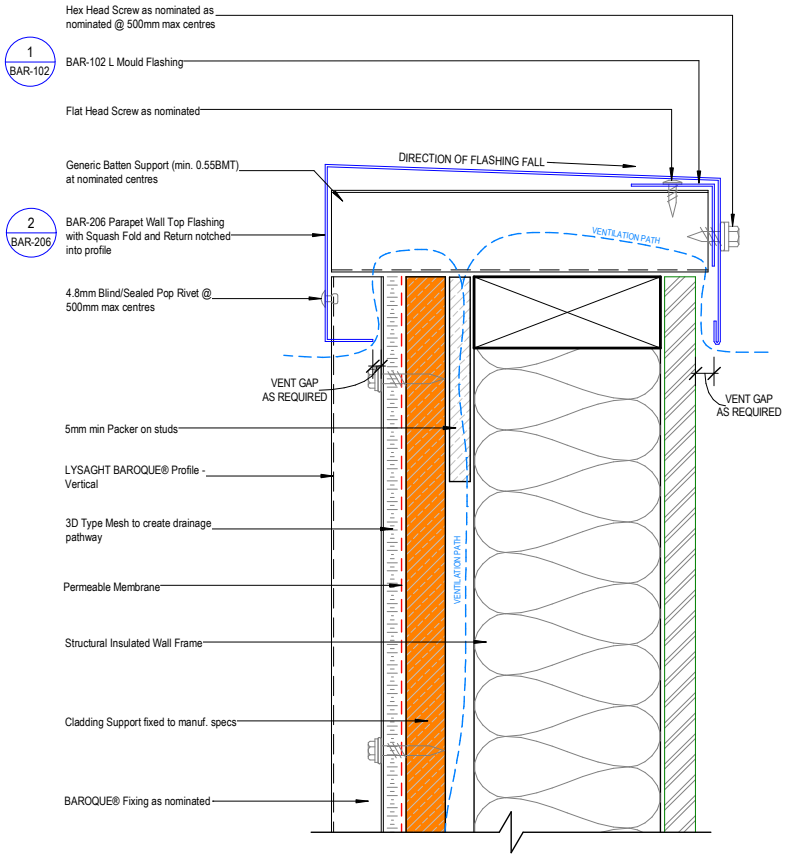


Figure 15.3.2.5:

Wall Closure Detail - Supported BAROQUE™ Horizontal Fix - B07-02

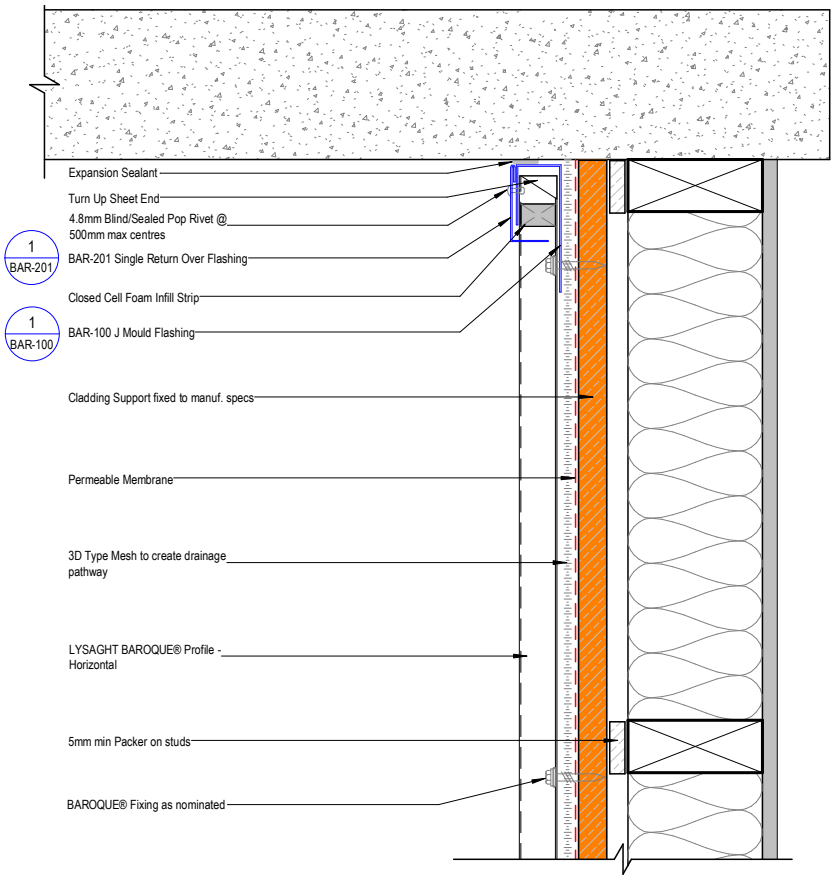


Figure 15.3.2.6:

Window Jamb Detail - Supported BAROQUE™ Horizontal Fix - B11-02

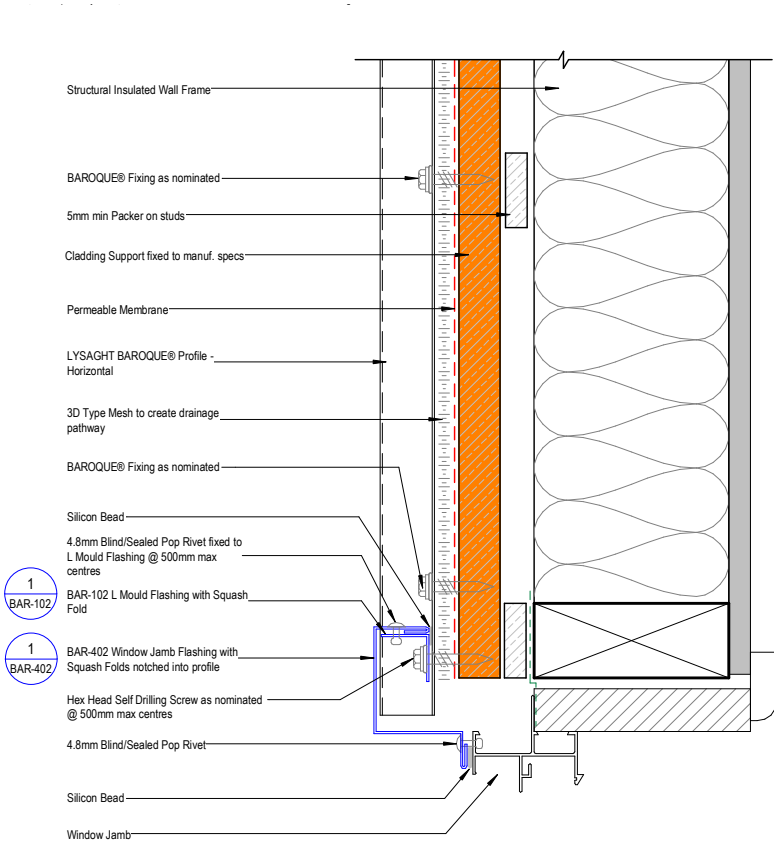


Figure 15.3.2.7:

Wall Base Detail - Supported BAROQUE™ Horizontal Fix - B08-02

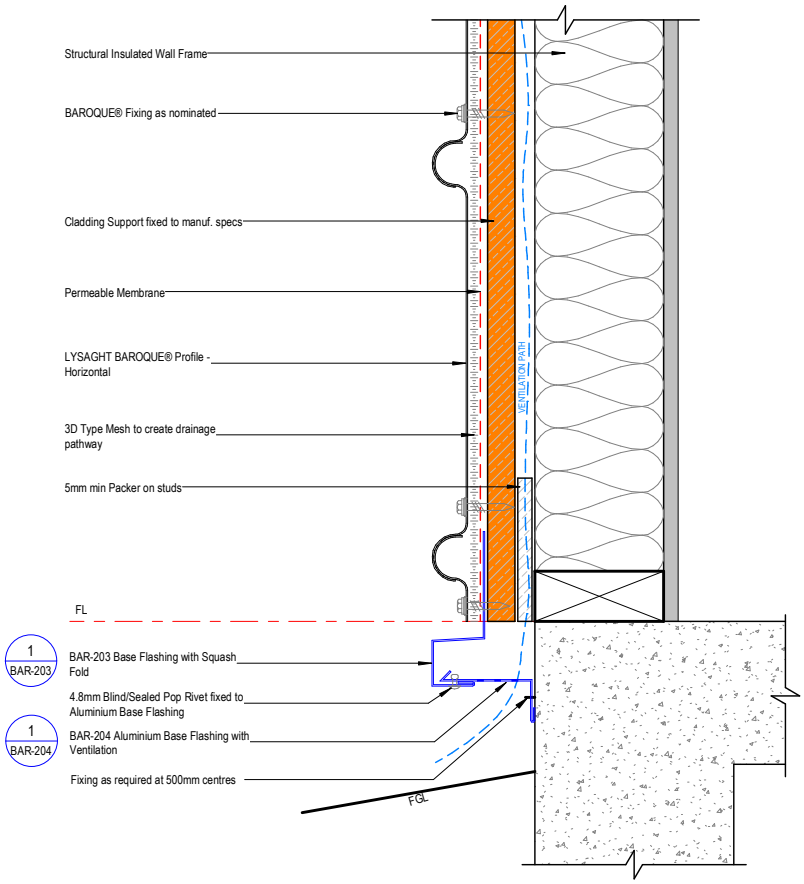


Figure 15.3.2.8:

Top of Wall Eave Detail - Zero Overhang - Supported BAROQUE™ Horizontal Fix - B09-02

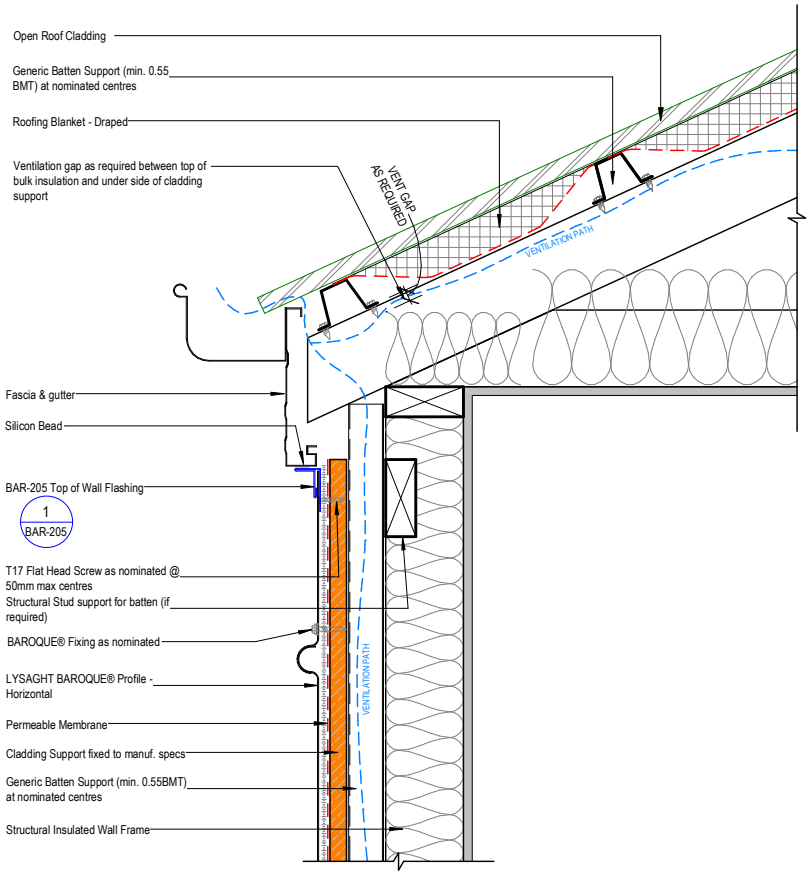


Figure 15.3.2.9:

Top of Wall Eave Detail - Overhang - Supported BAROQUE™ Horizontal Fix - B09-06

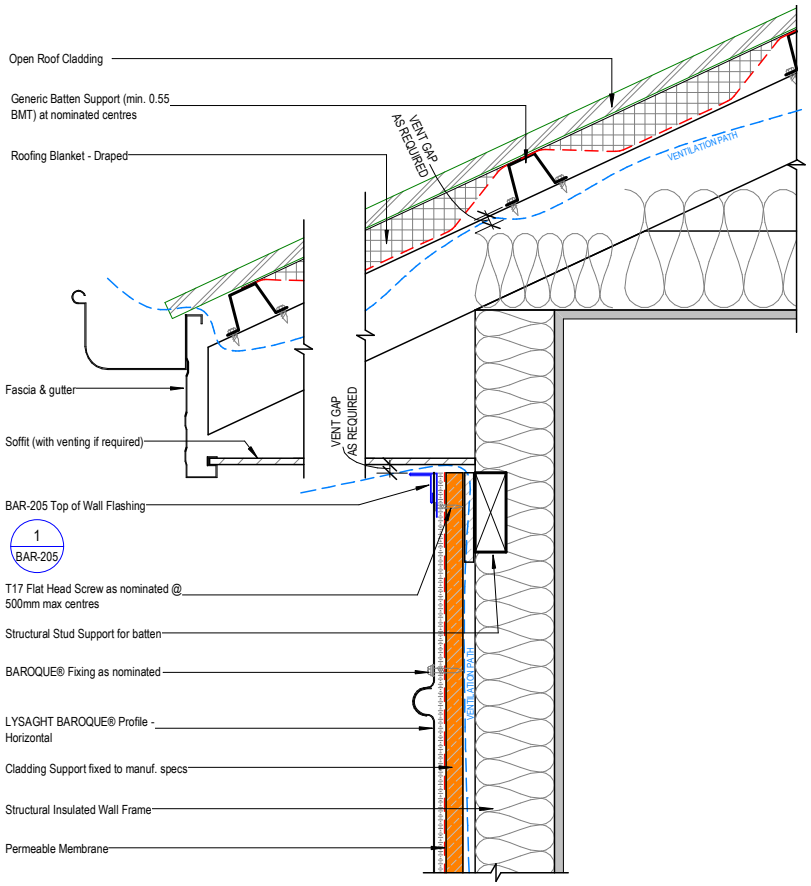


Figure 15.3.2.10:

Window Sill Detail - Supported BAROQUE™ Horizontal Fix - B11-06

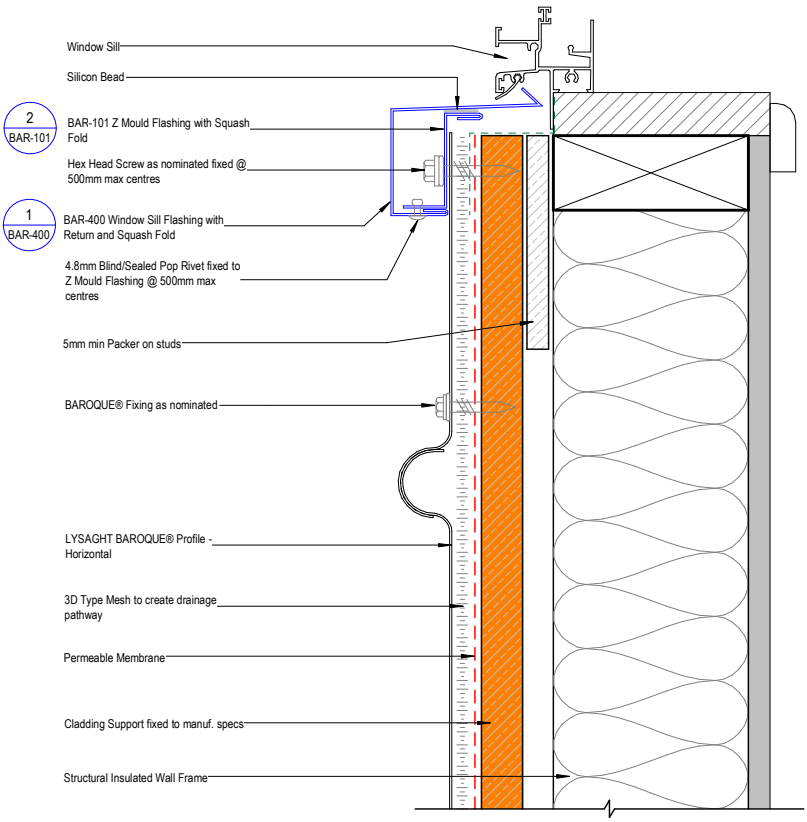
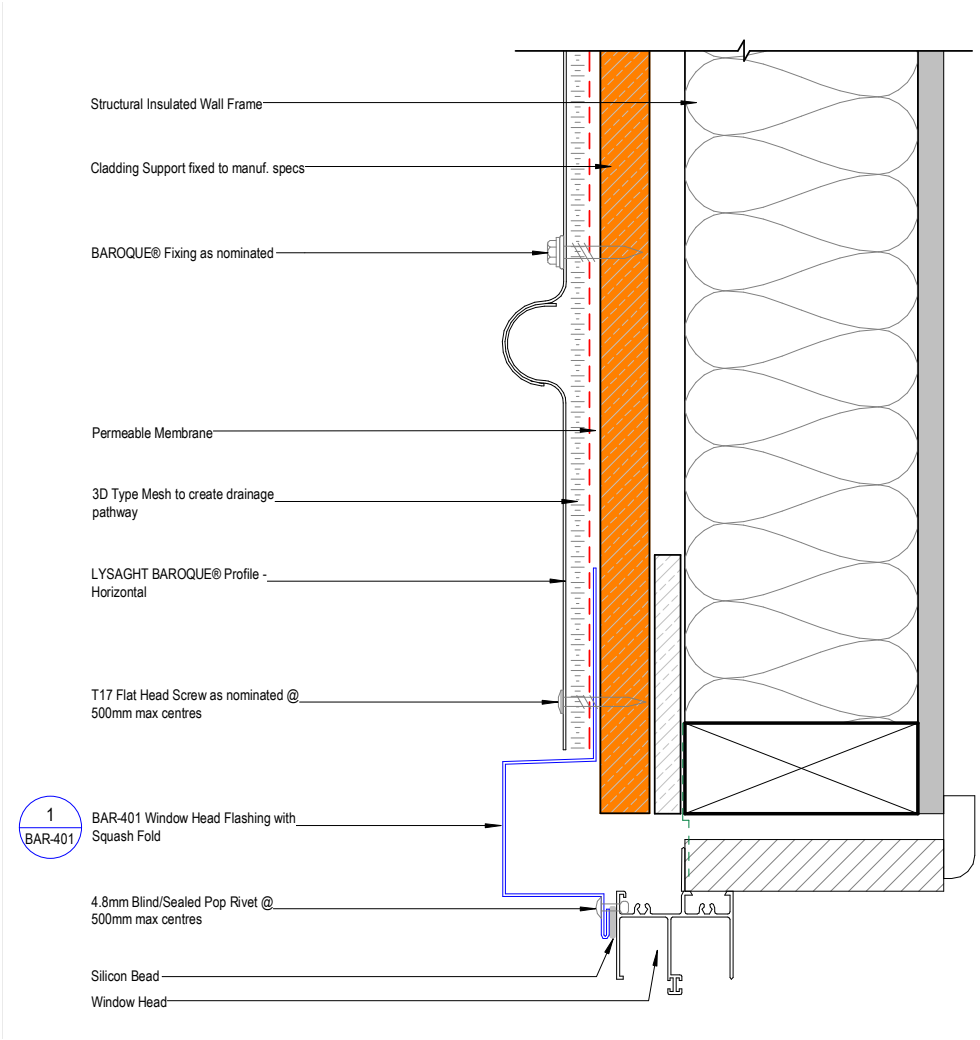


Figure 15.3.2.11:

Window Head Detail - Supported BAROQUE™ Horizontal Fix - B11-10



15.3.3 BAROQUE™ TYPICAL WALL DETAILS - VERTICAL FIX

Figure 15.3.3.1:

Typical Wall Cladding Setout - Supported BAROQUE™ Panel - Vertical Fix - Plan View - B04-07

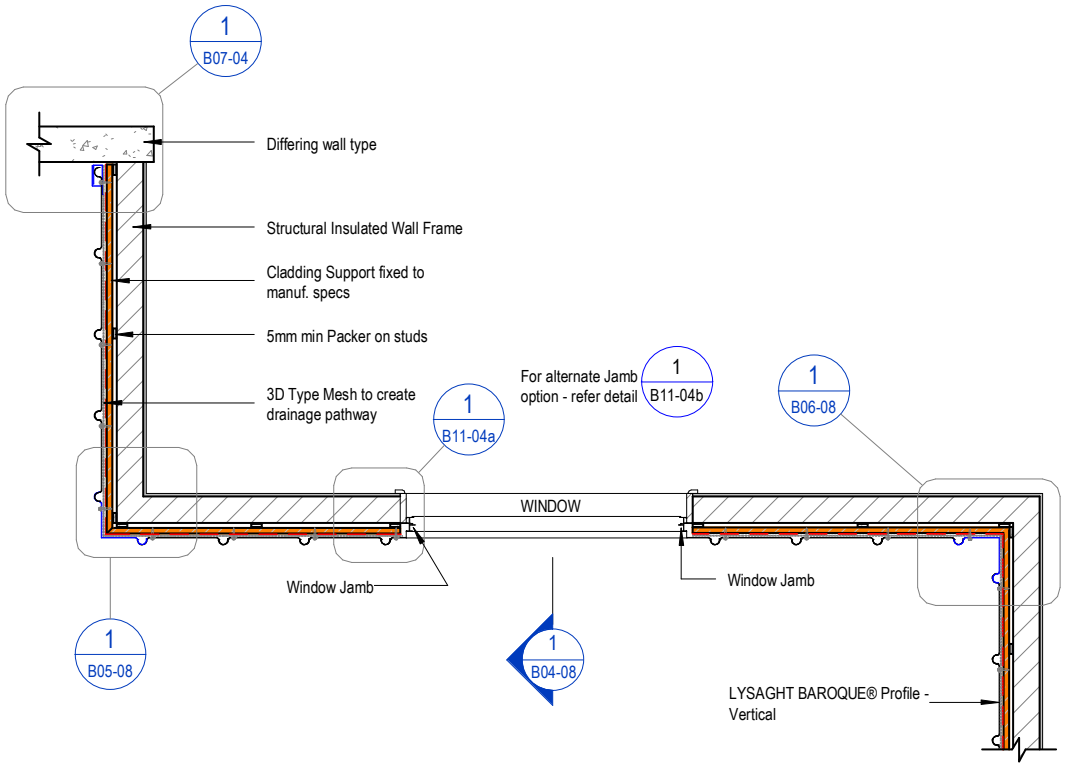


Figure 15.3.3.2:

Typical Wall Cladding Setout - Supported BAROQUE™ - Vertical Fix - Sectional View - B04-08

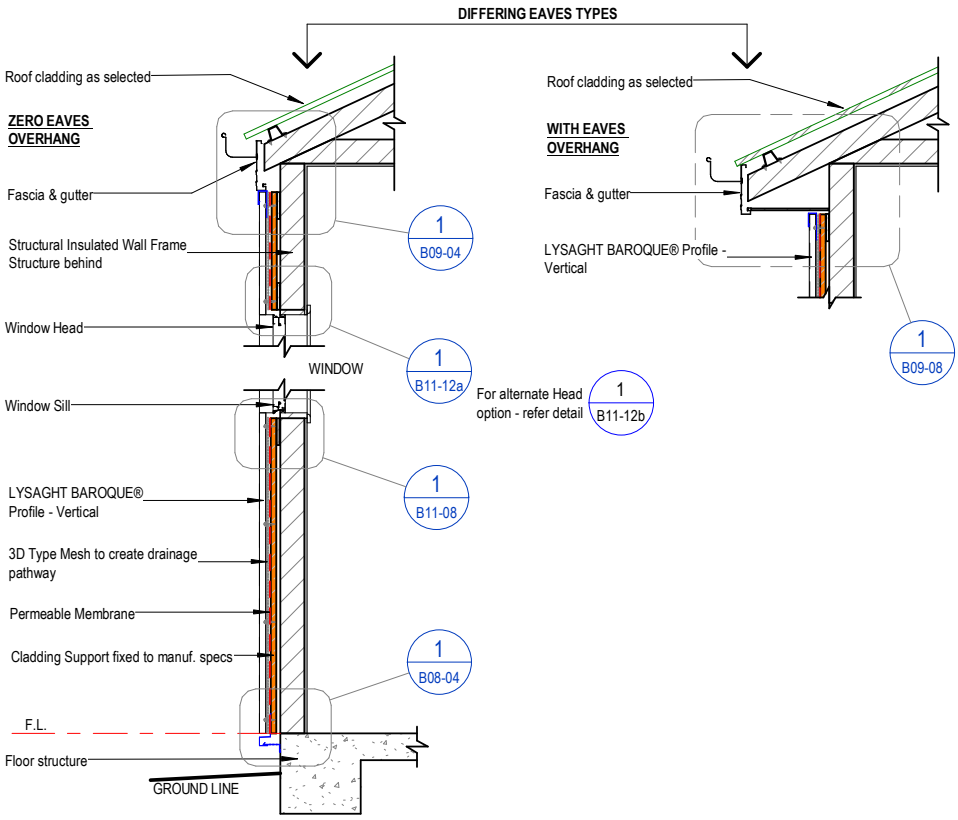


Figure 15.3.3.3:

External Corner Detail - Supported BAROQUE™ Vertical Fix Overlap Underlap - B05-08

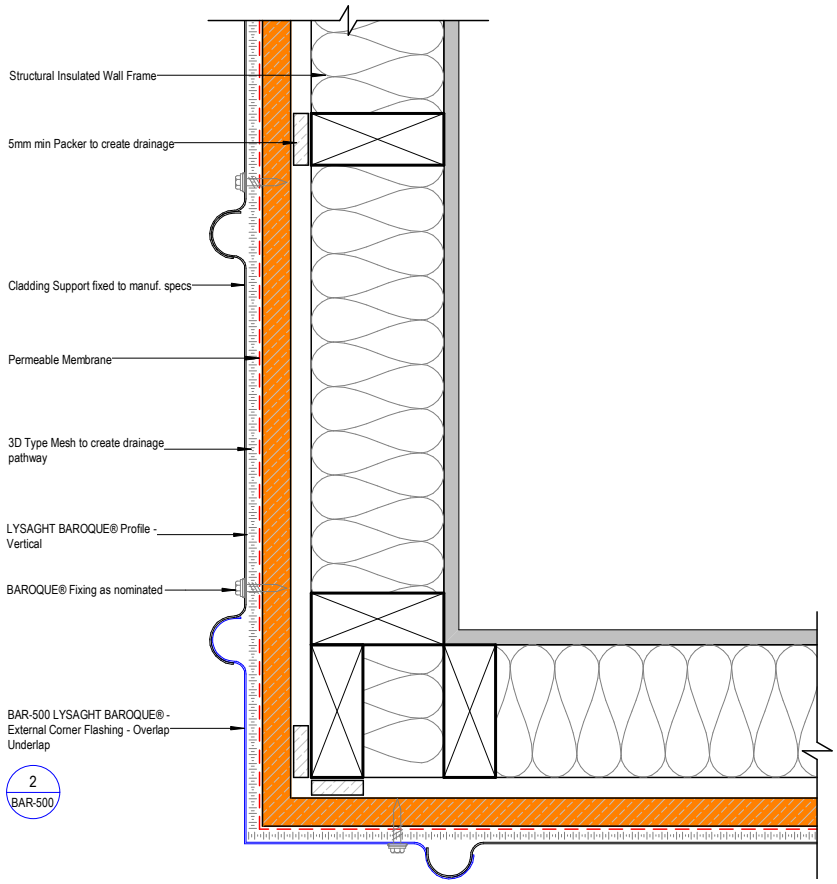


Figure 15.3.3.4:

Internal Corner Detail - Supported BAROQUE™ Vertical Fix Overlap Underlap - B06-08

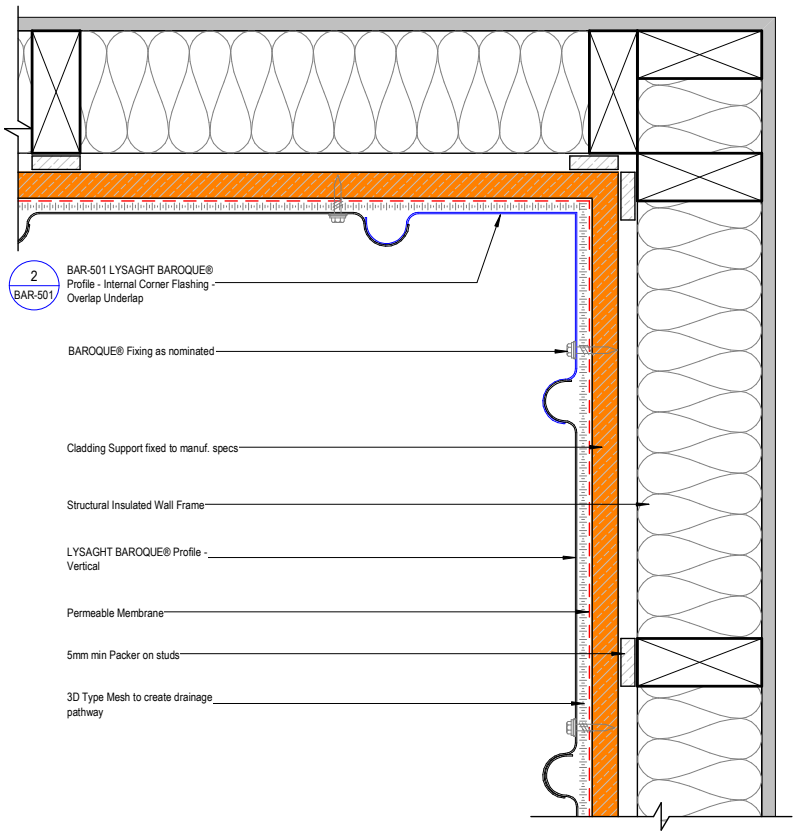


Figure 15.3.3.5:

Wall Closure Detail - Supported BAROQUE™ Vertical Fix - B07-04

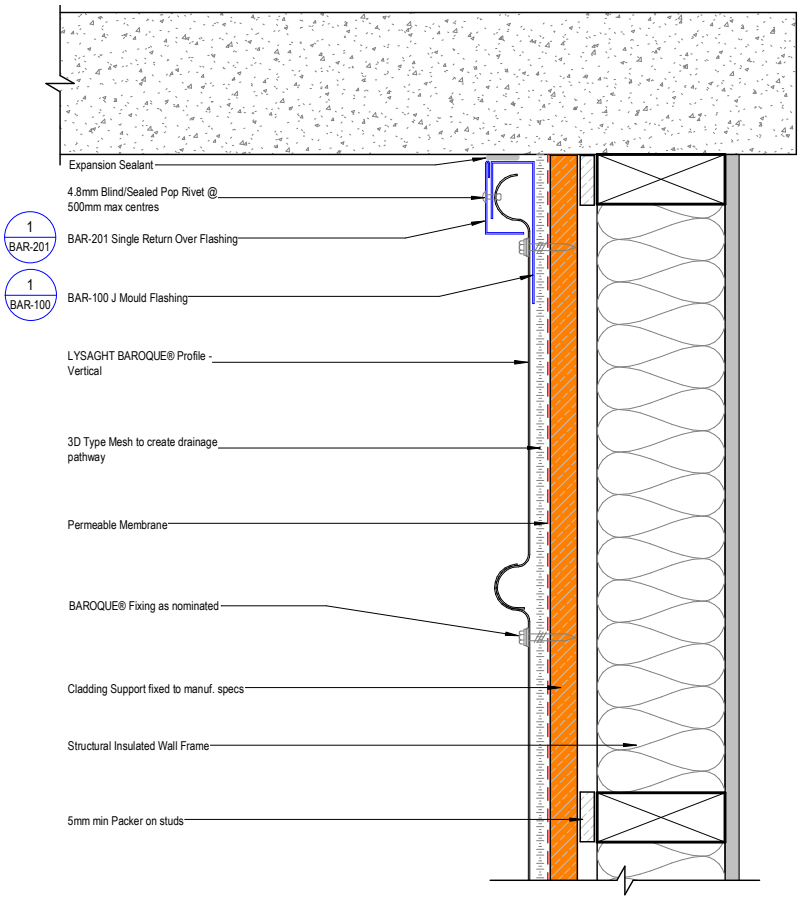


Figure 15.3.3.6:

Window Jamb Detail - Supported BAROQUE™ Panel - Vertical Fix Option 1 - B11-04a

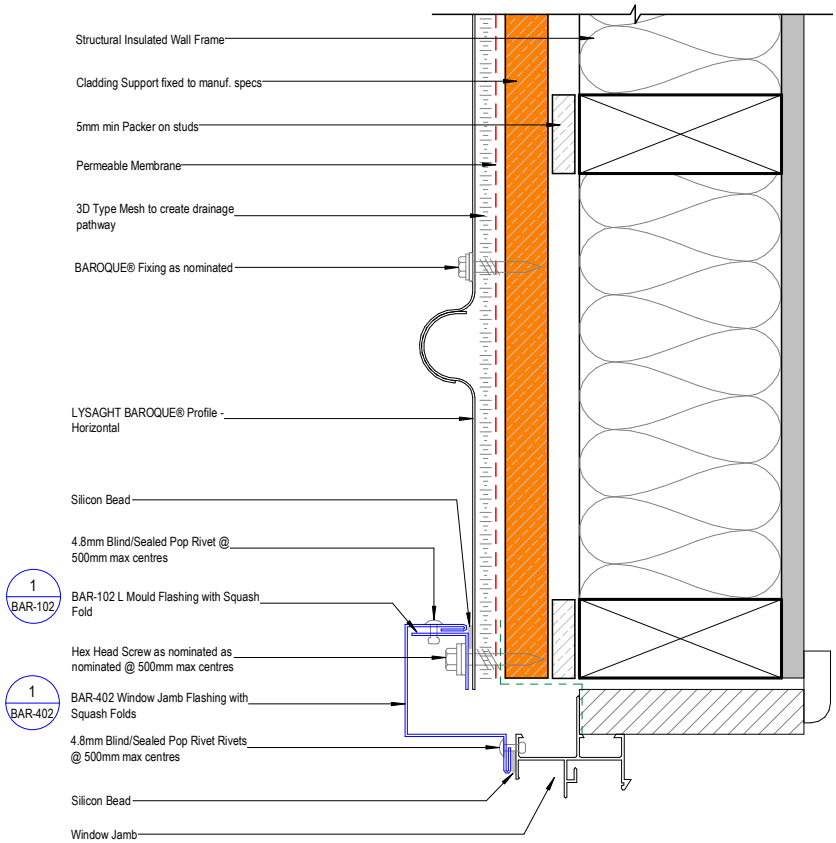


Figure 15.3.3.7:

Window Jamb Detail - Supported BAROQUE™ Panel - Vertical Fix Option 2 - B11-04b

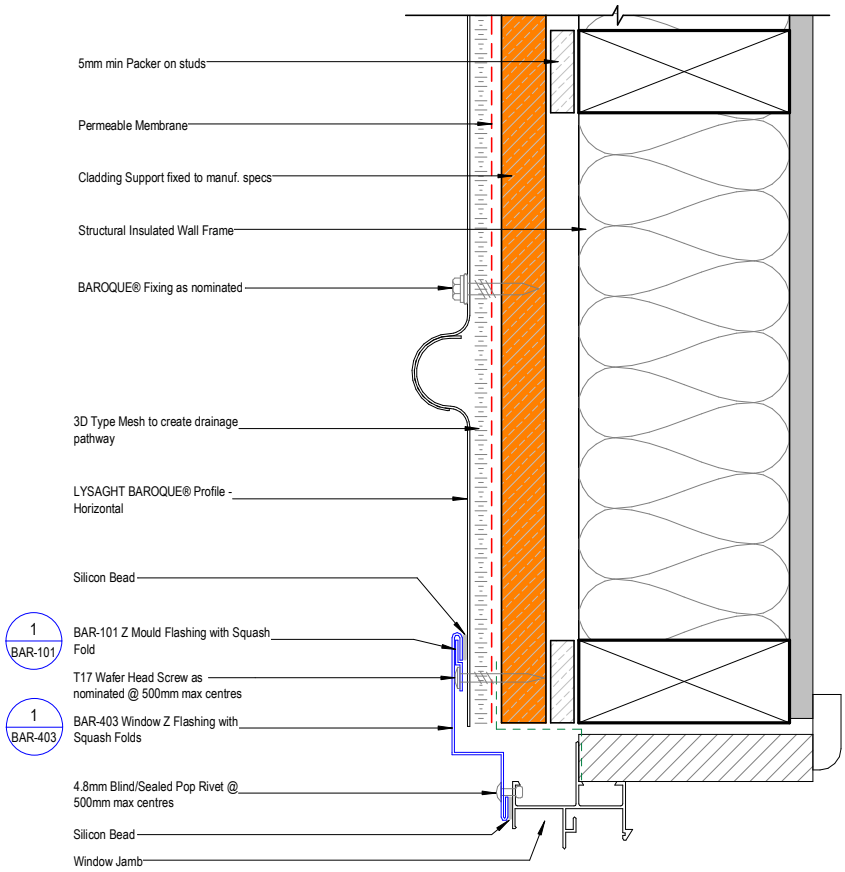


Figure 15.3.3.8:

Wall Base Detail - Supported BAROQUE™ Panel - Vertical Fix - B08-04

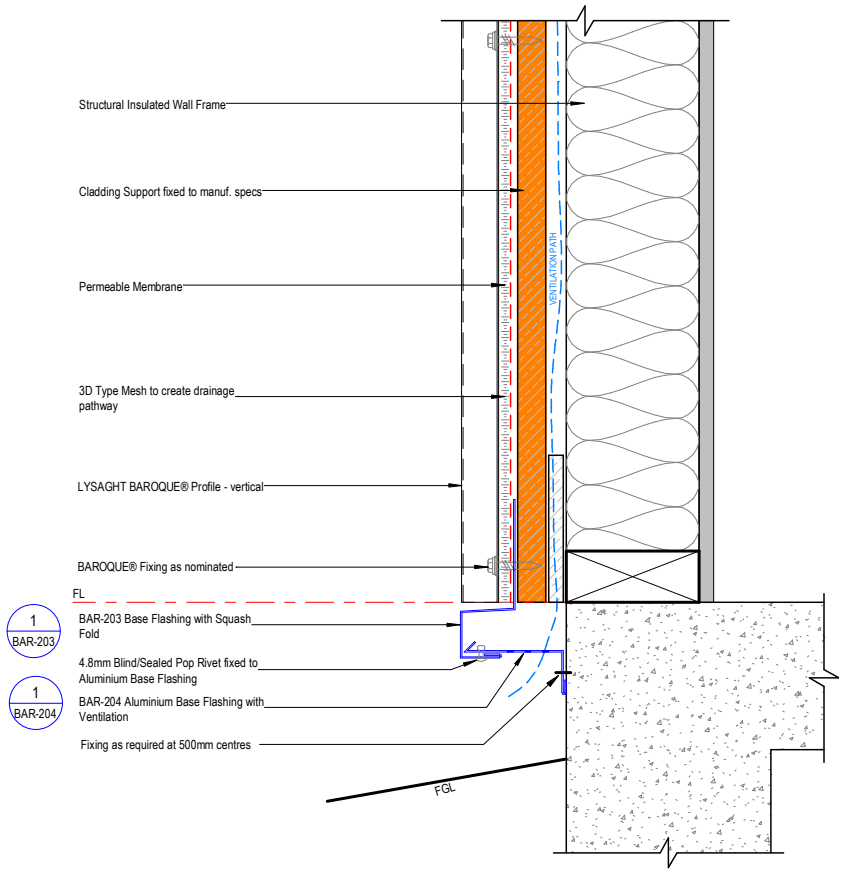


Figure 15.3.3.9:

Top of Wall Eave Detail - Zero Overhang - Supported BAROQUE™ Panel - Vertical Fix - B09-04

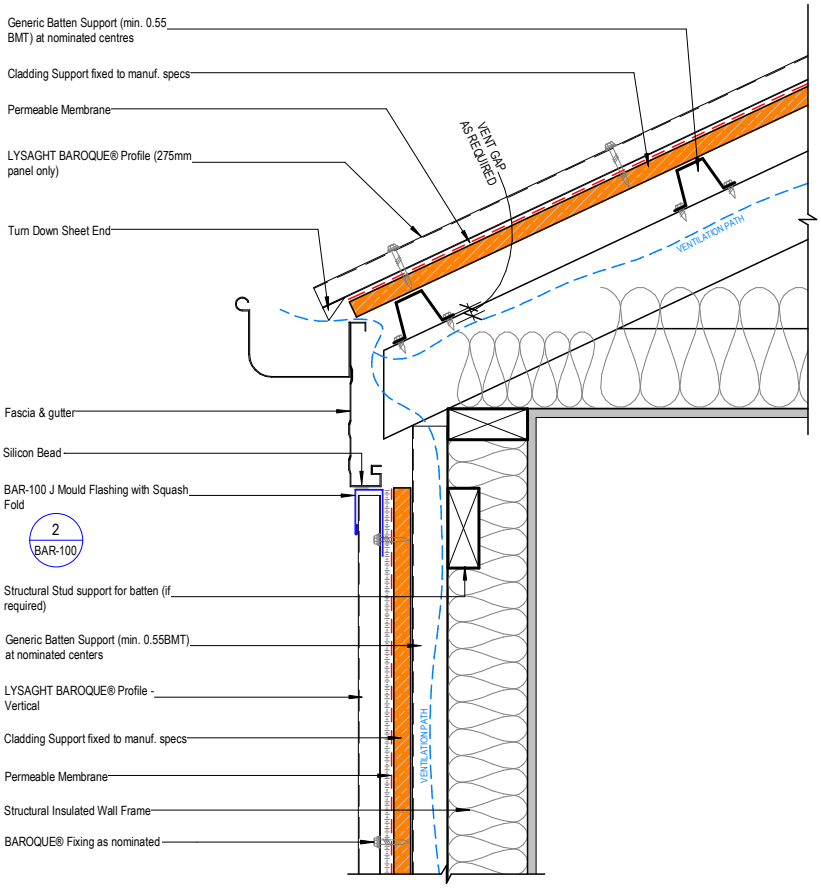


Figure 15.3.3.10:

Top of Wall Eave Detail - Overhang - Supported BAROQUE™ Panel - Vertical Fix - B09-08

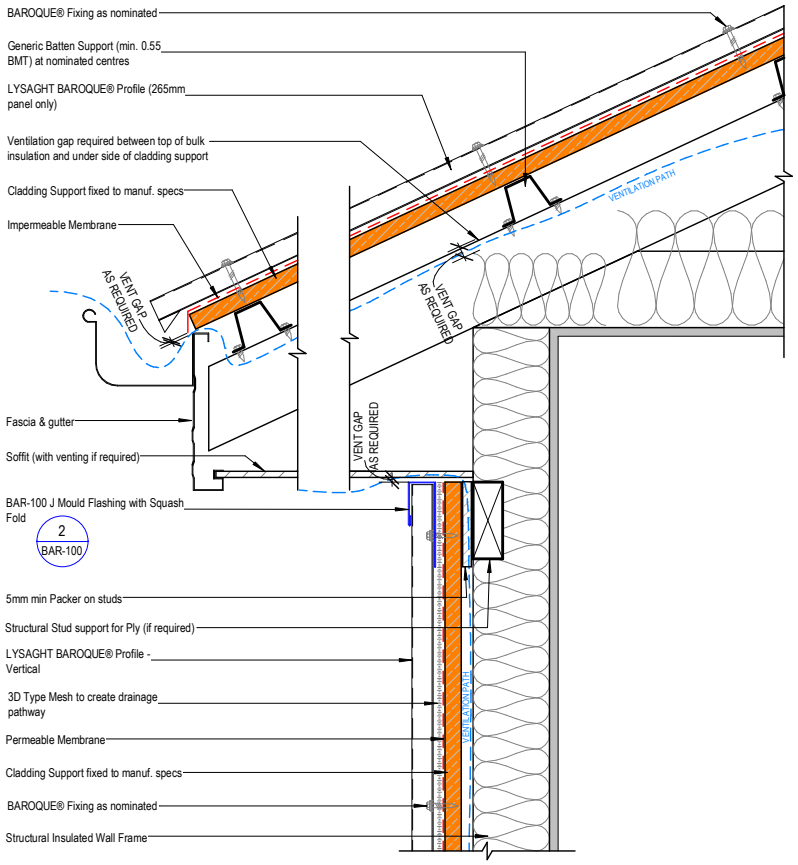


Figure 15.3.3.11:

Window Sill Detail - Supported BAROQUE™ Panel - Vertical Fix - B11-08

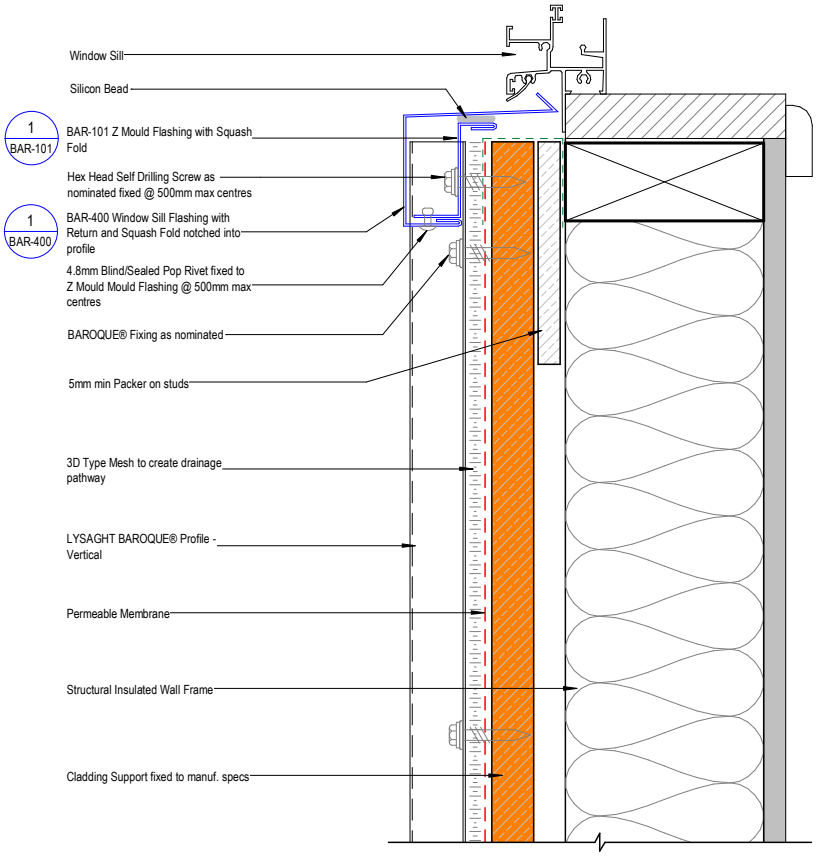


Figure 15.3.3.12:

Window Head Detail - Supported BAROQUE™ Panel - Vertical Fix Option 1 - B11-12a

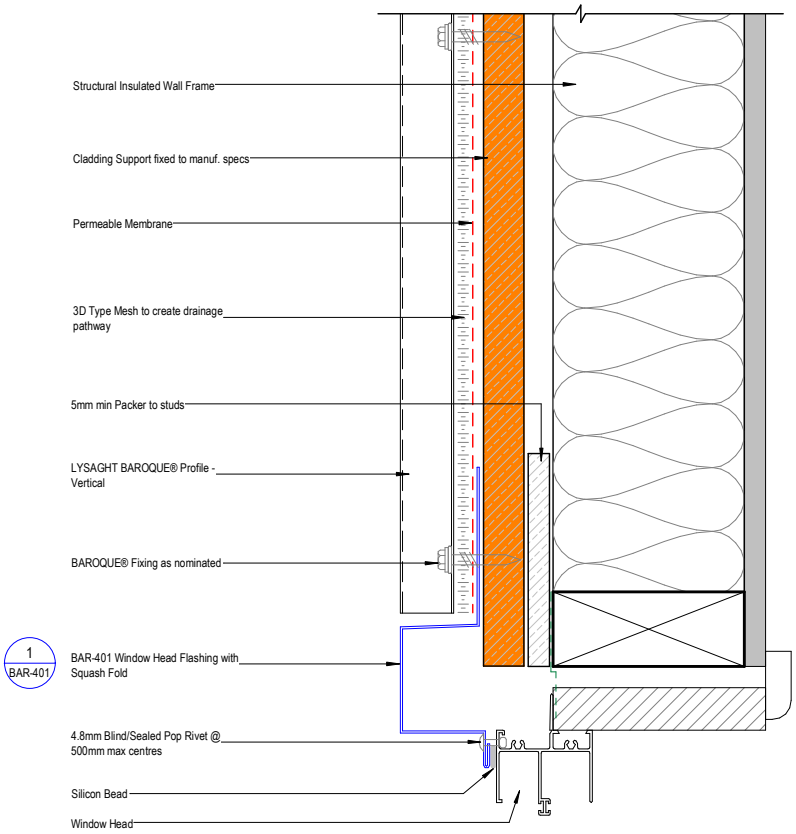
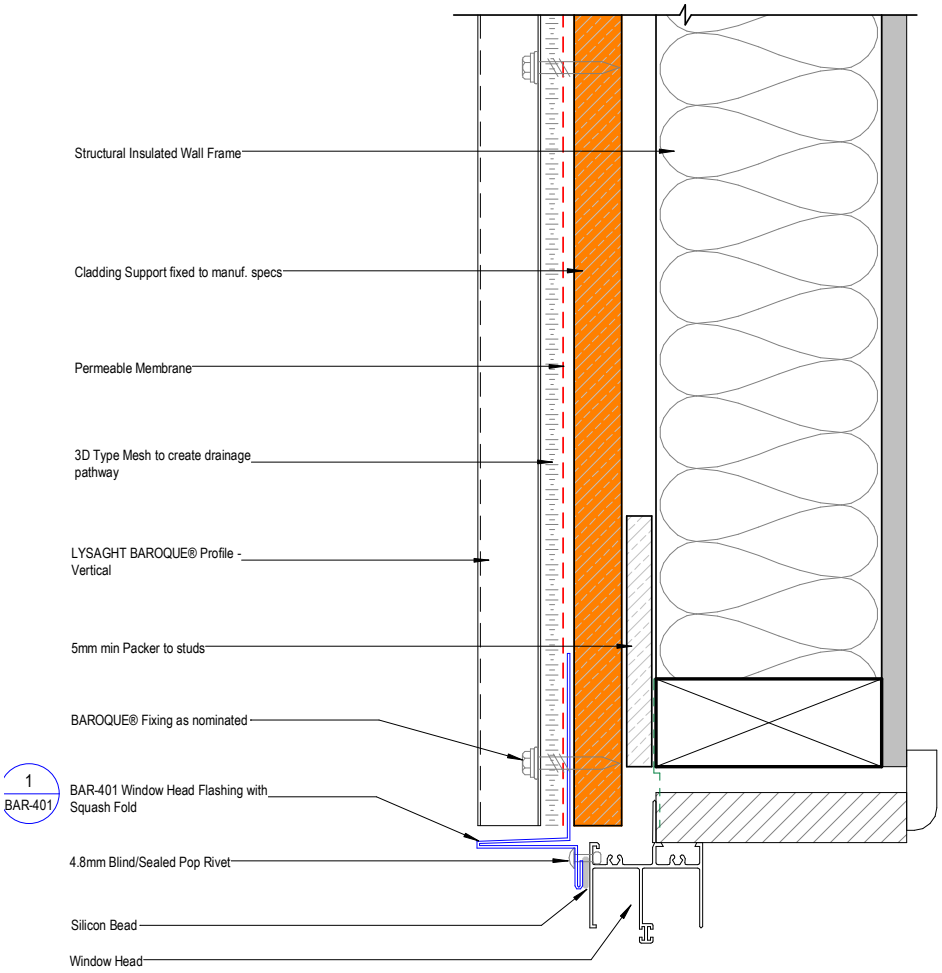


Figure 15.3.3.13:

Window Head Detail - Supported BAROQUE™ Panel - Vertical Fix Option 2 - B11-12b



15.3.4 BAROQUE™ WALL TO ROOF

Figure 15.3.4.1:

BAROQUE™ Vertical Fix Wall to BAROQUE™ roof - Supported - Side View - B12-12

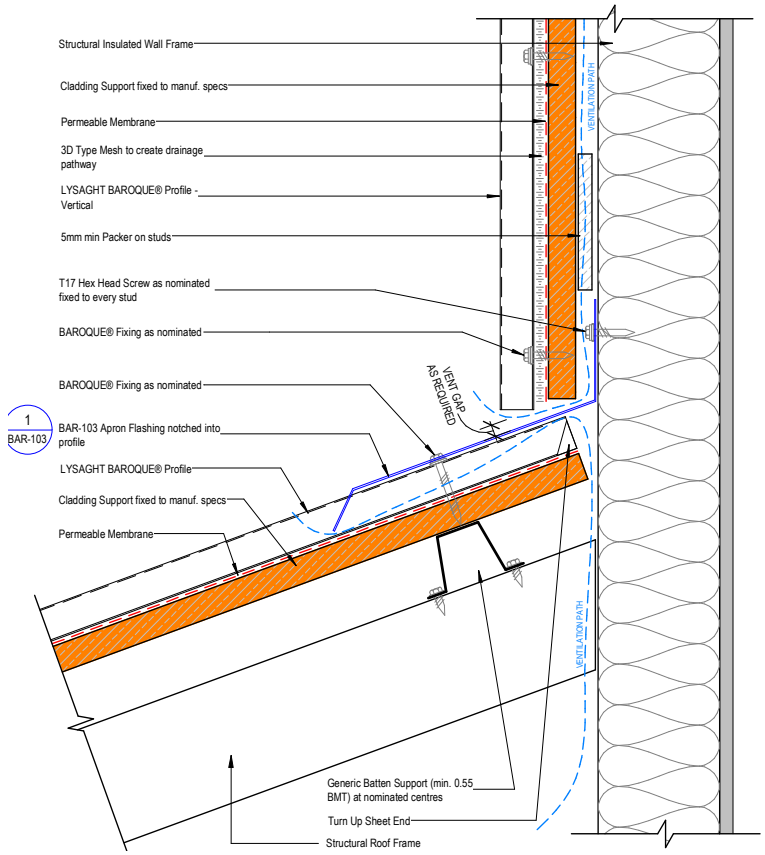
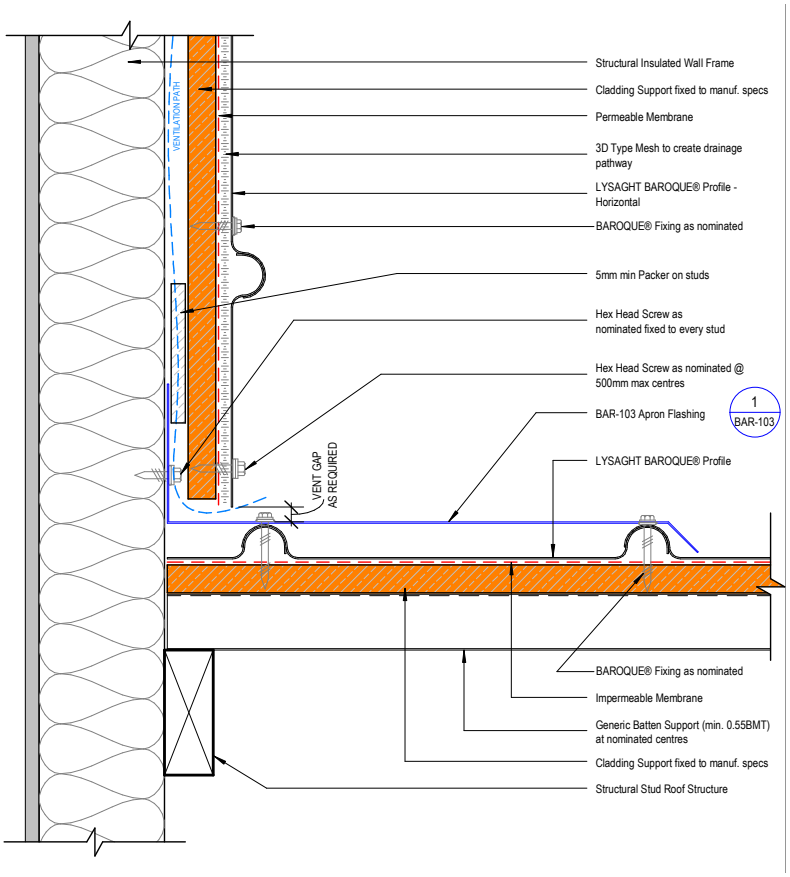


Figure 15.3.3.12:

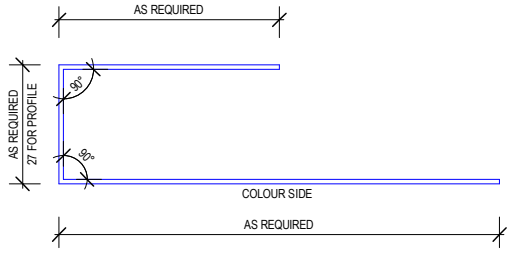
BAROQUE™ Horizontal Fix Wall to BAROQUE™ roof - Supported - Supported - B12-14



15.3.5 BAROQUE™ TYPICAL FLASHINGS

Figure 15.3.5.1:

BAR-100 - J Mould Flashings



BAR-100 - J Mould Flashing with Squash Fold

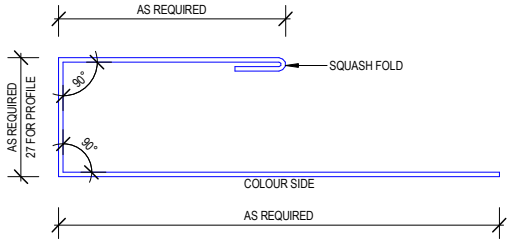
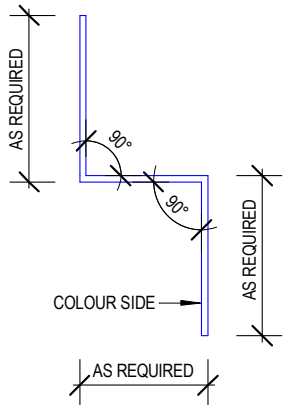


Figure 15.3.5.2:

BAR-101 - Z Mould Flashing



BAR-101 - Z Mould Flashing with 1 Squash Fold

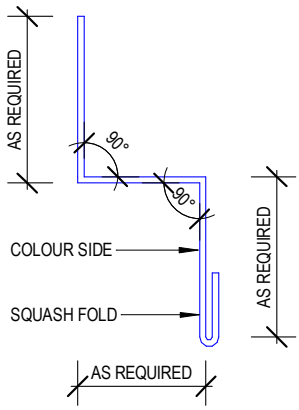
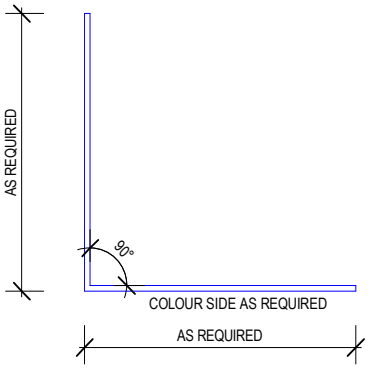
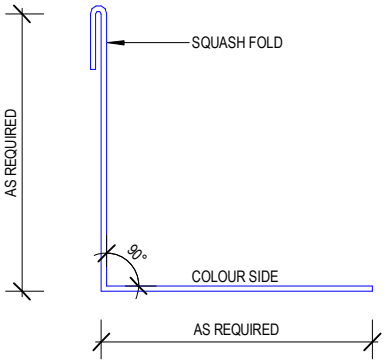


Figure 15.3.5.3:

BAR-102 - L Mould Flashing



BAR-102 - L Mould Flashing with 1 Squash Fold



BAR-102 - L Mould Flashing with Squash Folds

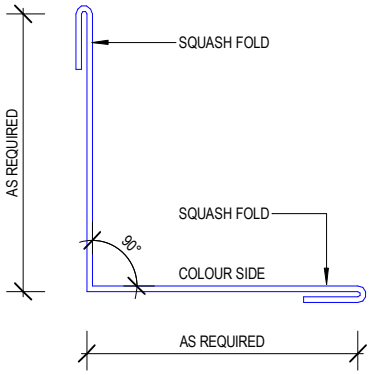


Figure 15.3.5.5:

BAR-103 - Apron Flashing

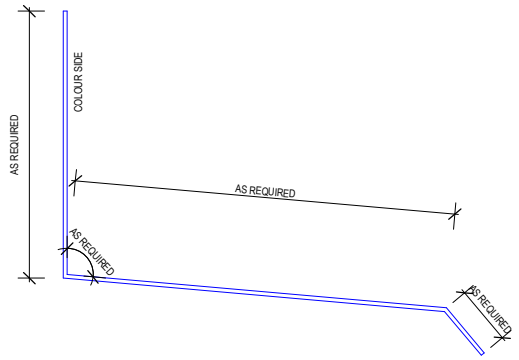


Figure 15.3.5.6:

BAR-103 - Apron Flashing with Squash Folds

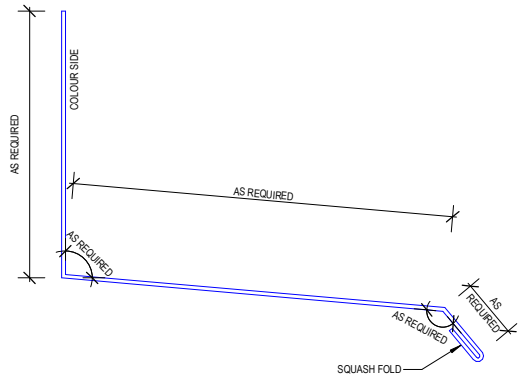


Figure 15.3.5.7:

BAR-104 - U Mould Flashing



Figure 15.3.5.8:

BAR-200 - External Corner over flashing

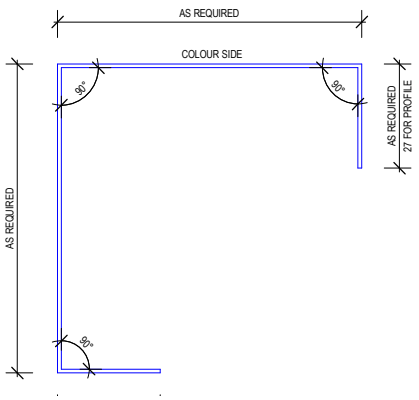


Figure 15.3.5.9:

BAR-201 - Single return over flashing

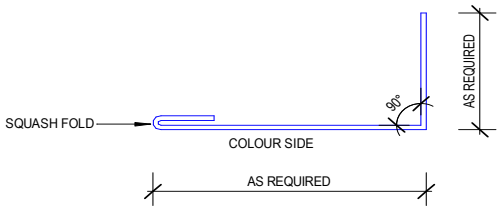


Figure 15.3.5.10:

BAR-202 - Internal corner over flashing

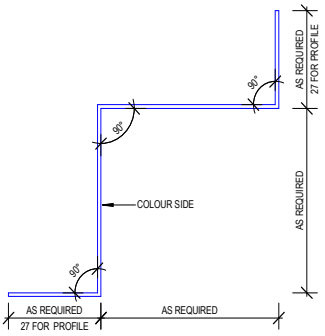
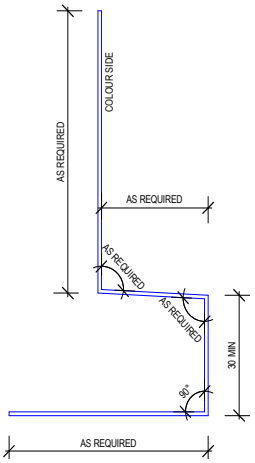


Figure 15.3.5.11:

BAR-203 - Base Flashing



BAR-203 - Base Flashing with Squash Fold

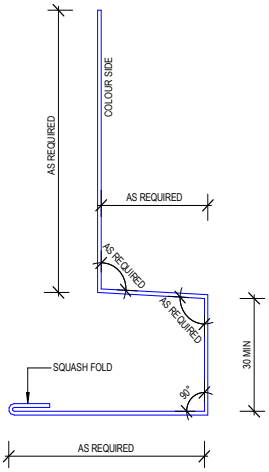


Figure 15.3.5.12:

BAR-204 - Aluminium Base Flashing with Ventilation

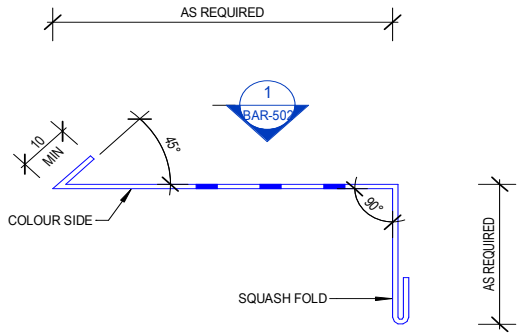


Figure 15.3.5.13:

BAR-205 - Top of Wall Flashing

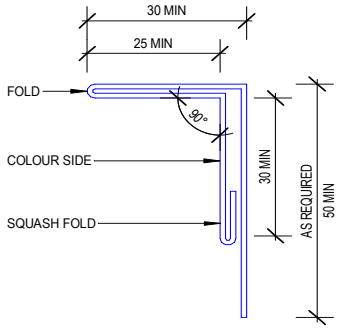
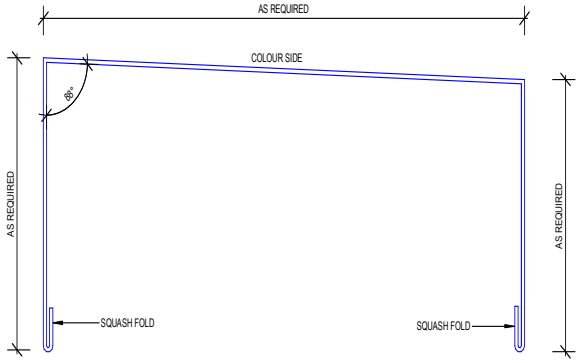


Figure 14.3.5.14:

BAR-206 - Parapet Top Flashing with Squash Folds



BAR-206 - Parapet Top Flashing with Squash Fold and return

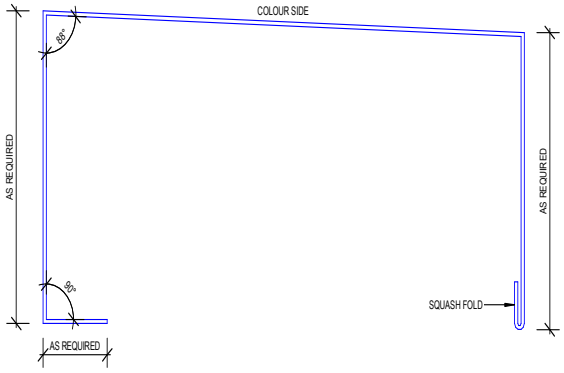


Figure 15.3.5.15:

BAR-300 - Roof valley flashing

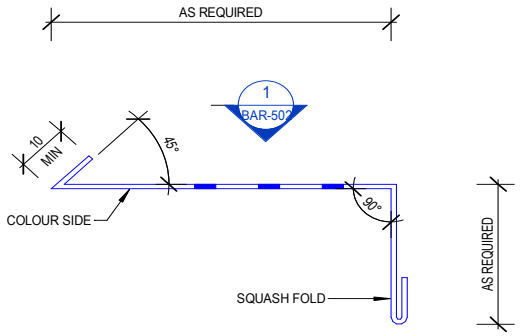
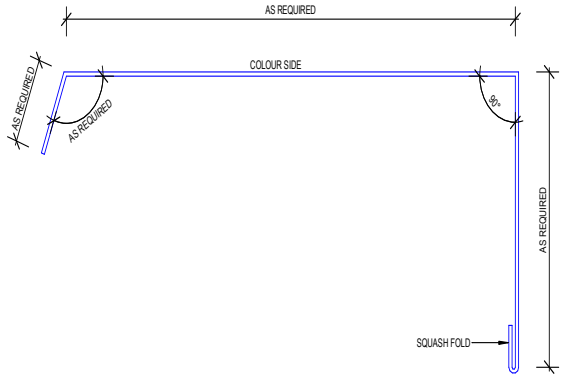


Figure 14.3.5.14:

BAR-301 - Barge Flashing with return and Squash Fold



BAR-301 - Barge Flashing with returns

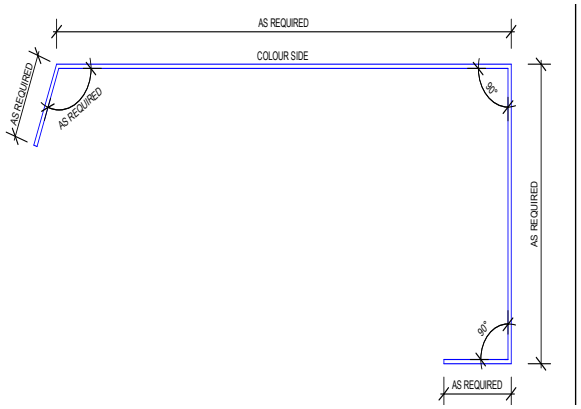


Figure 15.3.5.15:

BAR-302 - Ridge Cap Flashing

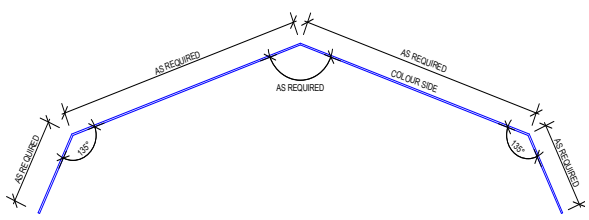


Figure 15.3.5.16:

BAR-400 - Window Sill Flashing with return

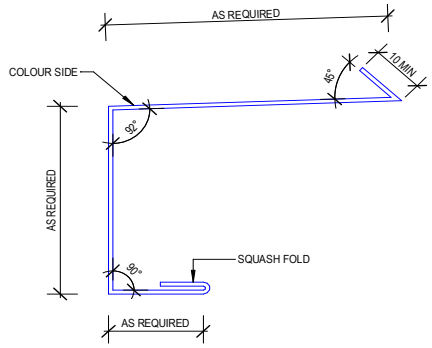


Figure 15.3.5.17:

BAR-401 - Window head flashing with Squash Fold

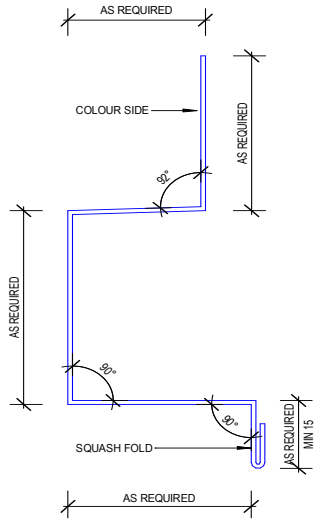


Figure 15.3.5.18:

BAR-402 - Window Jamb Flashing with Squash Folds

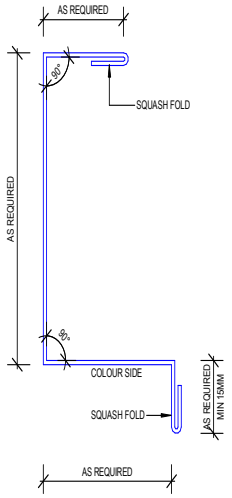


Figure 15.3.5.19:

BAR-403 - Window Z Flashing

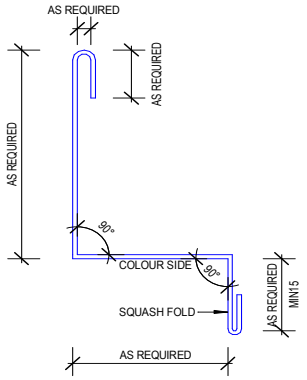
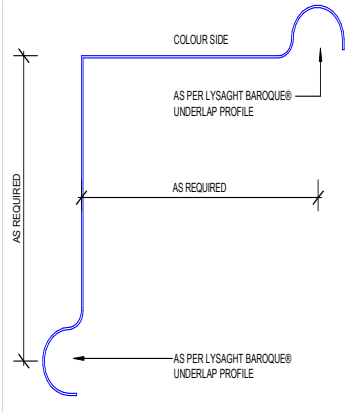
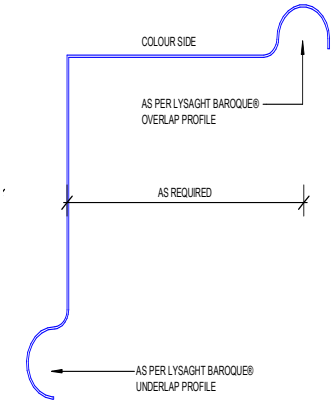


Figure 15.3.5.20:

BAR-500 - External Corner Details - Underlap Underlap



BAR-500 - External Corner Details - Overlap Underlap



BAR-500 - External Corner Details - Overlap Overlap

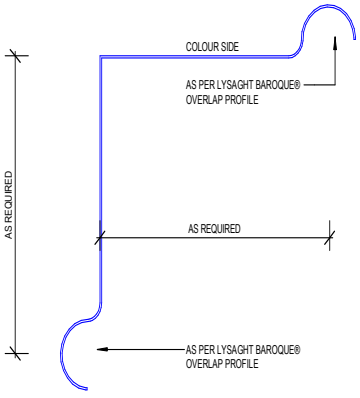
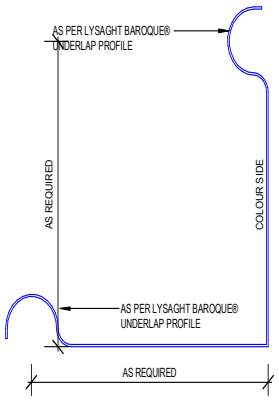
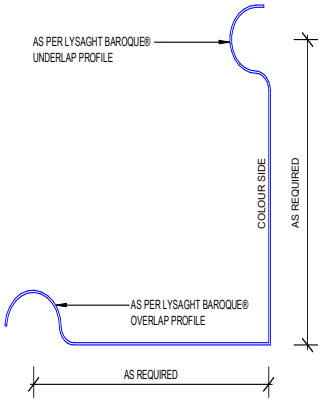


Figure 15.3.5.21:

BAR-501 - Internal Corner Details - Underlap Underlap



BAR-501 - Internal Corner Details - Overlap Underlap



BAR-501- Internal Corner Details - Overlap Overlap

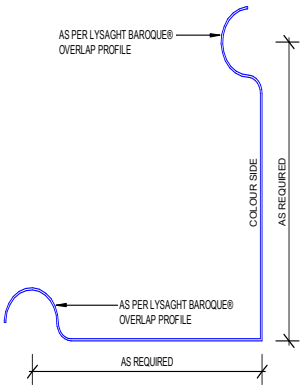


Figure 15.3.5.22:

BAR-502 - Perforation Detail

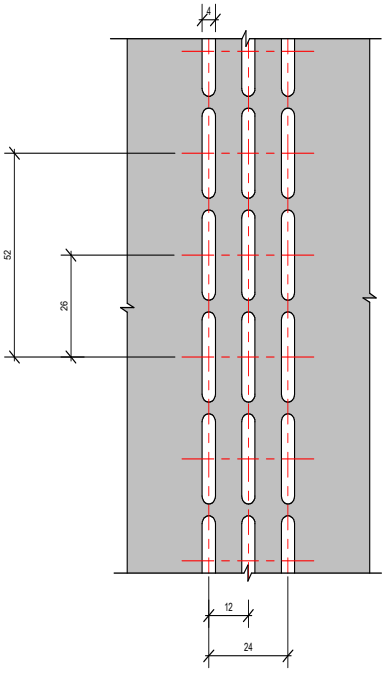
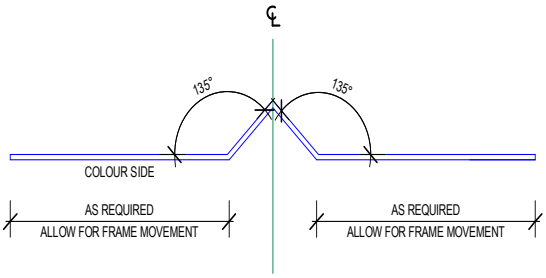


Figure 15.3.5.23:

BAR-504 - Corrosion Resistant Flashing



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2. Flashing coverage and fixings to comply to AS 1562.1
3. In roofing applications, some cover widths of the zenith range of products are not suitable for batten fixing. When designing Reference should be made to professionals.lysaght.com
4. As a general rule the following minimum gaps for ventilation and drainage has been adopted:
    - for walling, minimum 5,000mm²/m
    - roof pitches greater than 15° with truss spans less than or equal to 10m-10,000mm²/m at eave 5,000mm²/m at ridge
    - for roof pitches 15° or less or single pitched roofs or truss spans greater than 10m-25,000mm²/m at eave 5,000mm²/m at ridge

Definitions

- Roofing blanket - draped refers to combination blanket insulation and foil membrane (foil to be impermeable, vapour control Membrane class 1)
- Impermeable refers to a membrane (class to be determined in reference with climate zone) which no substance can pass through.
- Permeable refers to a class 1 membrane having pores or openings that permit water vapour to pass through but not moisture

These details are suggested methods of ventilation and drainage pathways only. The overall design and dimensions are still the Responsibility of the designer in accordance with the NCC and relevant Australian standards.

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