Commercial Roofing

metecnospan®
econoclad®
solarspan®
insulroof®
equideck®

Colorbond®
THE COLOURS OF AUSTRALIA SINCE 1966

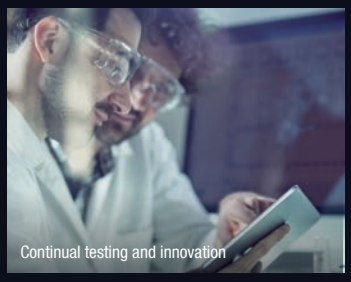
BONDOR® metecno®

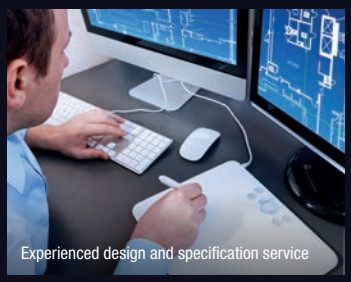
Design and Install Guide

V3 – Current 22/02/2024

About us


Australian Standards Tested & Certified Products


Continual testing and innovation


Experienced design and specification service

Bondor Metecno is Australia's leader in insulated sandwich panel (ISP) for your complete thermal building solution. ISPs are structural, thermally efficient and quick to install, their inherent properties are well suited to our current building needs in the drive to reduce our carbon footprint and achieve net zero.

The Bondor Metecno Group consists of the Bondor business and the MetecnoPIR business and has operated in Australia since the 1950's. The group has made a significant investment in Australia and continues to do so, with 9 manufacturing locations across all States and a NATA accredited R&D and testing facility in Brisbane.

The group has a wide range of insulated panel walling and roofing products for all market segments from temperature-controlled environments, commercial, industrial, agricultural, residential and home improvement. ISPs typically have two steel facings with a core of insulating material between them. Bondor Metecno are Australia's only manufacturer, distributor and installer of the most common globally accepted core materials EPS-FR, Mineral Wool and Polyisocyanurate.

Bondor Metecno supports the National Construction Code and Australian Standards for the Australian built environment and rigorously tests its products to ensure they conform.

The group also supports independent third-party assessment of its products in the form CodeMark Certificate of Conformity. Bondor Metecno has the largest number of CodeMark certificates in the insulated panel industry. The group has also published Environmental Product Declarations for the full ISP product range to assist designers, architects and builders.

Bondor Metecno also invests in research and development through associations with major universities and research bodies. These studies have included; thermal performance and achievement of 9-star ratings for residential properties using ISP, Recycling opportunities for plastics in manufacturing building products, improving fire performance of ISP products and introducing real time monitoring and manufacturing 4.0 principles into building products manufacturing.

For more information visit:

www.bondor.com.au | www.metecnopir.com.au

Quality Assurance, Proven Partnerships

BlueScope Steel

In business, your reputation is everything and minimizing risk makes sound business sense. Using only BlueScope® Steel for our panel skins ensures quality Australian steel products and transparent and reliable warranties.

Codemark

Australia's CodeMark Certification is a third-party building product certification scheme that authorises the use of new and innovative products in order to facilitate compliance with the NCC. Bondor Metecno has a range of select wall and roof products that are CodeMark certified and cover multiple performance criteria to meet today's building regulations.

https://bondor.com.au/resources/codemark-accredited-products/

Factory Mutual (FM)

Approved Products and Systems

Factory Mutual (FM) Global is one of the worlds leading insurance companies and its product testing is an accepted international standard of product quality and performance in the insurance industry.
A range of Bondor Metecno products and installation details have been FM approved, providing building owners and insurers a level of confidence in their performance in the face of fire or natural hazards such as cyclones.

IPCA

Bondor Metecno is an active member of the Insulated Panel Council Australasia (IPCA), involved in developing the Industry Code of Practice for insulated panel construction. IPCA set out the principles and standards from design, manufacture, installation, maintenance and risk management of Insulated Panel in Australian buildings. The IPCA Code of Practice has been developed through industry leaders, external fire experts and the AFAC.

AIA

The Australian Institute of Architects

The Australian Institute of Architects (AIA) is the peak body for architectural professionalism in Australia, representing 12,000 members. The Institute works to improve our built environment by promoting quality, responsible and sustainable design.

As supporting corporate partner to the AIA, Bondor Metecno is actively involved in industry forums, technical CPD presentations and specific product and installation advice to AIA members.

NATA

NATA accreditation provides a means of determining, formally recognising and promoting the competence of facilities to perform specific types of testing, inspection, calibration, and other related activities.

Bondor Metecno's structural laboratory is accredited to ISO/IEC 17025 by NATA and is fully dedicated to the testing of Bondor Metecno's products.

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Terminology

The following terminology have been adopted throughout the document:

Cantilever / End Overhang

Where the roof 'overhangs' or continues past the wall along the roof run length.

Corner Overhang

Combination of cantilever / end overhang and side overhang at the corner of the roof. The maximum corner overhang (cantilever and side overhang) varies between roof panel product.

Roof Run Length

The total length of the roof parallel to the roof run.

Roof Sheet Length

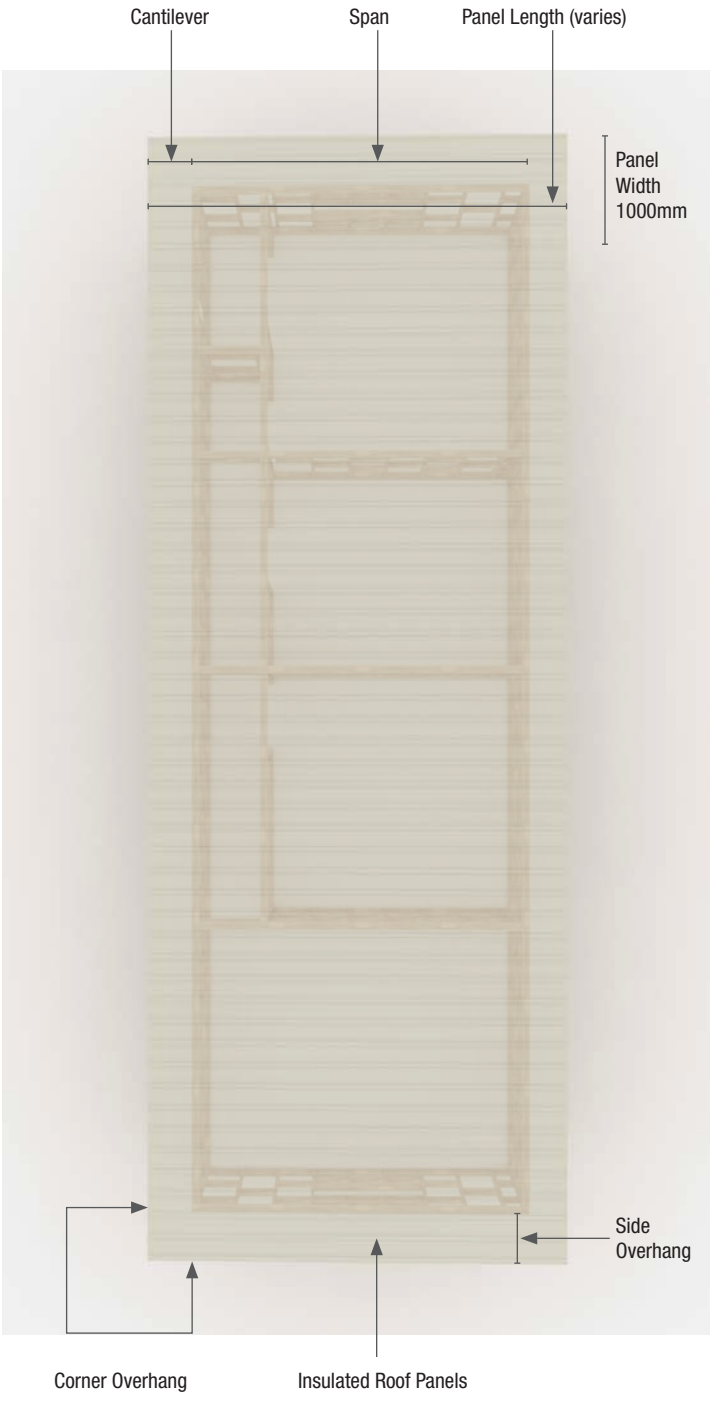
Roof sheet length refers to the actual sheet or panel length. In long roof runs, multiple panel lengths joined by SecureLap jointing system may be required.

Roof Span

The roof length between fixings.

Side Overhang

Where the roof 'overhangs' the wall along the roof width, typically extends a short distance past the side wall of the building. The maximum side overhang varies between roof panel product.



General Design Information

The design and construction must be compliant with the Australian National Construction Code (NCC) and other applicable regulations and standards. The Specifier is responsible that the details in this specification are appropriate for the intended application and that additional detailing is performed for specific design requirements or any areas that fall outside the scope of this specification.

Why Consider Insulated Panel?

Bondor Metecno's range of insulated roofing profiles provide the roofing, ceiling and insulation in one strong and functional panel. EPS-FR or PIR cores in thicknesses from 40mm - 250mm are sandwiched between both flat and trapezodial steel skins manufactured from COLORBOND® steel.

Panel choice is made easy by matching panel core and thickness to satisfy thermal requirements, with roof profile selection to satisfy roof drainage performance. Roofing panels are available in lengths up to 22m*, and span significantly further than single skin roofing products allowing a reduction in structural framing costs. Installation time is significantly reduced translating into an overall cost saving as well as earlier occupancy for the client.

Insulated panel roofing construction is quickly gaining momentum as pressure increases to build more thermally efficient buildings. Air tightness critical to control heat gain from above as well as air leakage via precise temperature control measures from within should be carefully considered.

* Check for availability

Section J Assessment

The objective to reduce GHG emissions and improve energy efficiency plays a key part in selecting suitable products that facilitate this objective and reinforce the outcome. It should also be noted that whilst the primary goal is not obtaining optimal comfort, the requirements are based on achieving an internal environment in which conditions are sufficiently amenable for occupants to minimise their use of artificial heating and cooling.

The energy use attributable to a building over its life can be broken into two distinct components: an operational energy component and an embodied energy component. Operational energy is the energy used during occupation/operation of the building and the GHG emissions attributable from the operational component is the focus of the NCC requirements. As the energy efficiency of buildings and appliances increase over the coming years, embodied energy will become increasingly important.

Bondor Metecno Panel Systems Versus Traditional Systems

- Up to 50% quicker installation means faster end user occupancy and earlier cash flow generation, with weeks saved from building schedules.
- Significantly longer spanning capability means a reduction in structural steel.
- Savings in structural steel, mesh and labour means the project is completed much quicker than conventional methods.
- Wall & roof panel side laps lock together and fixing points over purlins secure tightly. This forms an air tight seal, significantly reducing air leakage, the number one enemy in energy efficiency. Insulated panels also help eliminate thermal bridging with continuous insulation over structural members.
- Bondor Metecno products conform to the Australian Standards through rigorous testing and independent certification to ensure compliance requirements are met across various building application performance criteria as prescribed in the NCC.
- Bondor Metecno products meet Part J (NCC Vol. 1) by providing roofing, insulation and ceiling in one product, eliminating the need for unsightly and labour intensive wire mesh, bulk insulation and spacer battens.

Bondor Metecno's Distinct Core Options

Bondor Metecno's unique position enables us to provide unbiased advice across a wide range of core options that are globally accepted, quality controlled and manufactured locally by Bondor Metecno in Australia across 8 state of the art facilities.

EPS-FR

EPS-FR

Expanded Polystyrene
with Fire Retardant

(EPS-FR) is a thermoplastic high strength foam, which is self-extinguishing when exposed to flame.

PIR

PIR

Fire-Retardant Polyisocyanurate

(PIR) is a thermoset high strength foam, which will char when exposed to flame.

Bondor Metecno Panel Systems

Bondor Metecno products conform to the Australian Standards and the performance requirements of the NCC through rigorous testing and independent certification.

Bondor Metecno offer two distinct roofing product solutions:

- Conventional Insulated Panel where the core is sandwiched between two layers of ZINCALUMNE® or COLORBOND® steel.
- Single layer of steel for the roofing side with PIR core bonded to a multi-layer foil, fiberglass flexible internal facing.

The two layer steel option offers significantly greater spans and thermal performance, and is regularly used in retail and heavy commercial applications.

The single layer steel option offers slight improvement in spans when compared to single skin products and competes effectively as the insulation is already bonded in place. It is regularly used in the very price sensitive industrial and agricultural market.

Cost Effective

Bondor Metecno roof systems are able to achieve significantly long spans, reducing structural steel and support requirements in comparison to traditional cladding and roofing products.

Design Flexibility

Coupled with Bondor Metecno's product performance is the design flexibility for specifiers to select from a wide array of exterior and interior finishes, with varying gloss levels, to inspire creative and colourful building envelopes with Bondor Metecno's high performing and functional building systems.

Low Maintenance & Hard Wearing

Bondor Metecno panel systems use COLORBOND® steel for its high quality and consistent pre-finished look as well as ongoing low maintenance, tested and proven for use in the Australian environment.

Environmentally Friendly

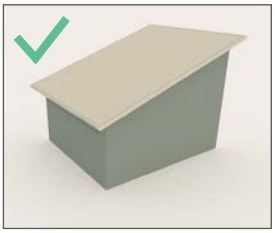
Bondor Metecno's wall and roof systems have a low impact on the environment with the use of zero ozone depleting insulation material and fully recyclable steel. Bondor Metecno products deliver building owners and occupants with superior thermal performance and air leakage control, reducing the building envelope's heating and cooling costs, energy consumption and carbon footprint.

Roof Design

Identifying Suitable Applications

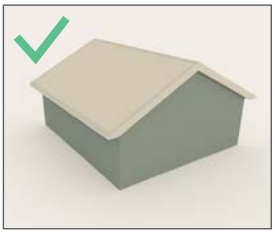
Insulated roof panels are versatile, highly efficient commercial roofing solution providing unrivaled strength, insulation and security. However, the very nature of the composite construction of the panel means it is less suitable for more complicated roof structures usually presented in the residential market. Sprung curved roofs, roofs with multiple hips or valleys are not typically the domain of any insulated panel product (see examples below).

Easiest and Most Economical Designs for panel roofing:



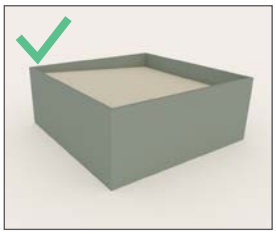
Skillion Roof

The simplest roof type for design and installation purposes would be the skillion roof. Skillion roofs typically have a top and bottom overhang and are screw fixed to the top wall plates and/or roof support beams. Skillion roofs can be butted against an external or internal wall and supported by a receiver channel.



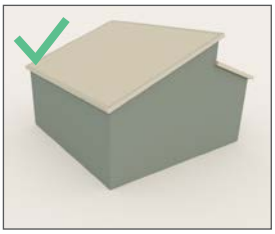
Gable Roof

Gable roof configurations require the provision of a ridge beam or central wall to support the sheets at the apex. The edge distance of roofing screw to the support structures should be minimum of 30mm (5x diameter of fastener).



Parapet Roof

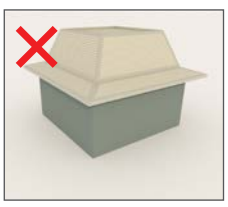
A parapet is a barrier which is an extension of the wall at the edge of a roof, terrace, balcony, walkway or other structure. Parapets were originally used to defend buildings from military attack, but today they are primarily used as guard rails and to prevent the spread of fires, or as an architectural feature to hide the roof structure and cladding.

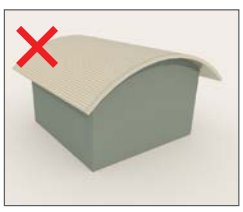


Pitch Saw Tooth Roof

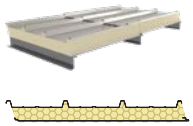
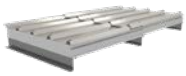
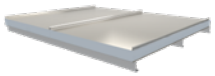
A pitch saw tooth roof is a roof with a vertical wall which sits between the two sloping sides, which features a row of windows (or one long, continuous window). The pitch saw tooth roof can be symmetrical, with a hipped or gable-type design, or else it can be asymmetrical, resembling something closer to a skillion roof. The main feature of a pitch saw tooth roof is that it incorporates a row of pitch saw tooth windows in the vertical panel between the two sloping roof planes. The row of windows forms a ‘clear storey’.

Complicated Roof Designs not typically suited to insulated roofing:





Product Quick Reckoner

Product	Core	Cover Width (mm)	Thickness (mm)	Total R-Value (m^2K/W at 15°C)	Weight (kg/m^2)	Max Length	Max Span (Multi-span) At 1kPa	Acoustic Rw value	Features
metecnospan 	PIR	1000	40-100	2.10-4.94	10.7-13.2	up to 25m**	6.9m (100mm)	24-25	Low Pitch Rib Roof, Long Spans, FM Approved
econoclad 	PIR	1000	25-100	1.50-5.06	5.6-8.7	16m	2.4m (100mm)	23	Foilback / Embossed PVC Rib Roof
solarspan  	EPS-FR	1000	50-200	1.40-5.15	10.6-12.7	up to 24m**	9.0m (200mm)	24-25	Low Pitch Rib Roof, Long Spans, Local Avail
insulroof  	EPS-FR & PUR	1000	50-200	1.61-5.35	11.6-13.7	up to 12m**	9.0m (200mm)	23-24	Corro Profile, Long Spans
equideck  	EPS-FR	1200	50-250	1.40-6.40	11.3-14.0	16m	8.1m (250mm)	24-25	Wide Flat Tray, Thermal Performance

Max spans shown represent thickest panel option for multi-spans.

**Refer to your local branch for alternative sizing as non-standard options available.

Underside Ceiling Finishes

Subtle underside profile variation are available in Bondor Metecno Insulated Roof Panels. The swaging to the underside of the panel provides additional stiffness and assists in controlling the looseness present in flat sheet during the roll forming process. The subtle profile changes are almost unrecognizable in large commercial buildings but are certainly a consideration in smaller retail environments. The underside of all panels are finished in COLORBOND® Surfmist® but other colour options may be available subject to quantities.

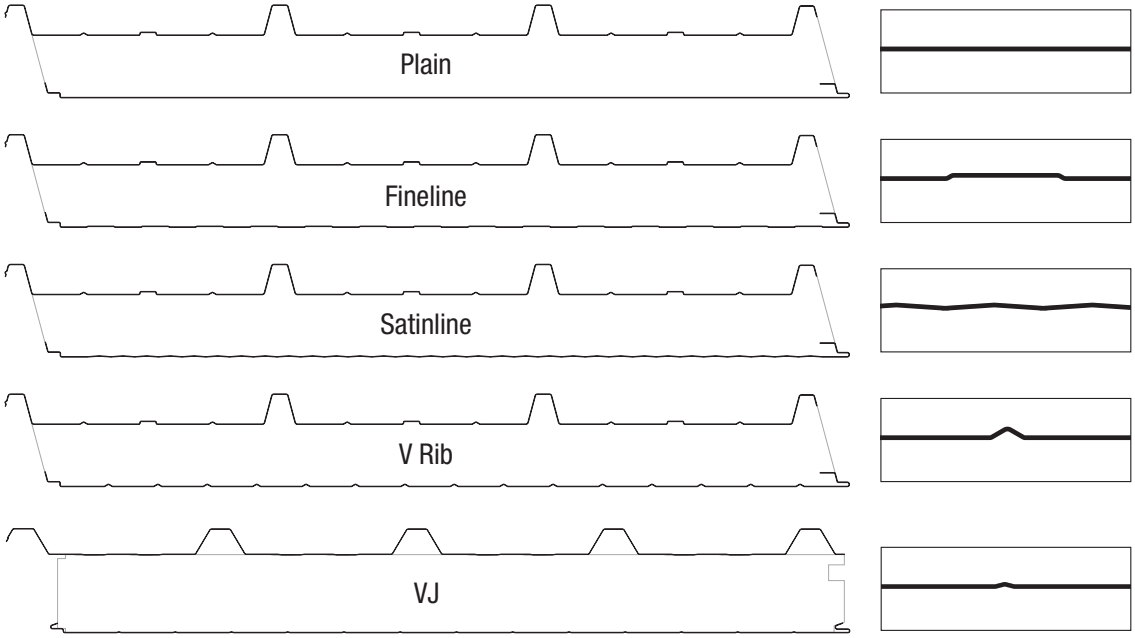
Plain - Contemporary Look

Various profiles with steel to both sides of panel (see below).

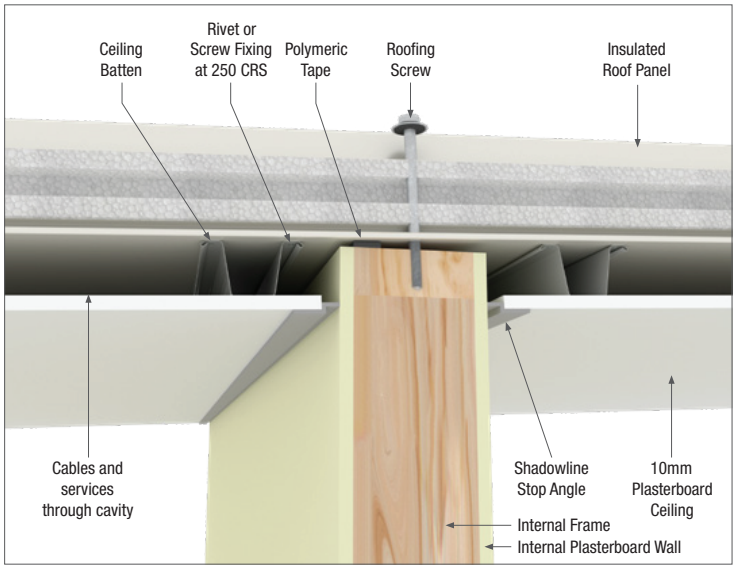
Foil or Vinyl

Single side steel profile - EconoClad®.

Profiles



While almost never used in commercial applications, it is possible to install secondary lightweight ceiling lining to the underside of the Bondor Metecno Insulated Panels. A ceiling batten is fixed to the underside of the Insulated Panel and the plasterboard is then fixed to the batten in the usual manner.



Refer to Plasterboard supplier for recommendations and installation.

Colour Options

Since the late 1990's there has been a shift away from dark colours, particularly for roofing. This has been championed by changes in the BlueScope Steel colour palette over this period and also changes to acceptable building practices under the NCC.

This process has continued with the changes introduced in the latest NCC for commercial roofs. Dark coloured roofs are no longer be permitted under the Deemed-to-Satisfy (DtS) provisions. Commercial buildings need a light-coloured roof, with all climate zones (except for Climate Zone 8) requiring a maximum solar absorptance of 0.45 to comply. This means that any commercial roof assessed under the DtS provisions need to be Classic Cream, Surfmist, Paperbark, Shale Grey or Evening Haze. All medium or dark coloured roofs, including "green" roofs, dark concrete and membrane roofs require a performance-based solution to demonstrate compliance.

Table 1: Bondor Metecno Insulated Panels Acceptable External Skin Colours based on BlueScope®'s Guidelines on Max Skin Temperature

PIR Core (<100°C)	Exposure Category			
	1	2	3	4
Max Solar Absorptance	**0.75**	**0.96**	**0.96**	**0.96**
Acceptable external skin colours	Classic Cream™	Classic Cream™	Classic Cream™	Classic Cream™
	Surfmist®	Surfmist®	Surfmist®	Surfmist®
	Paperbark®	Paperbark®	Paperbark®	Paperbark®
	Shale Grey™	Shale Grey™	Shale Grey™	Shale Grey™
	Dune®	Dune®	Dune®	Dune®
	Pale Eucalypt®	Pale Eucalypt®	Pale Eucalypt®	Pale Eucalypt®
	Manor Red®	Manor Red®	Manor Red®	Manor Red®
	Basalt®	Basalt®	Basalt®	Basalt®
	Woodland Grey®	Woodland Grey®	Woodland Grey®	Woodland Grey®

EPS-FR Core (<80°C)	Exposure Category			
	1	2	3	4
Max Solar Absorptance	**0.54**	**0.62**	**0.69**	**0.75**
Acceptable external skin colours	Classic Cream™	Classic Cream™	Classic Cream™	Classic Cream™
	Surfmist®	Surfmist®	Surfmist®	Surfmist®
	Paperbark®	Paperbark®	Paperbark®	Paperbark®
	Shale Grey™	Shale Grey™	Shale Grey™	Shale Grey™
	Dune®	Dune®	Dune®	Dune®
	*Pale Eucalypt®	Pale Eucalypt®	Pale Eucalypt®	Pale Eucalypt®
	*Manor Red®	*Manor Red®	Manor Red®	Manor Red®
	*Basalt®	*Basalt®	Basalt®	Basalt®
	*Woodland Grey®	*Woodland Grey®	*Woodland Grey®	Woodland Grey®

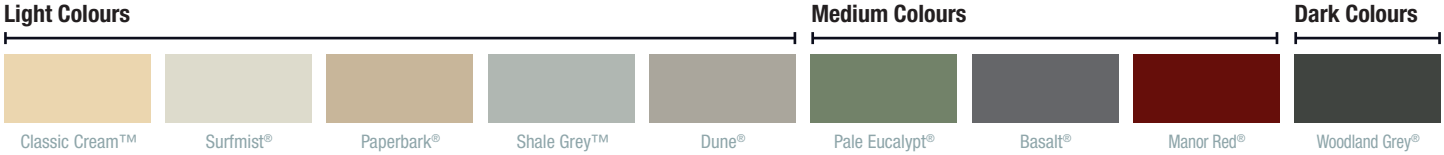
* Limited Warranties apply - Contact Bondor®/Metecno® for more information.

Deemed To Satisfy | Performance Solution

Exposure Category 1 – Extreme inland (Wilcannia, Oodnadatta, Swan Hill, Mardie)
Exposure Category 2 – Majority of seaboard Australia (Melbourne, Sydney, Brisbane, Townsville, Adelaide, Perth, Cains)
Exposure Category 3 – Cooler regions of mainland Australia (Toowoomba, Mackay, Cooma, Port Stephens, Omeo, Gladstone, Bowral, Lithgow, Bright)
Exposure Category 4 – Tasmania (Hobart, Launceston, Devonport)

NCC Classification:

BASIX (NSW only):



Thermal

It is recommended to use lighter colors with solar absorptance of less than 0.45 (refer Figure 1 & Table 2). In climate zones 1 to 5, the solar absorptance of the upper surface of a roof must not be more than 0.64.

Smart selection of roof colors not only help to achieve maximum thermal efficiency from the roof panels but also save installation costs (with thinner roof panels to meet the NCC Vol.1 energy efficiency requirements) and long term energy costs.

The energy efficiency requirements of the NCC Vol.1 for commercial buildings can be met by:

- A deemed-to-satisfy tick the box approach – by satisfying the minimum total R-value for roof & ceiling construction in all states except NSW and Northern Territory in accordance with NCC Vol. 1.
- Computer modelling of the proposed building - in this case minimum R-values are not specified however the R-value of the proposed roof/ceiling will need to be entered into computer modelling program.
- NSW requirements of some building classes are met by complying with BASIX (New South Wales Building and Sustainability Index) requirements.
- Peer/expert review
- Verification

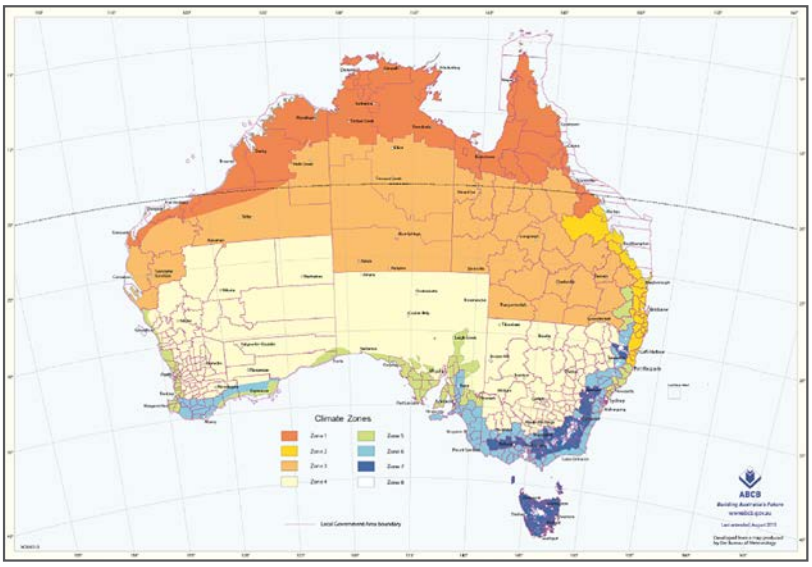


Figure 1: NCC Climate Zones

Table 2 provides the minimum total R-values and minimum core grade/thickness of Bondor®/Metecno®'s insulated roofing panel required in Australia in accordance with NCC Vol.1 and BASIX (except Class 2 and Class 4 part of a building). For that, refer to NCC Vol. 1.

Table 2: Minimum Total R-values and Minimum Core Grade / Thickness of Bondor's Insulated Roofing Panel in Australia

Bondor®/Metecno® Roofing Products (Grade & Thickness) to Meet NCC - Vol. 1 Minimum Total R values (m^2K/W)									
Light & Medium Colours (Solar Absorptance <0.45)	Climate Zone:	1 (Darwin/ Cairns)	2 (Brisbane/ Mackay)	3 (Alice Springs/Mt Isa)	4 (Kalgoorlie/ Wagga Wagga)	5 (Adelaide/ Perth/ Sydney)	6 (Albany/ Melbourne)	7 (Hobart/ Canberra)	8 (Alpine)
Classic Cream, Surfmist, Paperbark, Shale Grey	Direction of Heat Flow:	Downwards					Downwards	Upwards	Upwards
	Min. Total R-value Required:	3.7					3.2	3.7	4.8
	MetecnoSpan® (mm):	PIR-80					PIR-80	PIR-80	PIR-100
	EconoClad® (mm):	PIR-80					PIR-60	PIR-80	PIR-100
	SolarSpan® (mm):	SL-150					SL-150 / M-125	SL-150	SL-200 / M-175
	InsulRoof® (mm):	SL-150					SL-125	SL-150 / M-125	SL-200
	Equideck® (mm):	SL-150					SL-150 / M-125	SL-150	SL-200 / M-175

Note: EPS core grade in accordance with AS1366.3.

Air Leakage

Once the sole domain of cold storage, freezers and wine storage, temperature controlled buildings now include data centres, clean rooms and medical storage. Air leakage is now a serious consideration as designers search for better thermal performance solutions, controlling air leakage from within commercial buildings is firmly in the spotlight. Providing comfortable spaces inside our buildings via air conditioning system is a complicated task, especially if the buildings air tightness is unpredictable. Obtaining a good air tight seal using multiple components is difficult so traditional bulk insulation and single skin cladding system struggle with air tightness, insulated panel roofing systems on the other hand offer better thermal performance inbound as well as rigid, well-sealed connections at all fixing points.

Marine Environments

For roofing in marine environments, refer to BlueScope Technical Bulletin TB 1A Steel roofing products – selection guide.

Fire Considerations

All buildings constructed in Australia must comply with the Building Code of Australia (BCA). The BCA is principally designed to maximise the safety, health and amenity of people in and around buildings. Section C of NCC Vol. 1, in particular, establishes the performance requirements and verification methods for fire resistance of Buildings of Classes 2 to 9. The minimum Type of fire-resisting Construction of a building is influenced by the Class of Building as well as rise in storeys. Requirements that are relevant to the properties of insulated wall panels for each of these Construction Types include the following:

- Fire hazard properties of internal linings
- Ancillary elements, such as awnings or sunshade

Table 4 provides a quick summary of fire properties of Bondor®/Metecno®'s commercial roofing products.

Property	MetecnoSpan®	EconoClad®	SolarSpan®	InsulRoof®	Equideck®
Core	PIR	PIR	EPS-FR	EPS-FR & PUR	EPS-FR
Group number AS 5637	Group 1 & 2[a]	Group 2	Group 1 & 2[b]	Group 1 & 2[b]	Group 1 & 2[b]
Fire Indices AS 1530.3	0, 0, 0, 1	0, 0, 0, 1	0, 0, 0, 2-3	0, 0, 0, 1	0, 0, 0, 3
Bushfire	BAL 40	BAL 40	BAL 40	BAL 40	BAL 40
FM	FM 4471 FM 4880 FM 4881	FM 4880	-	-	-

NOTES:
Construction requirements for Group 1 and Group 2 are shown below, please refer Metecno® for more information.

a) PIR Panel:

Group 1:
- Panel thickness up to 100mm
- Roof to Wall intersection: minimum of 0.6mm steel 40 x 40mm internal angles with Soudaseal FR or Gorilla Firecryl Acrylic Sealant, and 0.5mm steel or aluminium external angles with optional silicone or mastic sealant, fixed with steel rivets or screws at maximum 300mm centres.

Group 2:
- Panel thickness up to 100mm
- Roof to Wall intersection: minimum of 0.5mm steel or 1.5mm aluminium 65 x 40 mm external angles, no sealant required; minimum of 0.5mm steel or 1.5mm aluminium 40 x 40 mm internal angles, no sealant required; fixed with rivets at maximum 300mm centres.

b) EPS Panel:

Group 1:
- Panel thickness up to 250mm
- Roof to Wall intersection: steel angles fixed with steel rivets or screws at maximum 300mm centres. Ceiling panel joints require steel stitching rivets at minimum 1200mm centres. Silicone sealant applied at the internal panel joints.

Group 2:
- Panel thickness up to 150mm
- Roof to Wall intersection: aluminium angles fixed with aluminium rivets or screws at maximum 300mm centres. Silicone sealant applied at the internal panel joints.

- Panel thicker than 150mm
- Roof to Wall intersection: steel angles fixed with steel rivets or screws at maximum 300mm centres. Silicone sealant applied at the internal panel joints.

Wind Actions: Commercial Applications

The wind actions shall be calculated by a structural engineer in accordance with AS/NZS 1170.2:2021 as follow:

a) Determine site wind speeds

b) Determine design wind speed

c) Determine design wind pressure and distributed forces

d) Calculate wind actions based on wind region (Figure 2), terrain category, building height, shielding and topographic Multiplier.

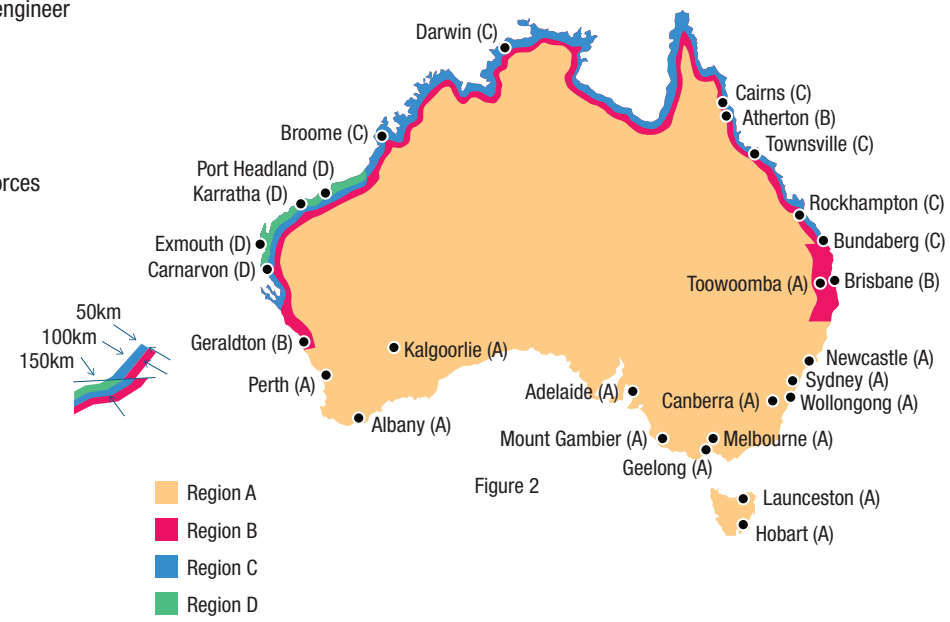


Figure 2

Roof Span

Permissible span is the allowable roof panel span between fixings under certain wind pressure. Due to the larger spans allowed by roof panels, extra consideration of roof reaction loads into standard timber or steel framed walls is required.

Single span roof panels only have fixings at both ends; multi-span roof panels have additional intermediate fixings. Do not span the roof panel more than the permissible spans from the span table. If longer roof span is required, consider breaking up the span by adding intermediate support beams (multi-span).

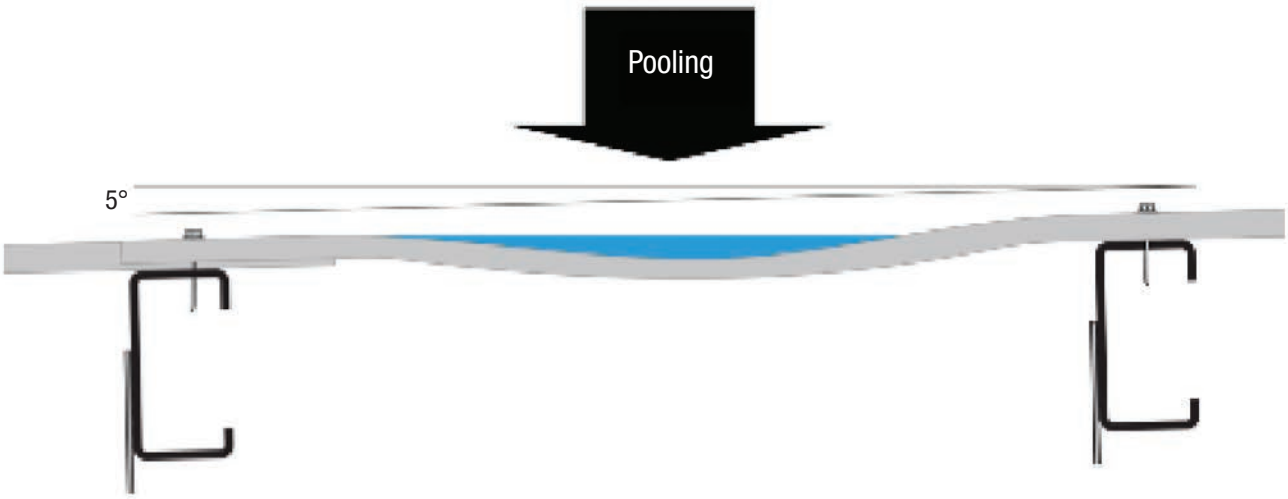
Deflection

Structural Steel

Minor structural frame deflection can occur as the supporting structural steel sags or deflects under its own weight. This can effectively lower the desired design pitch by a half to one degree in some cases. Designers should allow for this possible deflection when matching product profiles with minimum pitches, particularly in very long roof runs or where roof penetrations are planned.

Sheeting Deflection

Sheeting deflection between fixing points is usually associated with single skin profiles and occurs when higher than allowable foot traffic loads are applied mid-span. The deflection to the sheeting is permanent and has the potential to reduce the service life of the sheeting via corrosion or even leaks if the damage is close to the overlaps. While the stiffer, stronger insulated panel is much less prone to this type of deflection, consideration should be given to specifying an approved walk-way system to allow access for following trades and on-going maintenance traffic.



Single Skin Profile

Insulated Panel

Additional Loads on Roof

These days, the commercial roof plays a far more important role than just keeping the building dry. Accommodating thermal performance, air conditioning, electrical platforms, exhaust vents, suspended ceilings, duct work, fire protection and solar systems that often blanket the entire available roof surface, now require early design consideration.

Dead load is the engineering term which refers to the weight of the roof structure itself, along with any permanently attached materials or structures on the roof, so it must be designed, first of all, to support itself, While most cladding manufacturers incorporate a modest load allowance to allow some additional loads, careful engineering calculations are required in conjunction with manufacturers load / span tables (refer span table notes).

Roof Drainage Capacity

Rainfall Intensity

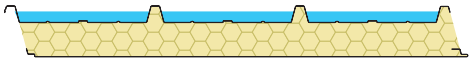
Values of rainfall intensity in Table 4 have been derived from the NCC and the Bureau of Meteorology data. Specific data for any location can be obtained from the Bureau of Meteorology website based on the Latitude and Longitude. It should however be emphasised that the extent and longevity of records in Australia are limited and any such data therefore carries with it a degree of uncertainty.

Roof Profile Capacity

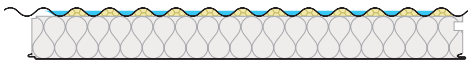
Each profile's water carrying capacity is calculated based on the cross sectional area of the trays. Allowable flow depths are influenced by both sheet overlap dimensions and a considerable safety margin.

Water Carrying Capacity

High height ribs and wider trays = more water



Low height ribs and narrow trays = less water



High height ribs and maximum trays = most water

This section provides water carrying capacity tables for each profile and allows profile selection considering the three important design critera. As you can see from the images above, narrow shallow trays shown on the corrugated profile carry much less water than the wider, deeper trays .

Most designers and builders are focused on keeping roof pitches to a minimum on commercial projects. Higher pitches add to cost via additional wall heights. In some cases height restrictions and compliance with fire regulations also need to be considered.

AS1562.1 provides designers and installers with clear information to determine the minimum requirements for the correct and safe design and installation of metal roof and wall cladding.

One important aspect that must be considered for roof cladding at design stage is the minimum water drainage requirement. This must be based on a rain fall resulting from a storm having an average recurrence interval of 100 years as determined in accordance with AS/NZS 3500.3 or local meteorological data. AS1562.1 specifies that the cladding system must provide water resistance and drainage when subjected to the above rainfall intensity. It further explains that the roof drainage capacity is affected by the following factors:

(a) the length and pitch (i.e. slope) of the roof;
(b) the profile of the cladding and its water channel drainage capacity;
(c) the risk of ponding in the case of a low pitch roof;
(d) anti-capillary feature geometry and location design on side laps;
(e) the potential penetration of water through end and side laps;
(f) drainage from an upper roof to a lower roof;
(g) change of pitch or a concave roof leading to a transition from laminar to turbulent flow;
(h) any penetrations in the roof that affect the flow of water down the roof pitch; and
(i) deflection of a roof structure will alter the roof pitch; the initial pitch, which therefore, should include an allowance for any permanent deflection of the roof structure, in particular long-term deflections in timber-framed structures.

The drainage capacity and minimum roof pitch for Bondor®/Metecno®'s roofing profiles have been determined according to the calculation procedures outlined in AS1562.1:2018. These values are shown in Table 6 for different rainfall intensities and various roof lengths.

NCC Vol. 2 lists the once in 100 years average recurrence interval for different localities in Australia. These values are shown in Table 5. Use this table to determine the rainfall intensity for the relevant locality. Based on this value refer to Table 6, to determine the minimum roof pitch for Metecno's various roofing profiles.

Table 5: Rainfall Intensity 1 In 100 Years (mm/hr)							
Australian Capital Territory		**Northern Territory**		**South Australia**		**Victoria**	
Canberra	193	Alice Springs	239	Adelaide	184	Ballarat	188
Gungahlin	179	Darwin	274	Gawler, Adelaide	158	Benalla	194
Tuggeranong	210	Katherine	250	Mt Gambier	144	Geelong	144
New South Wales		**Queensland**		Murray Bridge	178	Horsham	173
Albury	180	Bamaga	298	Port Augusta	199	Lakes Entrance	198
Broken Hill	219	Brisbane	305	Port Pirie	181	Melbourne	187
Goulburn	156	Ipswich, Brisbane	278	Yorketwon	166	Hastings, Melbourne	145
Kiama	319	Vicotria Point, Brisbane	320	**Tasmania**		Sorrento, Melbourne	140
Newcastle	316	Bundaberg	340	Burnie	180	Mildura	218
Orange	186	Cairns	278	Flinders Island	166	Stawell	186
Sydney	262	Cloncurry	278	Hobart	116	**Western Australia**	
Avalon, Sydney	278	Innisfail	301	Launceston	121	Albany	178
Campbelltown, Sydney	222	Mackay	316	Queenstown	120	Broome	287
Penrith, Sydney	244	Mt Isa	260	St. Marys	203	Bunbury	199
Windsor, Sydney	233	Noosa Heads	331			Derby	256
Tweed Heads	330	Rockhampton	300			Geraldton	193
Wollongong	308	Toowoomba	268			Kalgoorlie	204
		Townsville	300			Perth	172
		Weipa	283			Joondalup, Perth	180
						Midland, Perth	163
						Port Hedland	230
						Tom Price	182

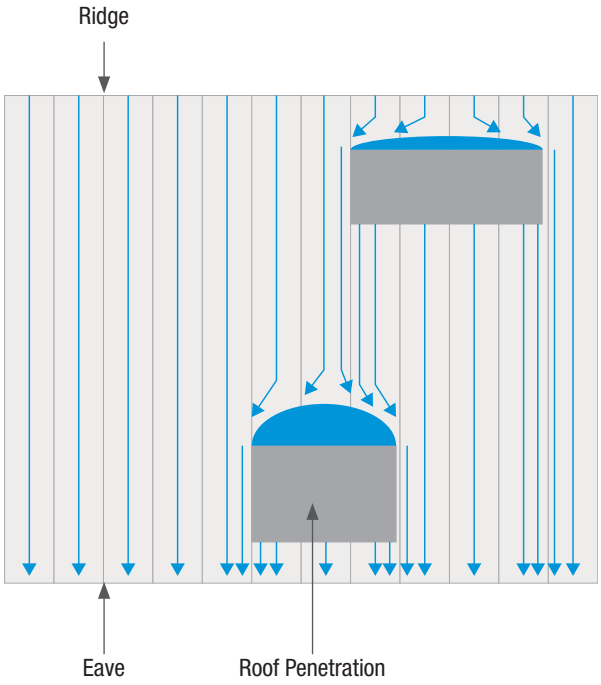
Table 6: Minimum Roof Pitch/Slope											
Rainfall Intensity (mm/hr)	Bondor®/Metecno® roofing products	Roof Length (m)*									
		5	10	15	20	25	30	35	40	45	50
100 to 150	MetecnoSpan®/EconClad®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	SolarSpan®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	InsulRoof®	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°
	Equideck®	3°	3°	3°	3°	3°	3°	3°	3°	3°	3°
151 to 200	MetecnoSpan®/EconClad®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	SolarSpan®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	InsulRoof®	5°	5°	5°	5°	5°	5°	5°	5°	5°	7.5°
	Equideck®	3°	3°	3°	3°	3°	3°	3°	3°	3°	3°
201 to 250	MetecnoSpan®/EconClad®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	SolarSpan®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	InsulRoof®	5°	5°	5°	5°	5°	5°	5°	7.5°	10°	15°
	Equideck®	3°	3°	3°	3°	3°	3°	3°	3°	3°	3°
251 to 300	MetecnoSpan®/EconClad®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	SolarSpan®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	InsulRoof®	5°	5°	5°	5°	5°	5°	7.5°	10°	15°	N/A
	Equideck®	3°	3°	3°	3°	3°	3°	3°	3°	3°	3°
301 to 340	MetecnoSpan®/EconClad®	2°	2°	2°	2°	2°	2°	2°	2°	2°	2°
	SolarSpan®		2°	2°	2°	2°	2°	2°	2°	2°	2°
	InsulRoof®	5°	5°	5°	5°	5°	7.5°	10°	15°	N/A	N/A
	Equideck®	3°	3°	3°	3°	3°	3°	3°	3°	3°	3°

* Contact Bondor Metecno for longer roof lengths.

Roof Sheet Length - Where Lapping is Required

Roof sheet length refers to the actual sheet or panel length. In long roof runs, multiple panel lengths joined by SecureLap® jointing system may be required. Check with your local supplier for maximum panel lengths available. Vacuum lifting devices are recommended for hoisting long panel lengths.

Roof Penetrations



Roof penetration placement can have a significant effect on water carrying capacity of each profile. A penetration effectively forms a dam across the roofing tray interrupting the water flow to the gutter. The correct penetration flashings divert the water trapped behind the penetration to adjacent trays but this additional water must be considered so that the tray receiving the extra water does not become flooded beyond its capacity.

Placing the penetrations at the head of the roof presents few problems because very little water is trapped behind them. However, placing the penetration at the lower end of a long run, low pitch roof can mean that water may need to be diverted to multiple trays share the extra water flow. Flooding these trays beyond their capacity would likely cause leaks through the sheeting overlaps. It is still possible to place penetrations near the lower end of the roof but some consideration should be given to placing the penetrations on a platform supported on “feet” that present a very small interruption to water flow.

Another factor that must be considered as part of the penetration design is the reduction in the allowable spans. The magnitude of this reduction will depend on the span, core material, the roof panel and skin thickness as well as any additional loading. When the penetrations are located within the pan of the profiled panel, the influence on the panel capacity is relatively small compared to the penetrations passing through the ribs. Therefore, it is not always accurate to assume that the remaining capacity is proportional to the remaining panel width after the cut-out. Stress concentration at the cut-out corners may further degrade the panel capacity if the penetrations are located in the bending critical regions. Penetrations created close to the side laps have profound impact on maintenance access loads and therefore it is not allowed to walk on the remaining strips of the panel left over after the cut-out.

It is important to ensure that the allowable panel capacity will not be exceeded, taking into consideration all the loads that are known at the design stage as well as any future loads that may be imposed by various trades during the building’s operation phase. Any point load hanging on the ceiling side of the roof panels must be located at least 1m away from penetrations. Stitching the panel joint is always a good practice to mitigate the detrimental effects on panel capacity during or after cut-out.

Detailed information is available on the location and size of penetrations for each panel thickness. Contact Bondor Metecno for more information, or if your application does not fall within the specified general guidelines. Penetrations need to be encapsulated and covered soon after the cut-out in line with general safe practices.

Dektite flashing to suit square tube feet used to support service platforms

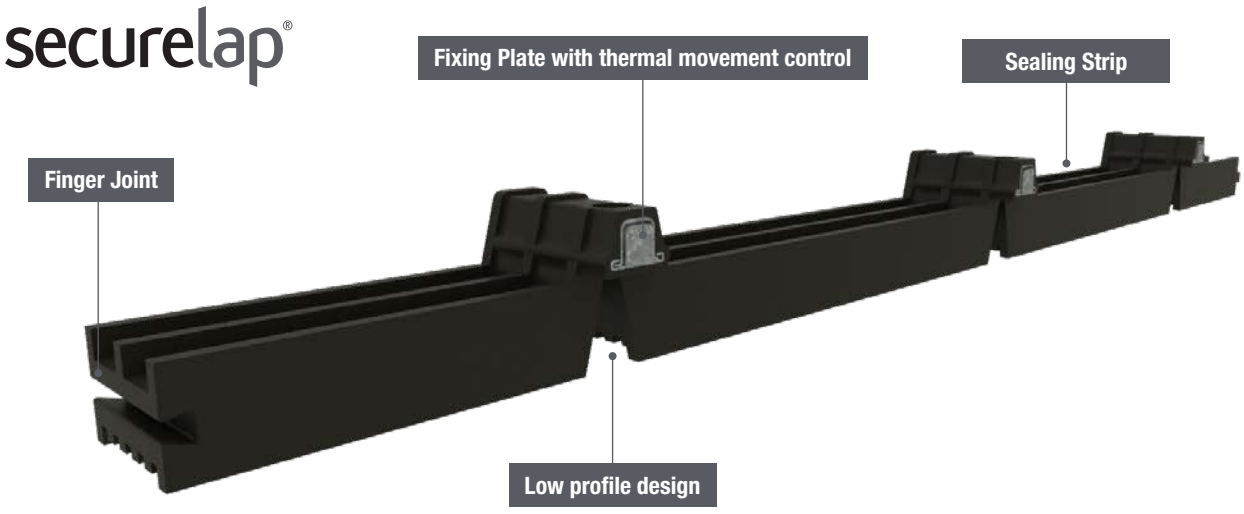
Roof Movement and Roof Lapping

Thermal Movement

All rigid metal materials expand and contract when temperatures change. In Australia on a clear, still day COLORBOND® Steel Surfmist® can reach 50 degrees C, while COLORBOND® Steel Night Sky® more than 80 degrees C. Expansion co-efficients vary in different material substrates seeing material like aluminium and zinc expand and contract at a far greater rate than steel. Metal roof systems can be the least forgiving of all roofing materials if allowance for expansion and contraction are not carefully considered.

Movement over short panel runs (up to 15m) are generally not a concern but in long panel runs (beyond 20m) movement can be significant and potentially a problem if not managed. Transverse thermal movement is not considered a problem (in ribbed cladding) because each overlap absorbs some thermal movement. Various fixing methods have developed over the years to minimize the effects of thermal movement, among these are:

- Concealed fixing clips allowing sheeting profiles to slide up and down the roof length during thermal movement (single skin profiles only, like Kliplok).
- Expansion Joints - a structural step is formed in the framework to facilitate movement. This system requires two purlins at the lapping point to essentially allow the roof runs to manage thermal movement separately. These runs are generally limited to approximately 24m for thermal movement control and ease of installation. This method of thermal movement control has been tried and proven for over 45 years in Australia and is suitable for both insulated panel and single skin roofing systems.
- Hybrid lapping systems like “Trim-Klip” for single skin profiles and SecureLap® for insulated panel systems allow thermal movement control but still allow connection over one purlin (no need for steel frame modification required in Expansion Joints)
- Thermal bow is the term given to upward and downward movement in insulated panel roofing during expansion and contraction events. Because insulated panel roofing is usually fixed at far wider support intervals, the panel has a tendency to bow up and down slightly during thermal movement. While some minor movement is dissipated by this method, it is not considered a solution for long roof runs above 24m.
- Sheet to sheet over-lapping techniques are all but extinct in Australia because they do not allow adequate thermal movement and encourage premature corrosion. BlueScope Steel’s warranty exclude perforation failures in sheet to sheet endlaps.



What is Roof Lapping

SecureLap®/SolarLap® is a unique roof lap jointing system developed specifically for insulated panel roofing. SecureLap®/SolarLap® changes the way long panel roof runs are designed and installed. SecureLap®/SolarLap® provides a solution to the troublesome “sheet to sheet endlap” and offers a real alternative to the more expensive “expansion joint” system which requires extra purlins and purlin cleat modifications.

The SecureLap®/SolarLap® roof jointing system is designed for pierced fixed panel roofing. It allows for the installation of lapped panels on standard purlin framing and provides a combination of a strong joint and a weather-resisting seal between lapped sheets.

SecureLap®/SolarLap® is significantly easier to install than current lapping alternatives. After the lower level panel is secured to the bottom half of the jointing purlin, the SecureLap®/SolarLap® sealing strip is fitted. The upper level sheet packer is then fitted to the top half of the jointing purlin before the upper level panel is fitted. (See more details in the installation section). Patented, cutting edge technology provides strength and water ingress security while preserving the integrity of the existing roof warranty.

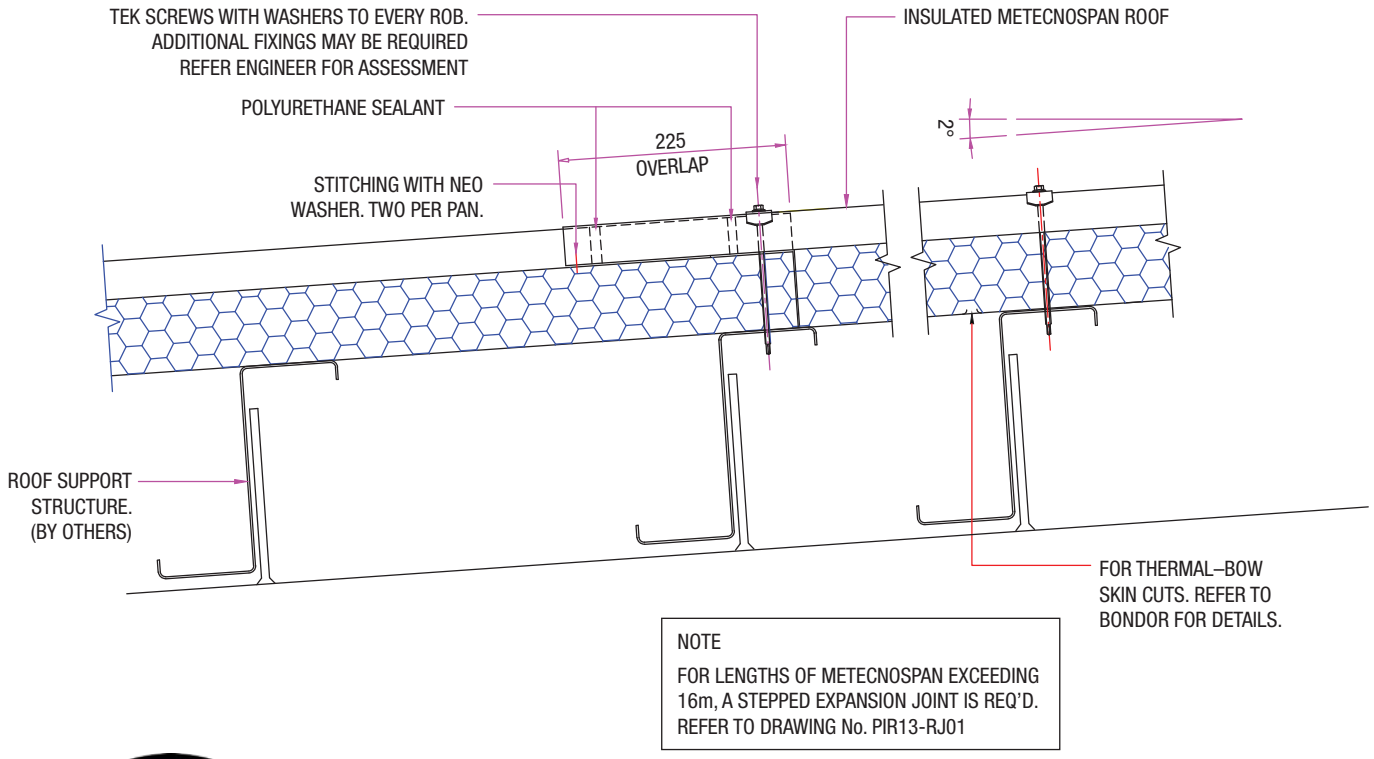
Benefits

- Cutting edge insulated panel end-lapping system for long monoslope roof
- Uniform purlin height requires no step in supporting structure or the need for structural modification. No additional purlins are required
- Suits profiles for roof slopes as low as 2˚
- No sealant or butyl tape required allowing easy panel alignment during installation
- Low profile seal provides improved visual roof continuity
- Independently weather tested by the CSIRO
- BlueScope Steel endorsed, preserving roof warranty
- Significant savings on installation labour
- Conforms to Australian Standards AS 4046.9
- Mechanical connection and roof turn-up provides water tight confidence
- Sealed lap providing a reduction in air leakage
- Lower transport and handling costs
- Allows thermal expansion and contraction

End Lap - Sheet to Sheet (not recommended)

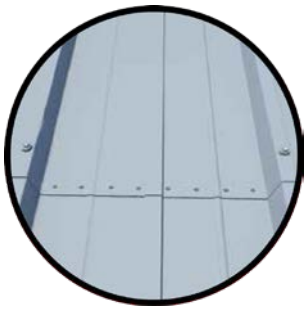
Connects the upper and lower level roof runs in the same plane. This system requires the core material to be removed completely as sealant provides the waterproofing seal. Unlike Expansion Step, this end lapping process physically connects the upper and lower roof sheets. This system is usually used when the roof steps have not been constructed as stepped or other restrictions.

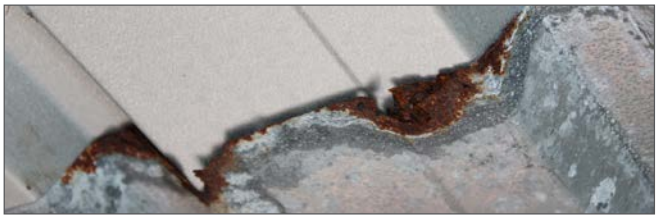
Note: The following illustrations depict MetecnoSpan®, however the same details are generally applicable to other roofing products.



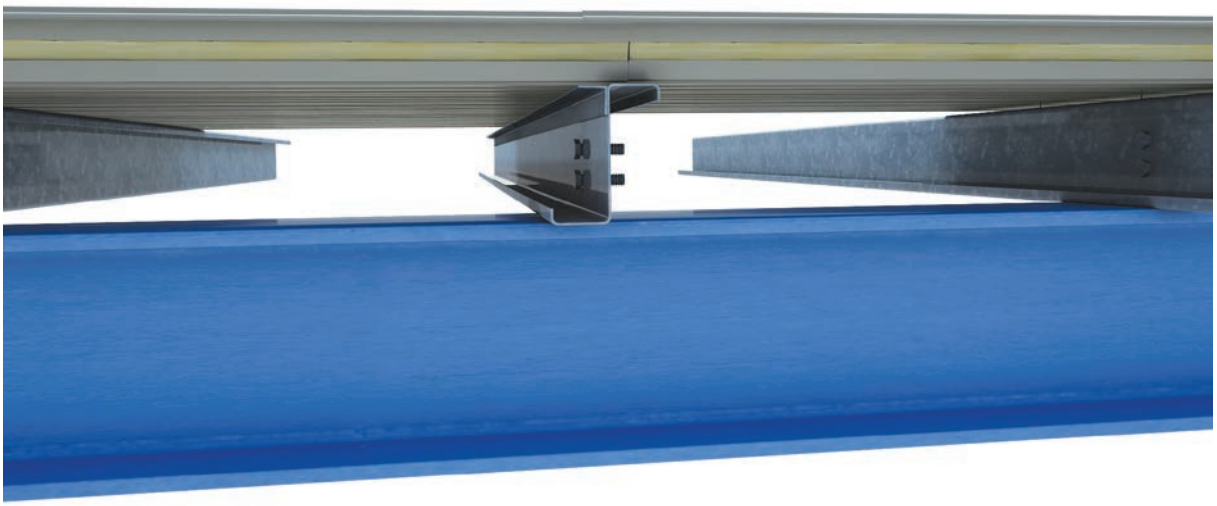
NOTE

FOR LENGTHS OF METECNOSPAN EXCEEDING 16m, A STEPPED EXPANSION JOINT IS REQ'D. REFER TO DRAWING No. PIR13-RJ01





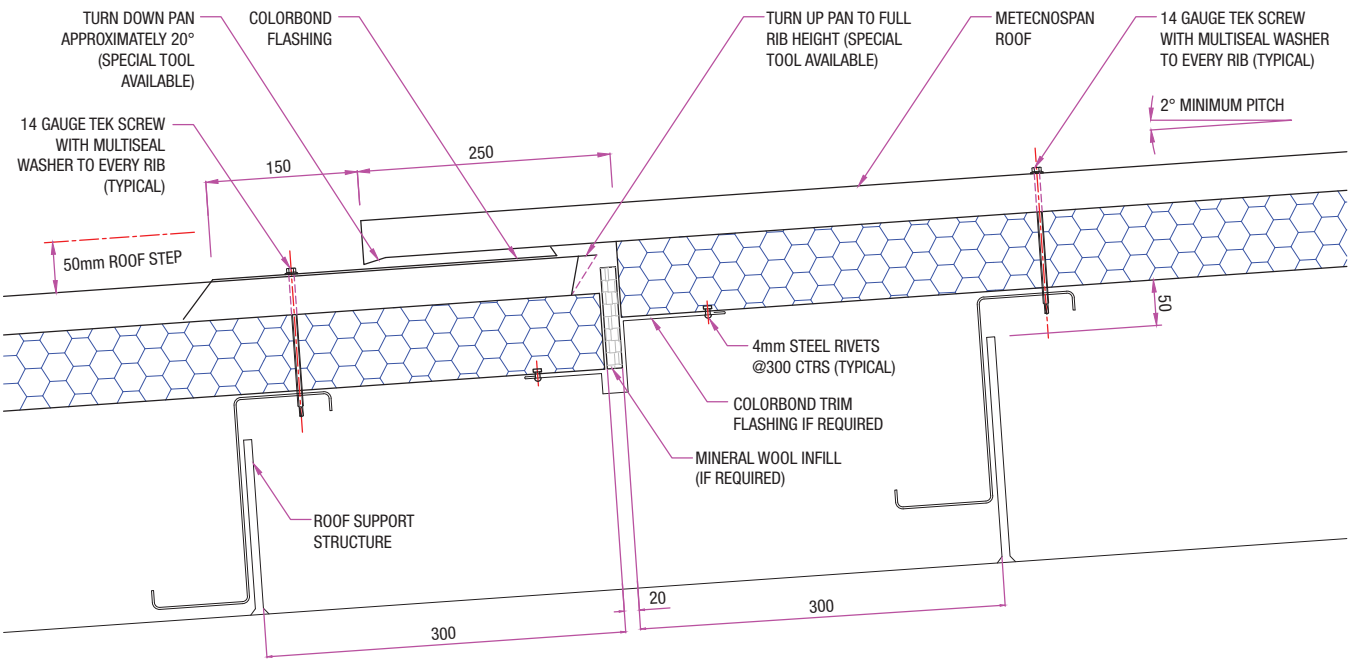
Sheet to sheet end lap corrosion failure

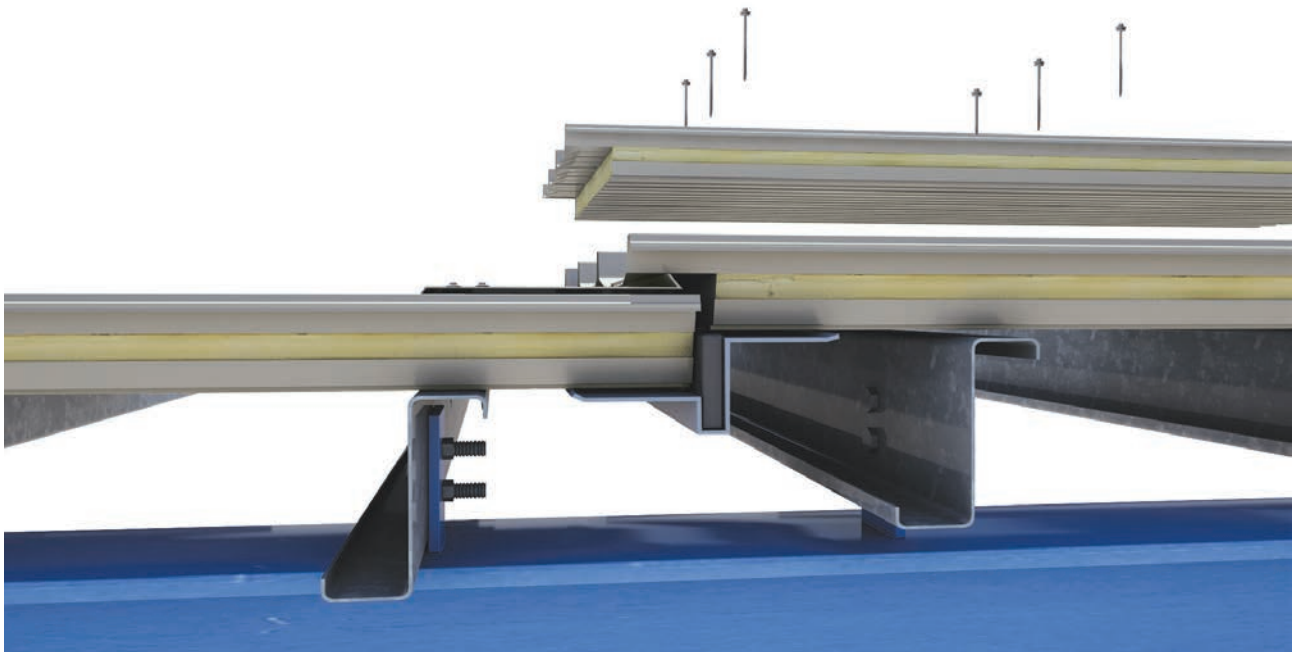


End Lap with Expansion Joint (recommended)

Allows true thermal movement. Upper and lower level roofs are connected to purlins independently, therefore allowing for expansion and contraction. The step joint is flashed utilizing baffle flashing techniques proven in Australian conditions over the last 45 years. This type of sheeting connection requires the upper level purlin cleats to be stepped allowing this roof to pass over the top of the lower level sheeting. Expansion steps are the preferred method to connect long roof runs. They offer better corrosion resistance and better control of thermal movement.

Expansion Step Detail - MSP-PI-RF008

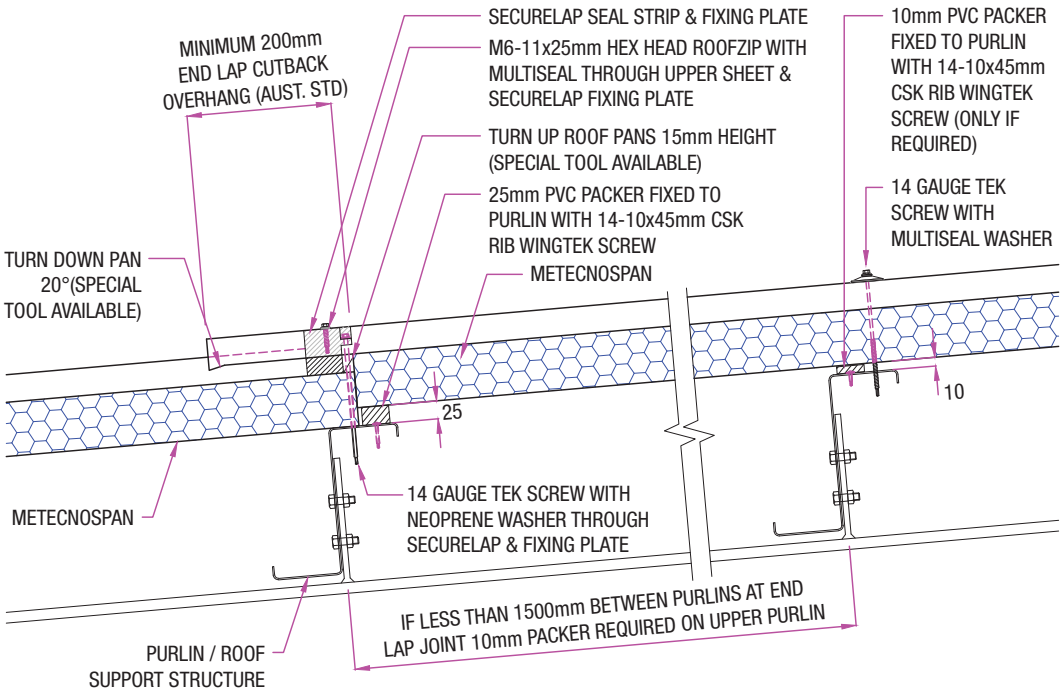


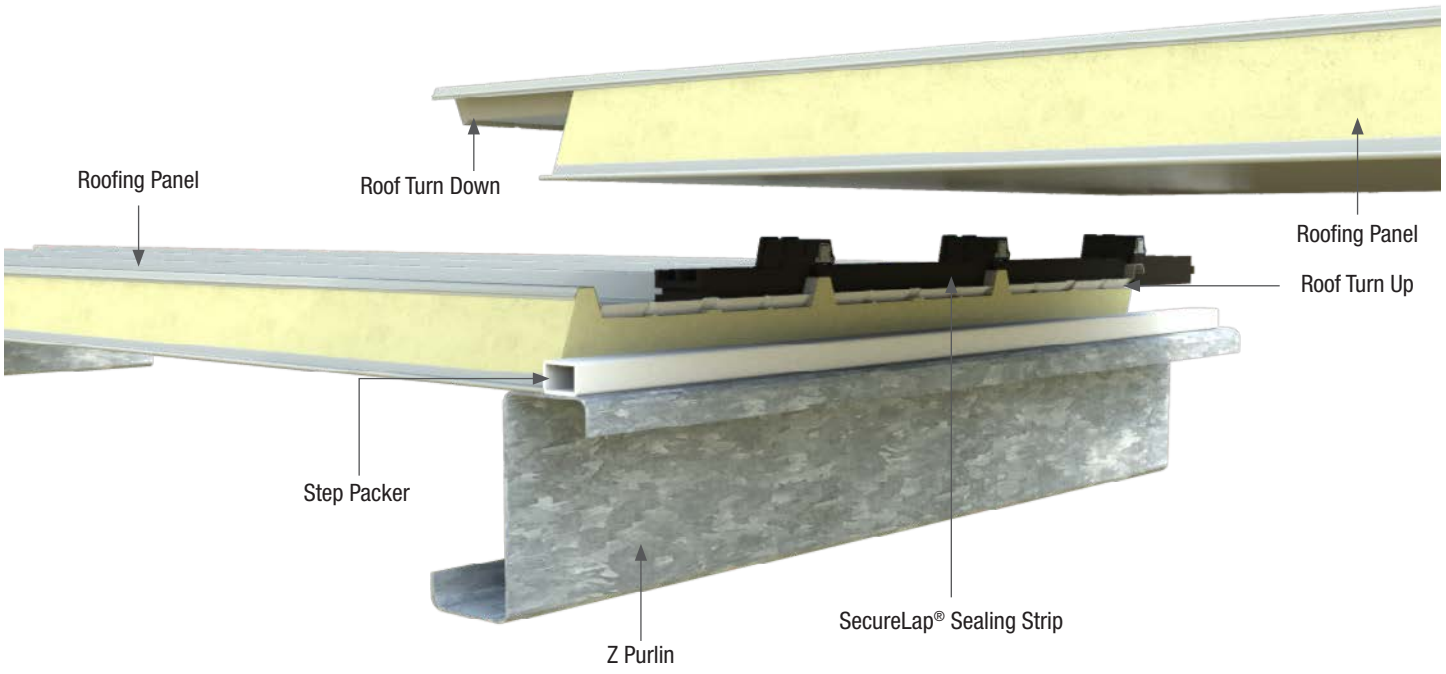


End Lap with SecureLap®/SolarLap® (recommended)

SecureLap® is a unique roof lap jointing system developed specifically for insulated panel roofing. SecureLap® changes the way long panel roof runs are designed and installed. SecureLap® provides a solution to the troublesome “sheet to sheet endlap” and offers a real alternative to the more expensive “expansion joint” system which requires extra purlins and purlin cleat modifications.

Roof End Lap Detail - SecureLap - MSP-PI-RF024





SecureLap®/SolarLap®

Applications

SecureLap®/SolarLap® addresses all the major concerns associated with current end-lapping techniques for insulated panel roofing while still allowing connection over one purlin. It is suitable for single or multiple insulated roof panel laps on long roof runs. The SecureLap®/SolarLap® system comprises of three main components, the polyurethane packer strip, the rubber sealing strip which houses the third component, the sliding fixing plate.

Thermal Expansion

The patented SecureLap®/SolarLap® assembly provides a flexible 75 mm wide sealing strip, moulded to suit the roofing profile. It includes the steel rib fixing assembly within the moulding. This fixing assembly allows both the primary and overlapping sheet connection to slide to facilitate minor thermal movement common in this type of connection.

Testing

Current sheet to sheet lapping systems rely on silicone sealant or multiple runs of butyl tape. This sealant or tape can become compromised during roof panel alignment. Tested to 2˚, SecureLap®/SolarLap® allows the underlap sheet to be turned up (weathered) providing a mechanical barrier to water ingress while the compressive closed cell sealing system stops wind driven rain entering the lap connection. No sealant or butyl strips are required and SecureLap®/SolarLap® is weather tested, conducted by CSIRO (Figure 3), to Australian Standards AS 4046.9-2002 (R2015), confirming suitability for Australia's harsh conditions.

Figure 3

Architectural Specification

SecureLap®/SolarLap® roof lap jointing system should be installed to all panel roof laps in accordance with manufacturers' instructions. For panel roofing, ensure you specify the right SecureLap®/SolarLap® profile to match the roof profile selected.

Warranty

Current sheet to sheet end-lapping techniques often allow the upper and lower level sheets to be in physical contact. During the wet/dry cycle, the protective coating on the steel sacrifices itself to protect the lap cut edge. When the protective zinc coating around the cut edge is exhausted, the cut edge, seeking further protection, attacks the over-lapping sheet (Figure 4). This can ultimately lead to premature failure. In some long run applications thermal movement can shear end-lap fixings and compromise sealant barriers resulting in water ingress.

The BlueScope Steel Warranty excludes corrosion failures associated with 'sheet-to-sheet' end-lapping (refer to BlueScope Technical Bulletin CTB 8 Building Applications). The SecureLap®/SolarLap® system addresses both the contact corrosion and expansion issues and has been endorsed by BlueScope Steel as a suitable solution for insulated roof panel end lapping.

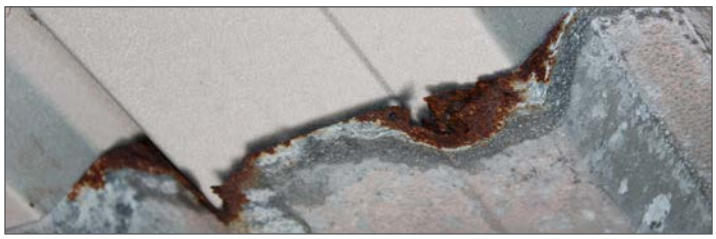


Figure 4 - Sheet to sheet end lap corrosion failure

Spans / Pressures

The roof lap jointing system is permitted to be used at the end support of multi-spans with no reduction in tabulated capacities. SolarLap® is limited to non-cyclonic applications, whilst SecureLap® can be used in both non-cyclonic and cyclonic applications. Please refer to each product span tables for construction details.

Where the end span adjacent to the joint on the upper level of sheeting is less than 1500mm, a 10mm durable packer should be placed on the purlin below the roofing panel. This reduces the ramping effect caused by the panel step at the lapping purlin and ensures adequate surface water velocity is maintained.

To maintain correct engagement with the supporting purlin a longer fixing screw is required where a packers are used.

Support Structure

Lap joints using the SecureLap®/SolarLap® system do not require the purlins to be stepped or raised. The supporting structural steel can be tailored and detailed so that all the roof purlins are in one plane. Cleats must be arranged to suit purlin spacings consistent with any required change in panel spacing arising from the Spans/Pressures clause above.

Penetrations and Obstructions

Obstructions to water flow should not be placed across the SecureLap®/SolarLap® joint, nor should the joint be crushed by any load. All roof penetrations should be at least 1500mm away from the SecureLap®/SolarLap® joint. Check the weight of the penetration & consider the panels ability to support the load in that specific location. Allowances should be made for any diverted water from penetrations to be diverted adequately across adjacent trays so as not to flood any single tray.

Integration of Skylights

Where required, translucent sheeting must be specified to be lapped at the SecureLap®/SolarLap® joint. Translucent sheeting for the lower run should be fixed before laying decking on an upper run. Check with your local translucent sheeting supplier for installation and flashing details.

Ordering

When ordering roof panels for a SecureLap®/SolarLap® joint, details must be provided for the 200mm over-lapping panel “cut back”.

Sheets must be measured accurately to ensure the SecureLap®/SolarLap® joint is installed over a supporting purlin.

While the SecureLap®/SolarLap® components are available ex-stock, subject to availability, roof panels require a short lead time.

Packaging

SecureLap®/SolarLap® roof lap joint units are supplied pre-packaged in recyclable cardboard boxes with 25 individual units (for 25m of roof joint width).

10mm and 25mm Packers are supplied in standard stock lengths to suit project requirements.

Serviceability Statement

While walking on panel roofing systems is quite solid under foot, we recommend caution be taken when walking adjacent to any lapped roof area. Do not walk on the overlapping section of the panels. Flat, rubber soled shoes as well as appropriate PPE and fall restraint systems, should be worn when walking on panel roofing. Place feet in the pans of the sheet where possible and avoid walking in the pans adjacent to the rib overlaps, particularly mid-span.

Good Practice

Bondor Metecno recommends that good trade practice be followed when using this product, as described in the Australian Standards Handbook HB39.

Cutting

SecureLap®/SolarLap® roof lap joint units can be easily cut across the foam section using a suitable sharp cutting implement. Please dispose of any off-cuts considerately.

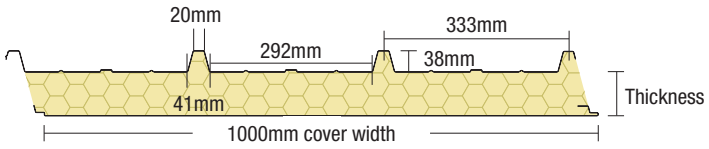
Applications, Specification & Span Tables

Applications

MetecnoSpan® trapezoidal roof panel is suitable for supermarkets, warehouses, factory buildings and retail outlets where high thermal performance and a finished underside is required. It's PIR core offers superior fire resistance. (Manufactured in Qld and Vic).

MetecnoSpan® requires a roof slope of 2 degrees or greater and is capable of very long roof runs made possible by two effective end lapping options. Wide trays and high rib design allow excellent water carrying capacity dependent on location (refer tables).

Dimensions



Specification

MetecnoSpan® external skin is manufactured from 0.42mm G550 high tensile AZ150 coated steel to AS 1397. Colour to be nominated from Bluscope Steels COLORBOND® chart.

The insulated core is available in a choice of 40, 60, 80 or 100mm thick polyisocyanurate (PIR) with zero ODP. The PIR core bonds to the inside and outside skin during manufacturing.

The internal cladding skin is 0.5mm G300, Z275 coated steel to AS 1397 formed with V Rib, Satinline or Fineline profile finish. Standard colour is Surfmist® (other colours may be available subject to order quantity).

End laps may be formed by either the standard expansion step method (also used in single skin applications) or by sheet / panel lapping in one plane and joined over a single purlin. This is achieved utilizing the patented SecureLap® End Lapping System.

Fasteners must be installed through every rib and manufactured from high grade carbon steel with minimum Class 4 anti-corrosion coating. Fasteners are to be fitted with bonded washers from either stainless steel or aluminium (16mm or 25mm diameter).

Flashings should be manufactured from 0.55mm G300, AZ150 BlueScope COLORBOND® steel and installed to Australian Standards. Infill strips manufactured from closed cell polyethylene may also be installed across the sheet profile (under flashing trims) where required.

Core	PIR (Fire-retardant Polyisocyanurate)
Width (cover mm)	1000
Thickness (mm)	40, 60, 80, 100
Length	Up to 25m (check for availability)
External Material	0.42mm COLORBOND® steel
External Finishes	Trapezoidal Profile
Exterior Colour Options	Surfmist®. Other colours available subject to minimum order quantities.
Internal Material	0.5mm G300 COLORBOND® steel
Internal Finishes	Plain, Fineline, Satinline, V Rib
Interior Colour Options	Surfmist®
Pitch	2 degree minimum
Paint System	AS/NZS 2728 & AS 1397
Acoustic Properties	Rw 24 - 25 depending on thickness
Material Group Numbers	Group 1 & 2[a]
Bushfire Attack Level	BAL-40 (All exposed core to be covered with flashing)
FM Approval	4471, 4880, 4881
Environmental	Zero Ozone Depleting Potential (ODP)
Fire Hazard Properties	AS/NZS 1530.3
Ignitability Index	0
Spread of Flame Index	0
Heat Evolved Index	0
Smoke Index	1
$SMOGRA_{RC}$	< 100
Suitable for Cyclonic Regions	Yes (refer tables)

a. AS 5637.1 / AS ISO 9705 - BCA Group Number

Refer Fire Considerations section for construction details.

The technical information contained in this document cover a breadth of applications where MetecnoSpan® may be used, which may be outside the scope of our Codemark certificate. Data specific to CodeMark certification can be found on MetecnoSpan®'s CoC CM40183.

CodeMark Certificate CM40183

BAL40

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Span Tables

With a cover of 1000mm and the ability to order sheets to any given length (max. 25m), the layout and calculation of quantities are greatly simplified. Large spans and sufficient overhangs (cantilevers) are determined by wind pressures and MetecnoSpan® panel thickness. Refer to MetecnoSpan® Span Table for permissible spans in the required region.

NON-CYCLONIC REGION A&B (ROOF APPLICATIONS ONLY)

PIR Core / 0.42mm Hi-tensile External / 0.5mm Internal Steel Skins. Maximum uniformly distributed ultimate wind load (kPa) for the given span:

Single Span, wind pressure acting outwards				
Span (mm)	Panel Thickness (mm)			
	40	60	80	100
1500	4.99	6.94	8.56	9.83
2700	2.15	2.84	3.57	4.31
3900	1.08	1.41	1.76	2.12
5100	0.67	0.86	1.07	1.29
6300	-	-	0.74	0.88

Multi-span, wind pressure acting outwards				
Span (mm)	Panel Thickness (mm)			
	40	60	80	100
1500	4.01	5.57	6.87	7.31
2700	2.27	3.14	3.86	4.11
3900	1.48	2.20	2.70	2.88
5100	-	1.40	1.83	2.20
6300	-	-	1.23	1.48

SPAN TABLE NOTES:

1. Extended span tables including cyclonic regions C&D and wind pressure acting inwards are also available. Refer Bondor®/Metecno®.
2. Fixing with min. 14g tek screws (or equivalent) at each rib are required.
3. Pressures specified are for wind gusts only per AS/NZS 1170.2.
4. Deflection limit of span/150 applies, and in accordance with Serviceability Limit State criteria per AS/NZS 1170.0 - TABLE C1.
5. Self weight of the panel has been allowed for, plus an allowance of up to 25kg/m^2 for light duty fittings (lights, etc.). No other dead loads permitted.
6. Non-trafficable maintenance access (concentrated load) of 140kg on any span has been allowed for.
7. Distributed live load of 0.25kPa (as per AS/NZS 1170.1) has been allowed for. Bondor®/Metecno® tests comply with details outlined in AS 4040.0, AS 4040.1, AS 4040.2, AS 4040.3, AS 1562.1 and AS/NZS 1170.1.
8. Min. roof slope of 2 degree applies.
9. For FM Approved applications,
   a) a max. span of 1830mm applies.
   b) approved fasteners must be used. Refer Bondor®/Metecno®.

Applications, Specification & Span Tables

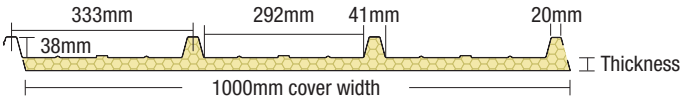
econoclad®

Applications

Econoclad® is a trapezoidal insulated roof panel suitable for warehouses, industrial buildings and agricultural applications where economy is paramount. It combines a single steel skin to the outside with a bonded PIR core retained by a multi-layered foil / polymer facing to the underside. EconoClad® is regularly substituted for conventional built up single skin / bulk insulation options providing excellent thermal and fire resisting qualities. (Manufactured in Qld and Vic).

EconoClad® requires a roof slope of 2 degrees or greater and is capable of very long roof runs made possible by two effective end lapping options. Wide trays and high rib design allow excellent water carrying capacity dependent on location (refer tables).

Dimensions



Specification

Econoclad® external skin is manufactured from 0.42mm G550 high tensile AZ150 coated steel to AS 1397. Colour to be nominated from Bluscope Steels COLORBOND® chart.

The insulated core is available in a choice of 25, 40, 60, 80 or 100mm thick polyisocyanurate (PIR) with zero ODP. The PIR core bonds on the inside to the foil / polymer facing and to the outside steel skin during manufacturing.

The internal cladding finish is “Albar 1224” which is a multi-layered polymer coated paper and foil composite. Standard colour is white or silver.

End laps may be formed by either the standard expansion step method (also used in single skin applications) or by sheet / panel lapping in one plane and joined over a single purlin. This is achieved utilizing the patented SecureLap® End Lapping System.

Fasteners must be installed through every rib and manufactured from high grade carbon steel with minimum Class 4 anti-corrosion coating. Fasteners are to be fitted with bonded washers from either stainless steel or aluminium (16mm or 25mm diameter).

Flashings should be manufactured from 0.55mm G300, AZ150 BlueScope COLORBOND® steel and installed to Australian Standards. Infill strips manufactured from closed cell polyethylene may also be installed across the sheet profile (under flashing trims) where required.

Core	PIR (Fire-retardant Polyisocyanurate)
Width (cover mm)	1000
Thickness (mm)	25, 40, 60, 80, 100
Length	Up to 16m (check for availability)
External Material	0.42mm COLORBOND® steel
External Finishes	High-Rib Trapezoidal Cladding Profile
Exterior Colour Options	Surfmist®. Other colours available subject to minimum order quantities.
Internal Material	Lightweight Thermal Foil, Fibreglass, PVC[c]
Internal Finishes	Foilback, Embossed PVC
Interior Colour Options	Bright White, Silver, Black
Pitch	2 degree minimum
Paint System	AS/NZS 2728 & AS 1397
Acoustic Properties	Rw 23
Material Group Numbers	Group 2[a]
Bushfire Attack Level	BAL-40 (All exposed core to be covered with flashing)
FM Approval	4880[b]
Environmental	Zero Ozone Depleting Potential (ODP)
Fire Hazard Properties	AS/NZS 1530.3
Ignitability Index	0
Spread of Flame Index	0
Heat Evolved Index	0
Smoke Index	1

a. AS 5637.1 / AS ISO 9705 - BCA Group Number

Refer Fire Considerations section for construction details.

b. When used as internal wall and ceiling, EconoClad® can achieve FM Approval. Refer to your local Metecno® branch for details.

c. For Fire Hazard Properties of EconoClad® with PVC internal facing, contact Metecno®.

The technical information contained in this document cover a breadth of applications where EconoClad® may be used, which may be outside the scope of our Codemark certificate. Data specific to CodeMark certification can be found on EconoClad®'s CoC CM40234.

FM APPROVED

CMI CERTIFICATION CodeMark Australia Certificate CM40234

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Span Tables

With a cover of 1000mm and the ability to order sheets to any given length (max. 16m), the layout and calculation of quantities are greatly simplified. Large spans and sufficient overhangs (cantilevers) are determined by wind pressures and EconoClad® panel thickness. Refer to EconoClad® Span Table for permissible spans in the required region.

Non-cyclonic

NON-CYCLONIC REGION A & B (ROOF APPLICATION ONLY)		
PIR Core / 0.42mm Hi-tensile External Steel Skin.		
Maximum uniformly distributed ultimate wind load (kPa) for the given span:		
Multi-span, wind pressure acting outwards		
Span (mm)	Panel Thickness (mm)	
	25, 40 & 60	80 & 100
600	8.05	8.05
900	5.38	5.38
1200	4.05	4.05
1500	3.25	3.25
1800	-	2.51
2100	-	1.72*
2400	-	1.16*
* For Region B, 1.86kPa and 1.43kPa can be used for 2100mm and 2400mm span respectively.		

SPAN TABLE NOTES:

1. Extended span tables including cyclonic regions C&D and wind pressure acting inwards are also available. Refer Bondor®/Metecno®.
2. Fixing with min. 14g tek screws (or equivalent) at each rib are required. Values only valid for use with steel members of bmt 1.5mm or thicker. For thinner steel substrates, fastener capacities must be checked.
3. Pressures specified are for wind gusts only per AS/NZS 1170.2.
4. Deflection limit of span/120 applies, and in accordance with Serviceability Limit State criteria per AS1562.1 - Cl 5.5.
5. Self weight of the panel has been allowed for, plus an allowance of up to 10kg/m^2 for light duty fittings (lights, etc.). No other dead loads permitted.
6. Non-trafficable maintenance access (concentrated load) of 110kg on any one panel has been allowed for in accordance with min. requirements of AS/NZS 1170.1.
7. Distributed live load of 0.25kPa (as per AS/NZS 1170.1) has been allowed for. Bondor®/Metecno® tests comply with details outlined in AS 4040.0, AS 4040.1, AS 4040.2, AS 4040.3, AS 1562.1 and AS/NZS 1170.1.
8. Min. roof slope of 2 degree applies.

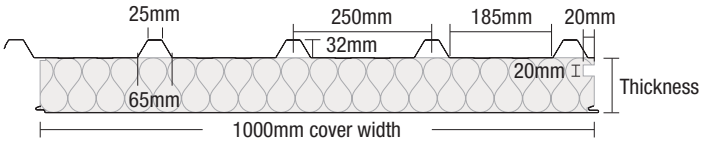
Applications, Specification & Span Tables

Applications

SolarSpan® is a long-spanning trapezoidal insulated roof panel system that combines roofing, EPS-FR insulation and a pre-painted ceiling in one durable, functional and attractive roof panel. It is installed in a variety of applications including educational facilities, multi-residential housing and retail facilities. Available all states.

SolarSpan® requires a roof slope of 2 degrees or greater and is capable of very long roof runs made possible by two effective end lapping options. Wide trays and high rib design allow excellent water carrying capacity dependent on location (refer tables).

Dimensions



Specification

SolarSpan® is a trapezoidal roof panel suitable for supermarkets, warehouses, factory buildings and retail outlets where a finished underside is required. (Manufactured in all states).

SolarSpan® external skin is manufactured from 0.42mm G550 high tensile AZ150 coated steel to AS 1397. Colour to be nominated from Bluscope Steels COLORBOND® chart.

The insulated core is available in a choice of 50, 75, 100, 125, 150, 175 or 200mm thick Expanded Polystyrene with fire retardant. The EPS-FR core is bonded to the inside and outside skin during manufacturing.

The internal cladding skin is 0.6mm G300, Z275 coated steel to AS 1397 COLORBOND® pre-painted steel. Standard colour is Surfmist® (other colours may be available subject to order quantity).

End laps may be formed by either the standard expansion step method (also used in single skin applications) or by sheet / panel lapping in one plane and joined over a single purlin. This is achieved utilizing the patented SolarLap® End Lapping System.

Fasteners must be installed through every rib and manufactured from high grade carbon steel with minimum Class 4 anti-corrosion coating. Fasteners are to be fitted with bonded washers from either stainless steel or aluminium (16mm or 25mm diameter).

Flashings should be manufactured from 0.55mm G300, AZ150 BlueScope COLORBOND® steel and installed to Australian Standards. Infill strips manufactured from closed cell polyethylene may also be installed across the sheet profile (under flashing trims) where required.

Core	EPS-FR (Expanded Polystyrene with fire retardant)
Width (cover mm)	1000
Thickness (mm)	50, 75, 100, 125, 150, 175, 200
Length	Up to 24m (check for availability)
External Material	0.42mm G550 COLORBOND® steel
External Finishes	High-Rib Trapezoidal Profile
Exterior Colour Options	Classic Cream™, Surfmist®, Paperbark®, Shale Grey™, Dune®, Pale Eucalypt®, Manor Red®**, Basalt®^, Woodland Grey®^**
Internal Material	0.6mm G300 COLORBOND® steel
Internal Finishes	Plain, VJ
Interior Colour Options	Classic Cream™, Surfmist®
Pitch	2 degree minimum
Paint System	AS/NZS 2728 & AS 1397
Acoustic Properties	Rw 24 - 25 depending on thickness
Material Group Numbers	Group 1 & 2[a]
Bushfire Attack Level	BAL-40 (All exposed core to be covered with flashing)
Fire Hazard Properties	AS/NZS 1530.3
Ignitability Index	0
Spread of Flame Index	0
Heat Evolved Index	0
Smoke Index	2-3
$SMOGRA_{RC}$	<100
Suitable for Cyclonic Regions	Yes (refer tables)

** Limited availability.
^ Darker colours warranted for use in limited regions. Check with your local SolarSpan® dealer for more information.

a. AS5637.1 / AS ISO 9705 - BCA Group Number

Refer Fire Considerations section for construction details.

The technical information contained in this document cover a breadth of applications where SolarSpan® may be used, which may be outside the scope of our Codemark certificate. Data specific to CodeMark certification can be found on SolarSpan®'s CoC CM40145.

CodeMark Certificate CM40145

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Colorbond

Span Tables

With a cover of 1000mm and the ability to order sheets to any given length (max. 24m), the layout and calculation of quantities are greatly simplified. Large spans and sufficient overhangs (cantilevers) are determined by wind pressures and SolarSpan® panel thickness. Refer to SolarSpan® Span Table for permissible spans in the required region.

NON-CYCLONIC REGION A&B (ROOF APPLICATIONS ONLY)

SL Grade EPS-FR Core / 0.42mm Hi-tensile External / 0.6mm Internal Steel Skins. Maximum uniformly distributed ultimate wind load (kPa) for the given span:

Single Span, wind pressure acting outwards							
Span (mm)	Panel Thickness (mm)						
	50	75	100	125	150	175	200
1500	5.16	7.70	9.41	10.98	13.26	15.51	17.81
2700	2.35	3.74	4.63	5.55	6.78	7.99	9.28
3900	1.28	2.00	2.55	3.11	3.67	4.23	4.79
5100	-	1.21	1.53	1.86	2.19	2.52	2.85
6300	-	-	1.04	1.25	1.47	1.69	1.91
7500	-	-	0.76	0.92	1.07	1.22	1.38
8700	-	-	-	-	0.82	0.94	1.05

Multi-span, wind pressure acting outwards							
Span (mm)	Panel Thickness (mm)						
	50	75	100	125	150	175	200
1500	4.15	5.90	7.61	7.74	7.74	7.74	7.75
2700	2.07	2.91	4.00	4.35	4.35	4.35	4.35
3900	1.17	1.72	2.41	2.95	3.04	3.04	3.05
5100	-	1.11	1.58	1.98	2.35	2.35	2.36
6300	-	-	1.10	1.40	1.77	1.93	1.93
7500	-	-	-	1.03	1.31	1.57	1.64
8700	-	-	-	-	-	1.20	1.43

SPAN TABLE NOTES:

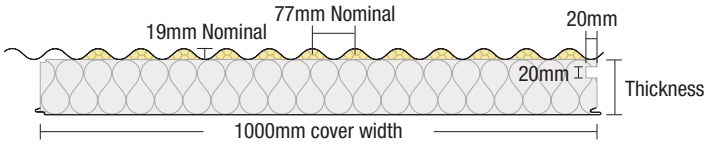
1. Extended span tables including cyclonic regions C&D, multi-span, wind pressure acting inwards and 0.5mm interior skin are also available. Refer Bondor Metecno.
2. Fixing with 14g tek screws (or equivalent) at each rib are required.
3. Pressures specified are for wind gusts only per AS/NZS 1170.2.
4. Deflection limit of span/150 applies, and in accordance with Serviceability Limit State criteria per AS/NZS 1170.0 - Table C1
5. Self weight of the panel has been allowed for, plus an allowance of max 25kg/m^2 for light duty fittings (lights, etc.). No other dead loads permitted.
6. Non-trafficable maintenance access (concentrated load) of 140kg on any span has been allowed for, in roof pans only. Avoid stepping on the ribs.
7. Distributed live load of 0.25kPa (as per AS/NZS 1170.1) has been allowed for. Bondor®/Metecno® tests comply with details outlined in AS 4040.0, AS 4040.1, AS 4040.2, AS 4040.3, AS 1562.1 and AS/NZS 1170.1.

Applications, Specification & Span Tables

Applications

InsulRoof® is a long-spanning insulated roof panel that features a corrugated roof profile and a pre-finished steel ceiling lining encased in Bondor's new proprietary dual layered insulating core technology comprising of EPS-FR and PUR.
This all-in-one roofing solution is manufactured using Australian-made BlueScope® COLORBOND® steel for durability and is ideal for a variety of applications including housing, multi-residential, commercial and industrial roofing applications where a corrugated roof profile is desired. It is also tested for use in cyclonic regions. SupaCore® is a proprietary and world-first insulating core technology developed by Bondor Metecno to deliver dual layers of high performance insulation and bonding strength.

Dimensions



Specification

InsulRoof® is a long spanning insulated roof panel that features a corrugated roof profile and a pre-finished steel ceiling lining encased in Bondor's proprietary dual layered insulating core which incorporates both EPS-FR and PUR technology. It is regularly specified for housing, multi-residential and commercial applications where the corrugated profile is desired and where very low pitches are not necessary. (Manufactured in Qld).

InsulRoof® requires a roof slope of 5 degree or greater and is capable of long roof runs dependent on location and pitch selection (refer tables).

InsulRoof® external skin is manufactured from 0.42mm G550 high tensile AZ150 coated steel to AS 1397. Colour to be nominated from Bluscope Steels COLORBOND® chart.

The insulated core is available in a choice of 50, 75, 100, 125, 150 or 200mm thick Expanded Polystyrene with fire retardant. The EPS-FR core and PUR are bonded to the inside and outside skin during manufacturing.

The internal cladding skin is 0.6mm G300, Z275 coated steel to AS 1397 COLORBOND® pre-painted steel.

Because the corrugated profile provides significantly less water carrying capacity than wide tray style profiles, End Lapping for InsulRoof® is limited to the standard expansion step method (also used in single skin applications).

Fasteners must be installed minimum through every third rib depending on location and manufactured from high grade carbon steel with minimum Class 4 anti-corrosion coating. Fasteners are to be fitted with bonded washers from either stainless steel or aluminium (16mm or 25mm diameter). Side laps should be stitched at approximately 1m centres.

Flashings should be manufactured from 0.55mm G300, AZ150 BlueScope COLORBOND® steel and installed to Australian Standards. Infill strips manufactured from closed cell polyethylene may also be installed across the sheet profile (under flashing trims) where required.

Core	EPS-FR (Expanded Polystyrene with fire retardant) PUR (Polyurethane Foam)
Width (cover mm)	1000
Thickness (mm)	50, 75, 100, 125, 150, 200
Length	Up to 12m (check for availability)
External Material	0.42mm G550 COLORBOND® steel
External Finishes	Corrugated
Exterior Colour Options	Classic Cream™, Surfmist®, Paperbark®, Shale Grey™, Dune®, Pale Eucalypt®, Manor Red®**, Basalt®^, Woodland Grey®^**, Zincalume™
Internal Material	0.6mm G300 COLORBOND® steel
Internal Finishes	Plain, VJ
Interior Colour Options	Classic Cream™, Surfmist®
Pitch	5 degree minimum
Paint System	AS/NZS 2728 & AS 1397
Acoustic Properties	Rw 23 - 24 depending on thickness
Material Group Numbers	Group 1 & 2[a]
Bushfire Attack Level	BAL-40 (All exposed core to be covered with flashing)
Fire Hazard Properties	AS/NZS 1530.3
Ignitability Index	0
Spread of Flame Index	0
Heat Evolved Index	0
Smoke Index	1
$SMOGRA_{RC}$	<100

Under certain light conditions this product may show an undulating surface which can vary depending on exterior profile and steel gauge selection as well as the environments varying light conditions.

** Limited availability.
^ Darker colours warranted for use in limited regions. Check with your local InsulRoof® dealer for more information.

a. Refer Fire Considerations section for construction details.

The technical information contained in this document cover a breadth of applications where InsulRoof® may be used, which may be outside the scope of our Codemark certificate. Data specific to CodeMark certification can be found on InsulRoof®'s CoC CM40235.

Span Tables

With a cover of 1000mm and the ability to order sheets to any given length (max. 12m), the layout and calculation of quantities are greatly simplified. Large spans and sufficient overhangs (cantilevers) are determined by wind pressures and InsulRoof® panel thickness. Refer to InsulRoof® Span Table for permissible spans in the required region.

NON-CYCLONIC REGION A&B (ROOF APPLICATIONS ONLY)

SL Grade EPS-FR Core / 0.42 Hi-tensile External / 0.6mm Internal Steel Skins. Maximum uniformly distributed ultimate wind load (kPa) for the given span:

Single Span, wind pressure acting outwards						
Span (mm)	Panel Thickness (mm)					
	50	75	100	125	150	200
1500	4.76	6.32	8.52	9.28	11.17	15.48
2700	2.69	3.11	4.27	5.46	6.66	9.09
3900	1.42	1.83	2.57	3.14	3.72	4.86
5100	-	-	1.55	1.88	2.22	2.89
6300	-	-	1.05	1.27	1.49	1.93
7500	-	-	-	0.93	1.08	1.40
8700	-	-	-	-	0.83	1.07

Multi-span, wind pressure acting outwards						
Span (mm)	Panel Thickness (mm)					
	50	75	100	125	150	200
1500	3.83	5.70	7.57	9.43	10.09	10.10
2700	2.17	3.21	4.25	5.28	5.65	5.66
3900	1.53	2.25	2.97	3.69	3.94	3.95
5100	-	-	2.01	2.45	2.89	3.05
6300	-	-	1.35	1.64	1.93	2.49
7500	-	-	-	1.19	1.39	1.80
8700	-	-	-	-	-	1.37

SPAN TABLE NOTES:

1. Extended span tables including Region B, single span and multi-span wind pressure acting inwards are also available. Refer Bondor Metecno.
2. Fixing with 4x 14g tek screws (or equivalent) per panel at minimum every 3rd corrugation are required.
3. Boxes shaded grey indicate fixings to be 7x 14g tek screws (or equivalent) per panel at minimum every second corrugation.
4. Pressures specified are for wind gusts only per AS/NZS 1170.2.
5. Deflection limit of span/150 applies, and in accordance with Serviceability Limit State criteria per AS/NZS 1170.0 - TABLE C1.
6. Self weight of the panel has been allowed for, plus an allowance of up to 25kg/m^2 for light duty fittings (lights, etc.). No other dead loads permitted.
7. Non-trafficable maintenance access (concentrated load) of 140kg on any span has been allowed for.
8. Distributed live load of 0.25kPa (as per AS/NZS 1170.1) has been allowed for. Bondor®/Metecno® tests comply with details outlined in AS 4040.0, AS 4040.1, AS 4040.2, AS 4040.3, AS 1562.1 and AS/NZS 1170.1.

Applications, Specification & Span Tables

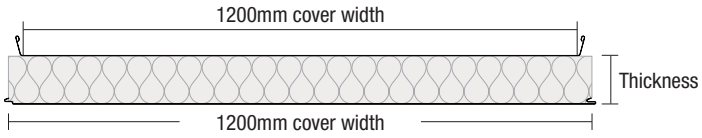
Applications

Equideck® insulated panel roofing is a flat pan, concealed fixed hybrid panel which provides the appearance of traditional single skin standing seam profiles. It provides clean visual lines, good thermal performance and a flat, rib-free surface potentially suitable for photovoltaic cells. Tt is regularly used on smaller feature or decorative applications such as walkways or commercial canopies but has also been used in data storage buildings where temperature control performance is paramount.

Equideck® roofing panels do not overlap with adjacent panels like our other roofing products. Panels are aligned, locking into the underside finger joint, then fastened via a bolt / washer assembly. This connection is concealed with a cover plate providing water-proofing and a clean aesthetic appearance.

Equideck® requires a roof slope of 3 degrees or greater and is suited to shorter roof run lengths. However, it can be end-lapped via the roof set down technique requiring the lower level purlins to be installed approximately 50mm lower than the upper level panel thickness to facilitate a non-contact overlap.

Dimensions



Specification

Equideck® is a flat tray roof panel suitable for roof canopies, walkways and some temperature controlled applications where a finished underside is desireble. (Manufactured in all states).

Equideck® requires a roof slope of 3 degrees or greater and is capable of roof runs lengths of up to 10m. Wide trays made possible by two effective end lapping options. Wide trays and high rib design allow excellent water carrying capacity dependent on location (refer tables).

Equideck® external skin is manufactured from 0.60mm G300 COLORBOND® coated steel to AS 1397. Colour to be nominated from BlueScope Steels COLORBOND® chart.

The insulated core is available in a choice of 50, 75, 100, 125, 150, 200 or 250mm thick Expanded Polystyrene with fire retardant. The EPS-FR core is bonded to the inside and outside skin during manufacturing.

The internal cladding skin is 0.6mm G300, Z275 coated steel to AS 1397 COLORBOND® pre-painted steel. Standard colour is Surfmist® (other colours may be available subject to order quantity).

Fasteners must be installed at every purlin and manufactured from high grade carbon steel with minimum Class 4 anti-corrosion coating.

Flashings should be manufactured from 0.55mm G300, AZ150 BlueScope COLORBOND® steel and installed to Australian Standards. Infill strips manufactured from closed cell polyethylene may also be installed across the sheet profile (under flashing trims) where required.

Core	EPS-FR (Expanded Polystyrene with fire retardant)
Width (cover mm)	1200
Thickness (mm)	50, 75, 100, 125, 150, 200, 250 (non-std options available)
Length	Up to 16m (check for availability)
External Material	BlueScope® Colorbond® Steel 0.6mm G300
External Finishes	Plain, Ribbed, Satinline
Exterior Colour Options	Surfmist®
Internal Material	BlueScope® Colorbond® Steel 0.6mm G300
Internal Finishes	Plain
Interior Colour Options	Surfmist®
Pitch	3 degrees minimum
Paint System	AS/NZS 2728 & AS 1397
Acoustic Properties	Rw 24 - 25 depending on thickness
Material Group Numbers	Group 1 & 2[a]
Bushfire Attack Level	BAL-40 (All exposed core to be covered with flashing)
Fire hazard properties	AS/NZS 1530.3
Ignitability Index	0
Spread of Flame Index	0
Heat Evolved Index	0
Smoke Index	2-3
$SMOGRA_{RC}$	<100

a. AS 5637.1 / AS ISO 9705 - BCA Group Number

Refer Fire Considerations section for construction details.

The technical information contained in this document cover a breadth of applications where Equideck® may be used, which may be outside the scope of our Codemark certificate. Data specific to CodeMark certification can be found on Equideck®'s CoC CM40195.

Span Tables

With a cover of 1200mm and the ability to order sheets to any given length (max. 16m), the layout and calculation of quantities are greatly simplified. Large spans and sufficient overhangs (cantilevers) are determined by wind pressures and Equideck® panel thickness. Refer to Equideck® Span Table for permissible spans in the required region.

NON-CYCLONIC REGION A&B (ROOF APPLICATIONS ONLY)

SL Grade EPS-FR Core / 0.6mm Steel Skins. Maximum uniformly distributed ultimate wind load (kPa) for the given span:

Single Span, wind pressure acting outwards							
Span (mm)	Panel Thickness (mm)						
	50	75	100	125	150	200	250
1500	3.49	5.19	6.89	8.59	10.29	12.12	12.12
2700	1.97	2.93	3.88	4.82	5.77	6.78	6.79
3900	1.06	1.67	2.20	2.73	3.25	4.31	4.74
5100	-	1.02	1.33	1.64	1.95	2.57	3.18
6300	-	-	0.91	1.11	1.32	1.72	2.13
7500	-	-	-	-	0.96	1.25	1.54
8700	-	-	-	-	-	0.96	1.18

Multi-span, wind pressure acting outwards							
Span (mm)	Panel Thickness (mm)						
	50	75	100	125	150	200	250
1500	2.82	4.18	4.91	4.91	4.91	4.92	4.92
2700	1.61	2.37	2.77	2.78	2.78	2.78	2.79
3900	1.14	1.67	1.95	1.96	1.96	1.96	1.97
5100	-	1.02	1.33	1.52	1.53	1.53	1.54
6300	-	-	0.91	1.11	1.26	1.26	1.27
7500	-	-	-	-	0.96	1.08	1.08
8700	-	-	-	-	-	0.95	0.95

SPAN TABLE NOTES:

1. Extended span tables including wind pressure acting inwards are also available. Refer Bondor Metecno.
2. Fixing details refer Fixing Recommendations section.
3. Pressures specified are for wind gusts only per AS/NZS 1170.2.
4. Deflection limit of span/150 applies, and in accordance with Serviceability Limit State criteria per AS/NZS 1170.0 - TABLE C1.
5. Self weight of the panel has been allowed for, plus an allowance of up to 10kg/m^2 for light duty fittings (lights, etc.). No other dead loads permitted.
6. Non-trafficable maintenance access (concentrated load) of 140kg on any span has been allowed for.
7. Distributed live load of 0.25kPa (as per AS/NZS 1170.1) has been allowed for. Bondor®/Metecno® tests comply with details outlined in AS 4040.0, AS 4040.1, AS 4040.2, AS 4040.3, AS 1562.1 and AS/NZS 1170.1.
8. Min. roof slope of 3 degree applies.

Fixing Recommendations

Bondor®/Metecno® Insulated Roof Panels only require fixing at both ends for single span, and intermediate fixing for multi-span; no fixing required at the sides.

For single span MetecnoSpan®/EconoClad®/SolarSpan®, screw-fixed (at every rib for non-cyclonic application, and every rib and pan for cyclonic application) to the structures at both ends only.

For single span InsulRoof®, screw-fixed (at every 3rd/2nd crest for non-cyclonic application and every crest for cyclonic application) to the structures at both ends only.

For multi-span, intermediate fixings are required.

For 50mm-100mm thick SolarSpan® in cyclonic application, fixing with 14g-14 Buildex screws into minimum 1.5mm BMT G450 steel are required. Fixings to be every rib and pan using Multiseal washers. For 125-200mm thick SolarSpan® in cyclonic application, fixing with 14g-14 Ideal Fastener screws into minimum 1.9mm BMT G450 steel are required. Fixings to be every rib and pan using Squarelok (BX) washers on ribs and Multiseal washers in pans.

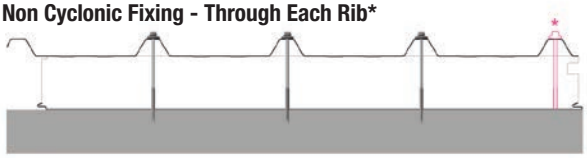
For Equideck®, fix the batten with M10 threaded rod to the supporting structures.

For InsulRoof®, side laps should be stitched at approximately 1m centres.

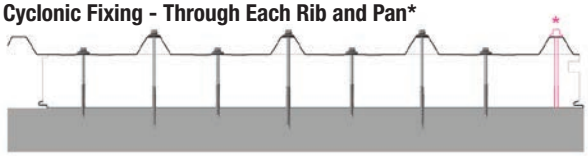
Side laps should be laid away from the prevailing wind and sit neatly on the preceding roof sheet. Use Bondor®/Metecno® recommended insulated roofing fasteners along with cyclone Assembly. Fascia gutter flashings should be fixed using sealed rivets in the valley.

Trapezoidal Roofing - MetecnoSpan®/ EconoClad®/SolarSpan®

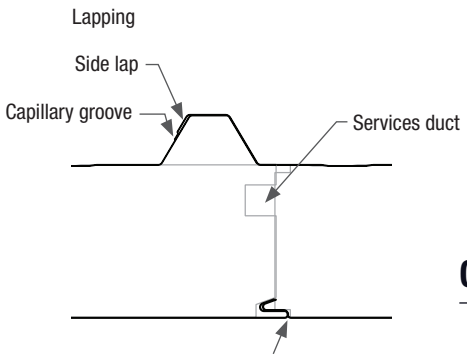
Non Cyclonic Fixing - Through Each Rib*



Cyclonic Fixing - Through Each Rib and Pan*



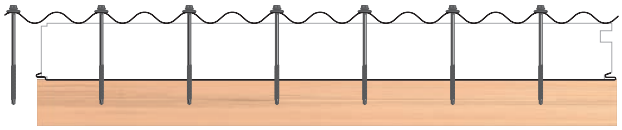
Screw with Multiseal



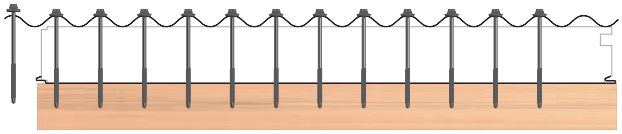
Screw with Square-Lok

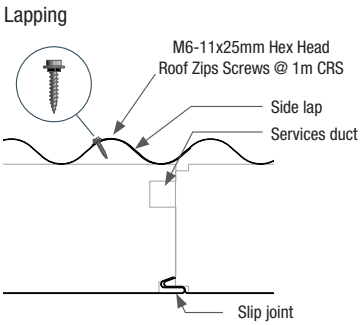
Corrugated Roofing - InsulRoof®

Non-cyclonic Fixing - Minimum Through Every 2nd Crest (7 Fixings)

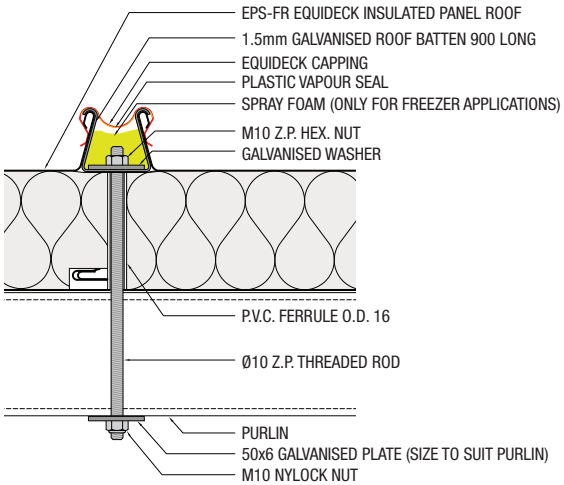


Cyclonic Fixing - Through Every Crest (13 Fixings)





Concealed Fix Roofing - Equideck®



Recommended Minimum Screw Length

metecnospan

Crest Fixing into Steel

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
1.5mm - 5.0mm Steel 	40	125
	60	150
	80	150
	100	205
4.8mm - 12mm Steel 	40	150
	60	150
	80	150
	100	200

Crest Fixing into Timber

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
Timber 	40	125
	60	150
	80	150
	100	175

Pan Fixing into Steel

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
1.5mm - 5.0mm Steel 	40	78
	60	95
	80	125
	100	150
4.8mm - 12mm Steel 	40	150
	60	150
	80	150
	100	150

Pan Fixing into Timber

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
Timber 	40	90
	60	100
	80	125
	100	150
Stitching Screws 	Metal thickness 0.42mm-1.5mm	25

econoclad

Crest Fixing into Steel

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
1.5mm - 5.0mm Steel 	25	95
	40	125
	60	150
	80	150
	100	205
4.8mm - 12mm Steel 	25	150
	40	150
	60	150
	80	150
	100	200

Crest Fixing into Timber

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
Timber 	25	100
	40	125
	60	150
	80	150
	100	175

Pan Fixing into Steel

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
1.5mm - 5.0mm Steel 	25	68
	40	78
	60	95
	80	125
	100	150
4.8mm - 12mm Steel 	25	150
	40	150
	60	150
	80	150
	100	150

Pan Fixing into Timber

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
Timber 	25	65
	40	90
	60	100
	80	125
	100	150
Stitching Screws 	Metal thickness 0.42mm-1.5mm	25

solarspan

Crest Fixing into Steel

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
1.5mm - 4.8mm Steel	50	125
	75	150
	100	175
	125	205
	150	230
	175	250
	200	300
3.0mm - 12mm Steel	50	150
	75	150
	100	200
	125	200
	150	230
	175	300
	200	300
Stitching Screws	Metal thickness 0.42mm-1.5mm	25

Pan Fixing into Steel

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
1.5mm - 4.8mm Steel	50	95
	75	125
	100	150
	125	175
	150	205
	175	205
	200	230
3.0mm - 12mm Steel	50	150
	75	150
	100	150
	125	200
	150	200
	175	230
	200	230

Crest Fixing into Timber

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
Timber	50	125
	75	150
	100	175
	125	200
	150	240
	175	300
	200	300

Pan Fixing into Timber

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
Timber	50	90
	75	125
	100	150
	125	175
	150	200
	175	300
	200	300

insulroof

Crest Fixing into Steel

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
1.5mm - 4.8mm Steel	50	125
	75	125
	100	150
	125	175
	150	205
	200	300
4.8mm - 12mm Steel	50	150
	75	150
	100	150
	125	200
	150	200
	200	300
Stitching Screws	Metal thickness 0.42mm-1.5mm	25

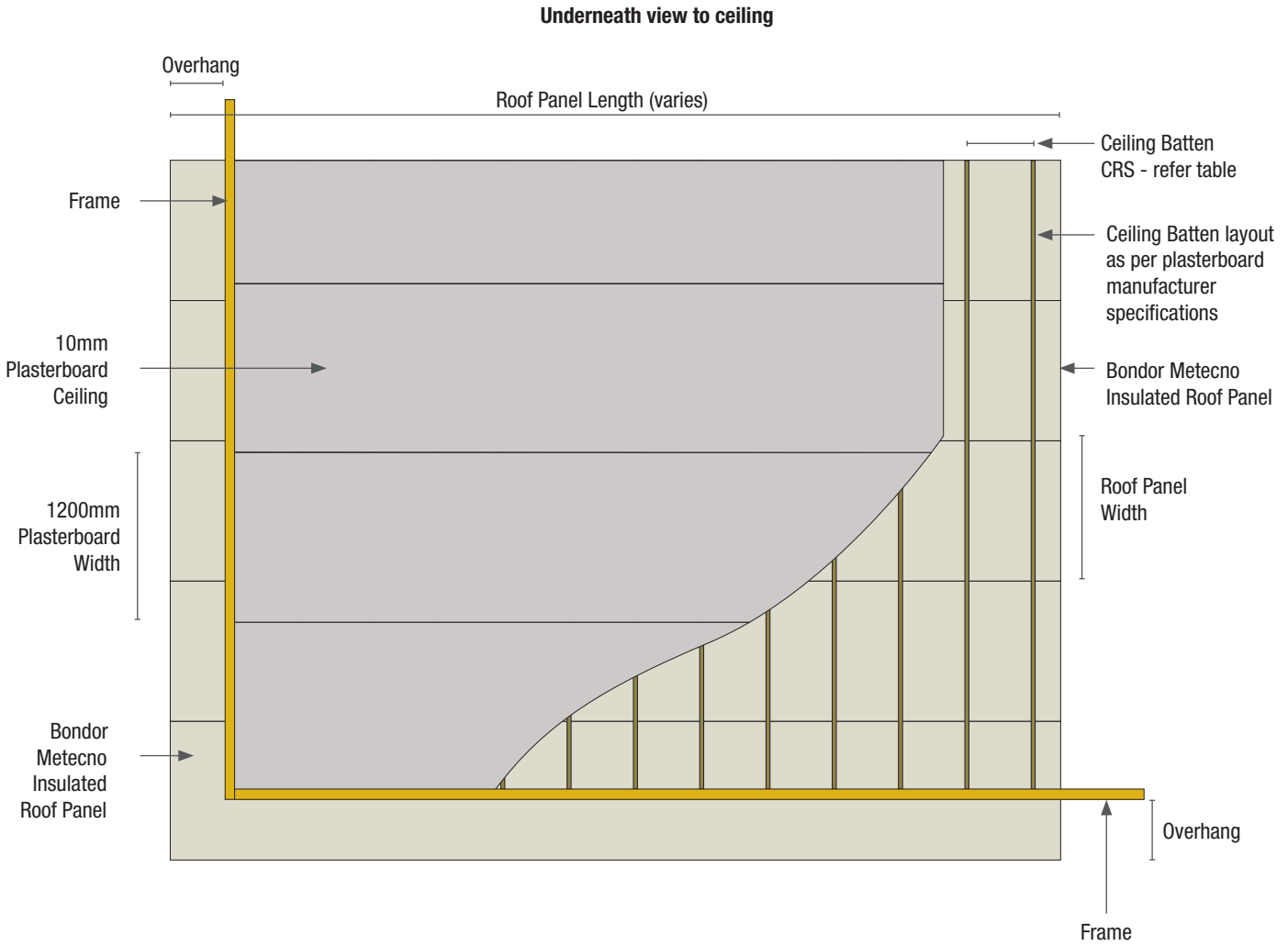
Crest Fixing into Timber

Fixing Into	Panel Thickness (mm)	Recommended Minimum Screw Length (mm)
Timber	50	100
	75	125
	100	175
	125	200
	150	240
	200	300

Ceiling with Plasterboard

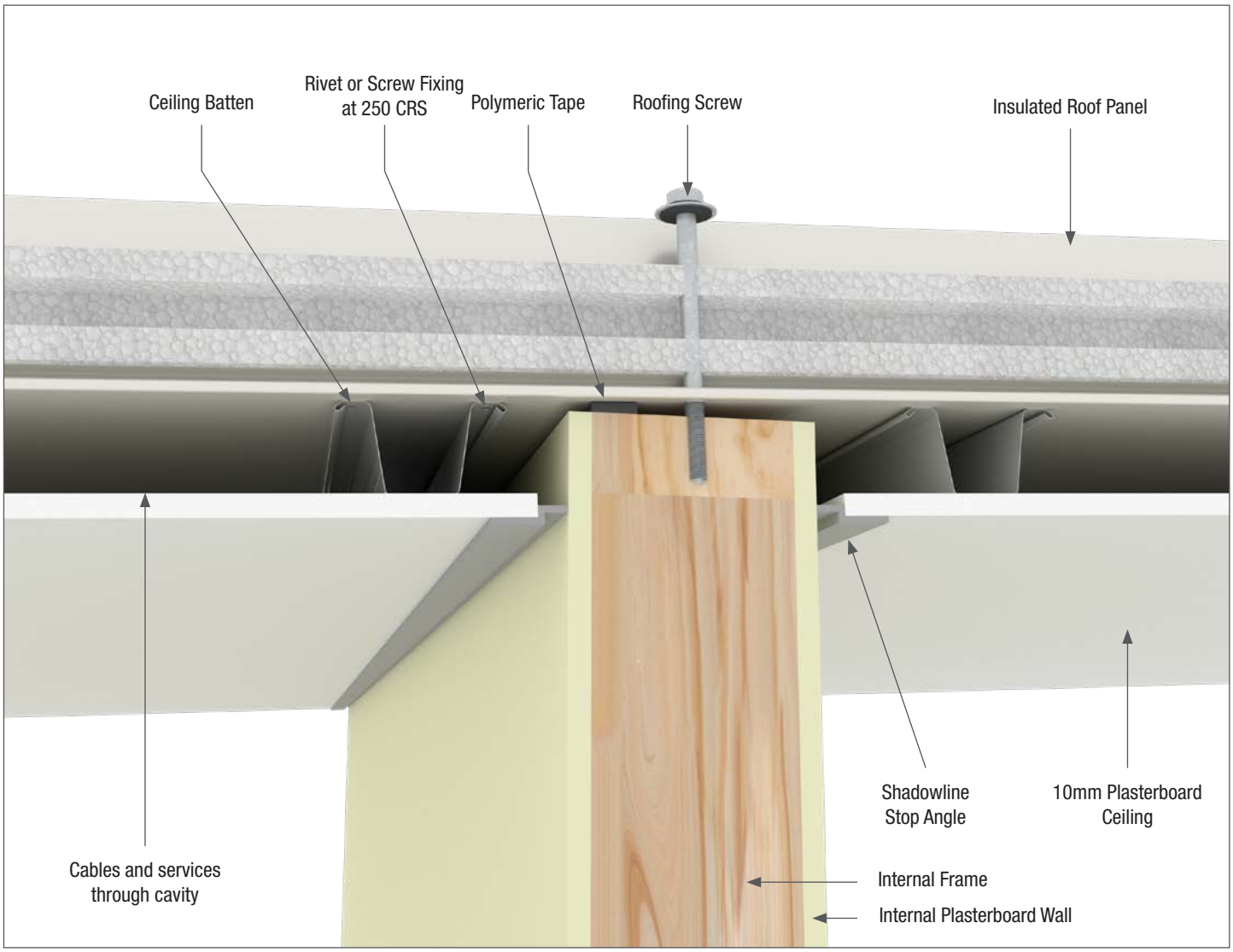
Although Bondor Metecno Insulated Roof Panels provide a flat or lightly profiled ceiling with a pre-painted COLORBOND® Surfmist® finish, plasterboard can also be installed to the underside (except EconoClad®) if preferred, via ceiling battens. This type of additional lining is more likely in residential applications but should be noted here as well. Ceiling battens should be laid perpendicular to the Insulated Roof Panel length. Plasterboard can then be attached to the ceiling battens perpendicular to ceiling battens (or parallel to the Insulated Roof Panels length).

Plasterboard Ceiling Fixing Detail - SSE-EP-RF057



Typical Weight of Ancillary Components (kg/m²)	Ceiling Batten Spacing (mm)	
	450 CRS	600 CRS
Ceiling Batten (0.354kg/m)	0.8	0.6
10mm Plasterboard	6.8	6.8
Total	7.6	7.4

Note:
The total dead loads on roof panels should not exceed 25kg/m² for MetecnoSpan®, SolarSpan® & InsulRoof®; and 10kg/m² for Equideck® and EconoClad®.
25kg/m² allowance consists of 15kg/m² loads on the top of the panel and 10kg/m² for loads hanging from the bottom skin.
As noted above, combined loads of 10mm plasterboard + ceiling battens almost reach the maximum allowance for Equideck®. Refer Metecno® for further information.



Refer to Plasterboard supplier for recommendations and installation.

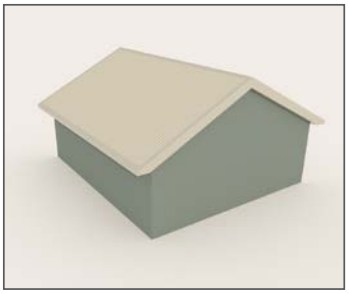
Flashings and Gutters

Commercial Roofing Design & Install Guide

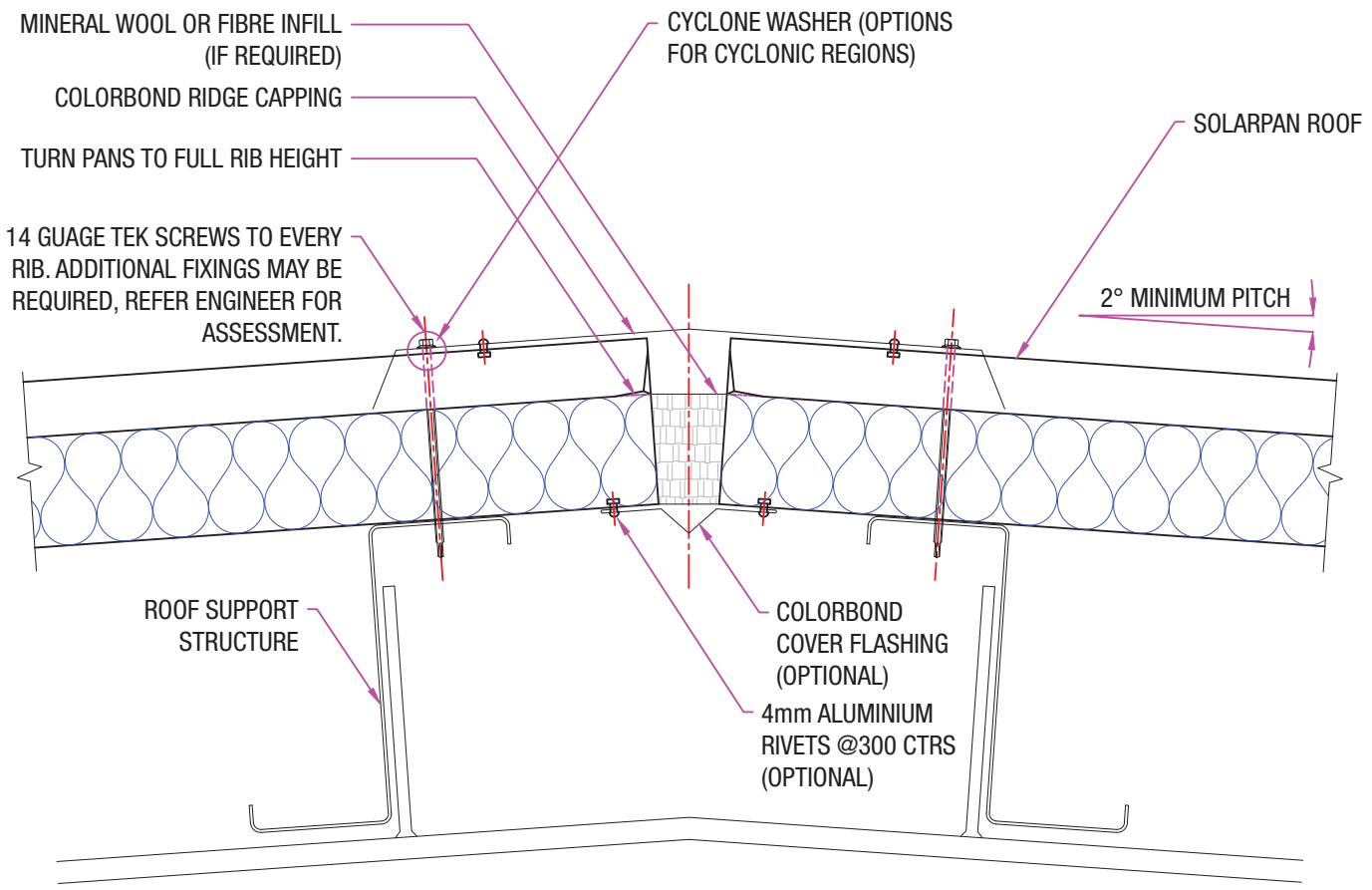
Flashing Design

Most of the additional costs associated with installing complicated roof designs are due to flashings. Simple skillion or gable roofs require the cheapest flashings and are easier for the roof plumber to make watertight. Refer to HB 39 for more information about roof flashing, drainage, material incompatibility, etc.

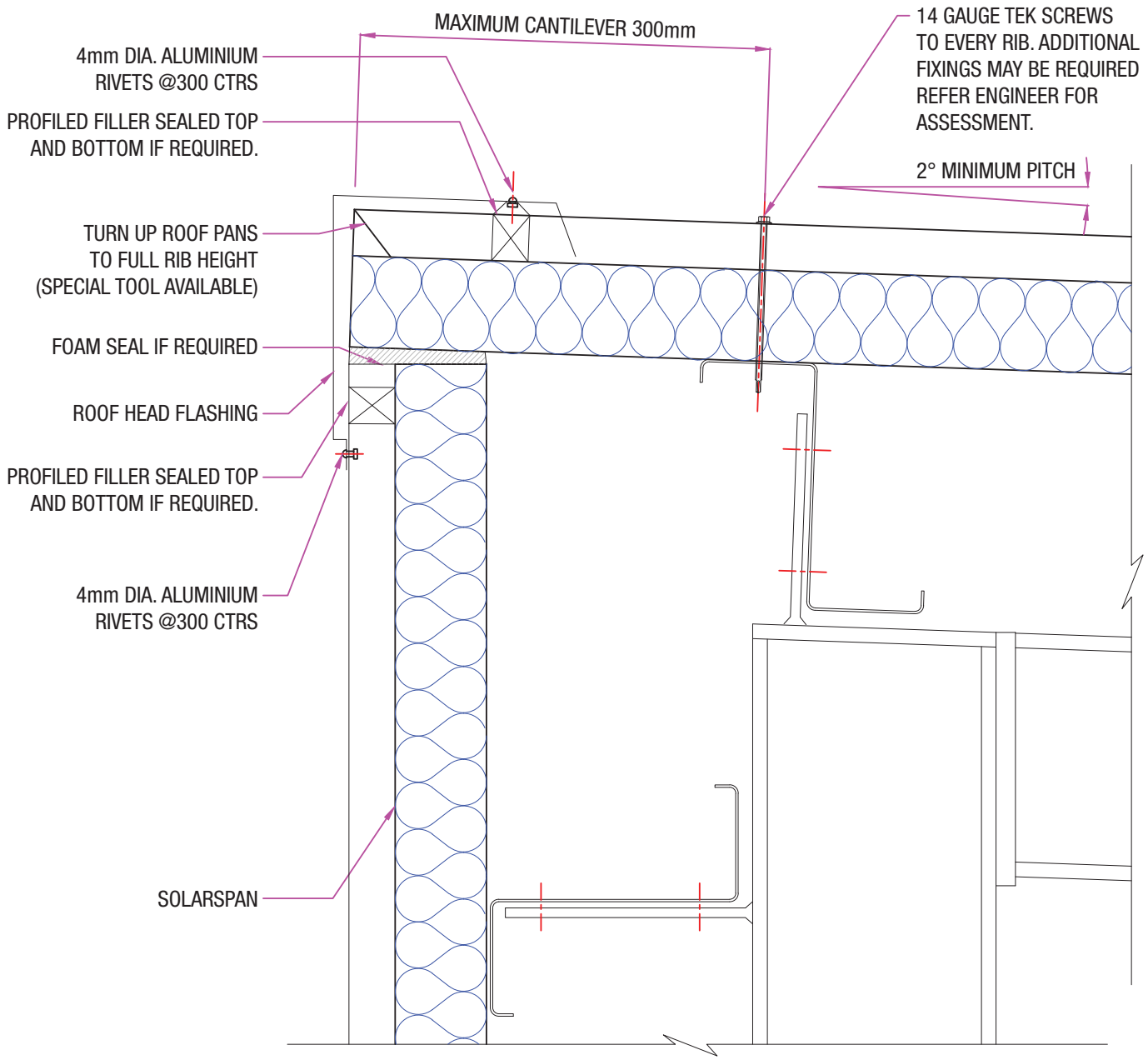
Note: The following illustrations depict SolarSpan®, however the same details are generally applicable to other roofing products.



Ridge Detail - SSE-EP-RF020

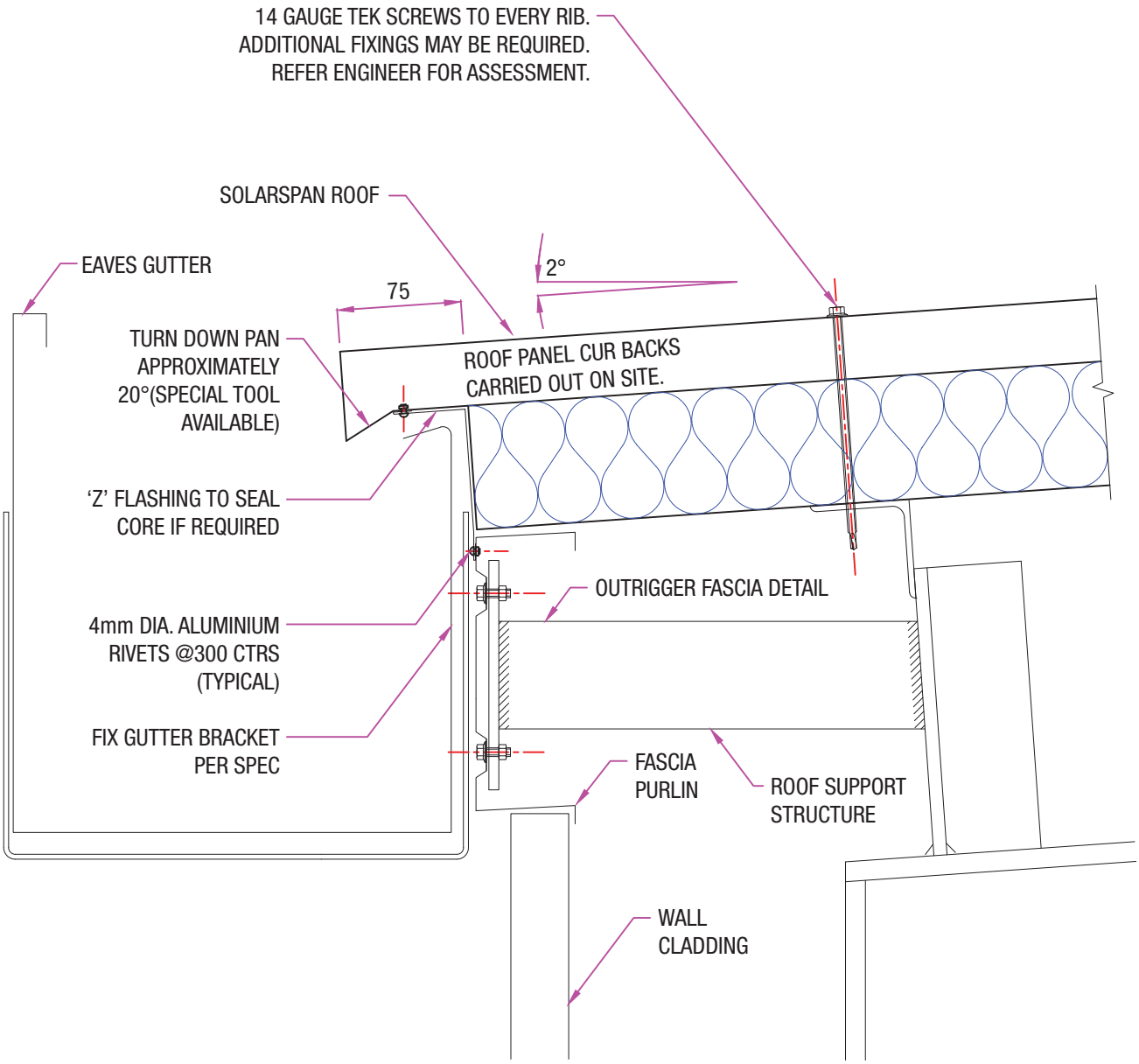


Head Flashing Detail - SSE-EP-RF010



Eaves Gutter Detail 2 - SSE-EP-RF006

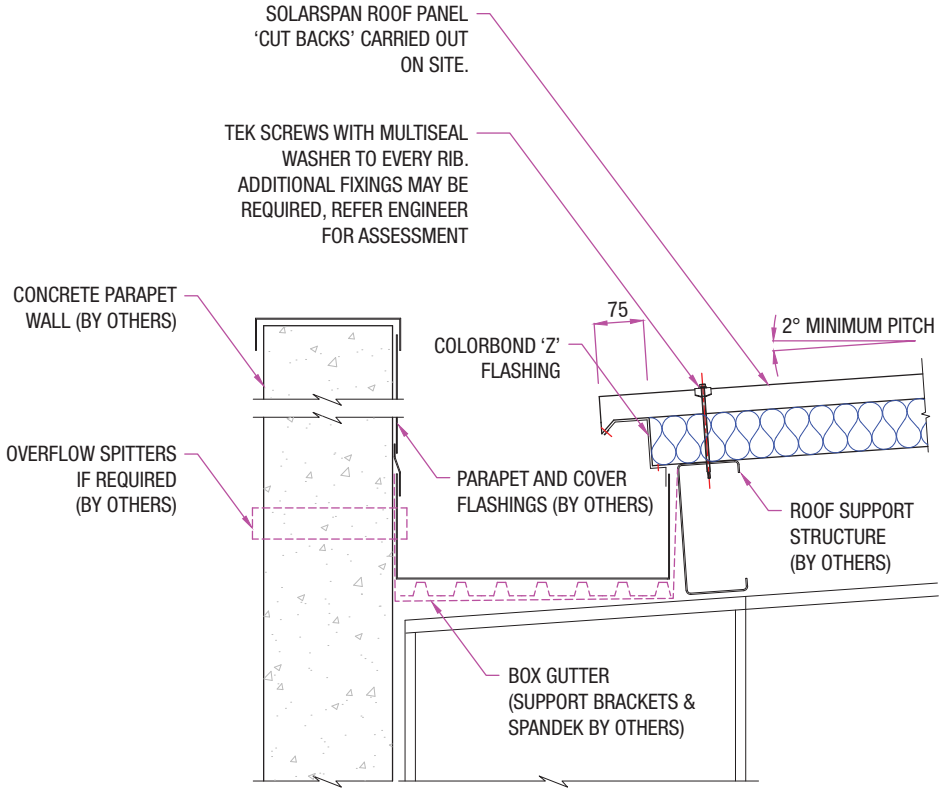
Eaves gutters should be installed with a minimum uniform fall of 1 in 500 towards the outlet to ensure complete drainage.



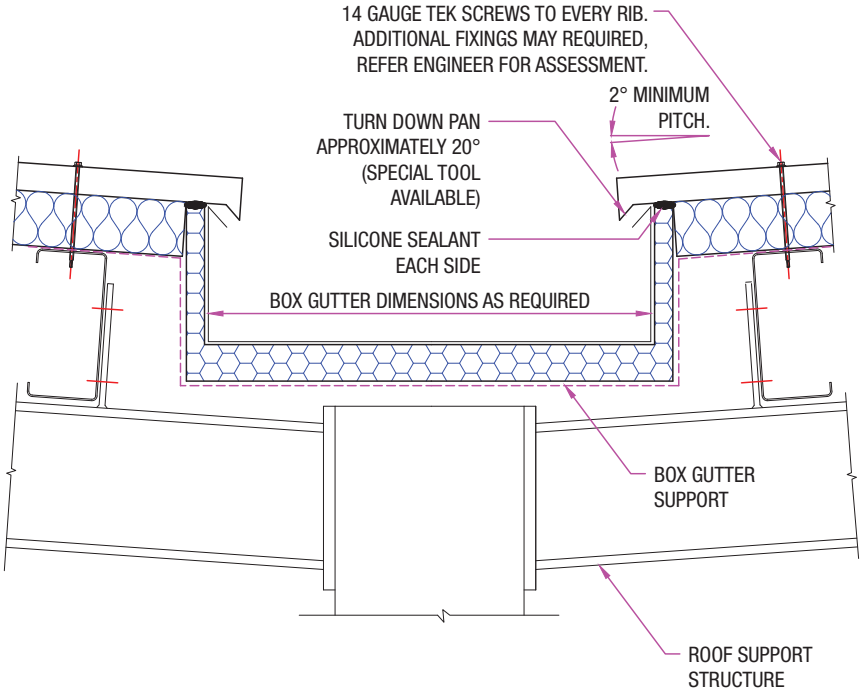
Note: Refer Metecno® for alternative arrangements.

Box Gutter Detail - SSE-EP-RF016

Wherever possible, design parapets and box gutters close enough to allow for a single flashing to seal the entire area. Using silicone breaks should be avoided if possible to minimise the chance of leaks developing over time. Box gutters should be installed with a minimum uniform fall of 1 in 200 towards the outlet.



Valley Box Gutter Detail - SSE-EP-RF015



Fixtures and Penetrations

Commercial Roofing Design & Install Guide

Fixtures to Bondor Metecno Roof Panels

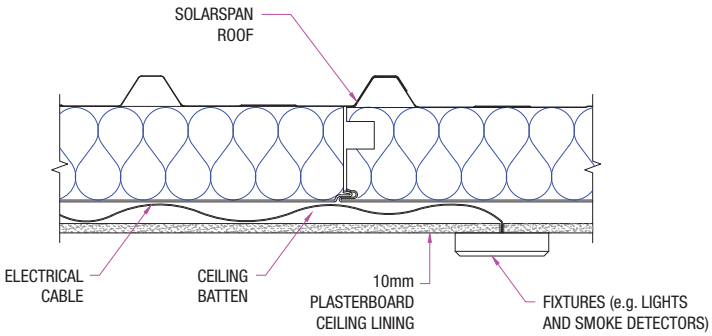
Total dead loads (e.g. solar panels, lights, ceiling fans etc.) on Bondor Metecno Roof Panels should not exceed 25kg/m^2 for MetecnoSpan®, SolarSpan® & InsulRoof®; 10kg/m^2 for EconoClad® & Equideck®.

Light fixtures such as lights and smoke detectors etc. up to 10kg/m^2 in total weight can be direct-fixed to the underside (ceiling face) of the Insulated Roof Panels (except EconoClad®) with 10g 16 TPI screws. Electrical cabling and conduits should be pre-routed to the desired location through the service duct at the panel slip joint during panel installation. Fixtures should be located away from the slip joint by drilling horizontally through the foam and then using the appropriate diameter metal-hole saw, cut through the underside of the steel sheet to required depth.

With plasterboard ceiling, typically, the total weight of 10mm plasterboard and ceiling battens are less than 10kg/m^2. Hence, there are 15kg/m^2 remaining weight for light fixtures (for MetecnoSpan®, SolarSpan® & InsulRoof®). Light fixtures up to 2kg/m^2 in total weight can be direct fixed to the plasterboard (min. 10mm thick). Electrical cabling should be pre-wired before plasterboard installation and run in between the plasterboard and ceiling battens.

Note: The following illustrations depict SolarSpan®, however the same details are generally applicable to other roofing products.

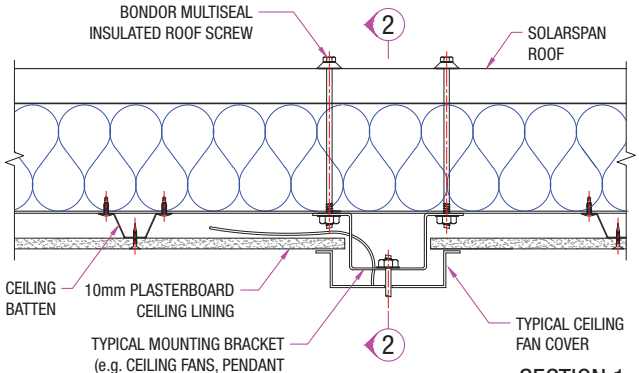
Light Fixtures Direct Fixing Detail - SSE-EP-RF051



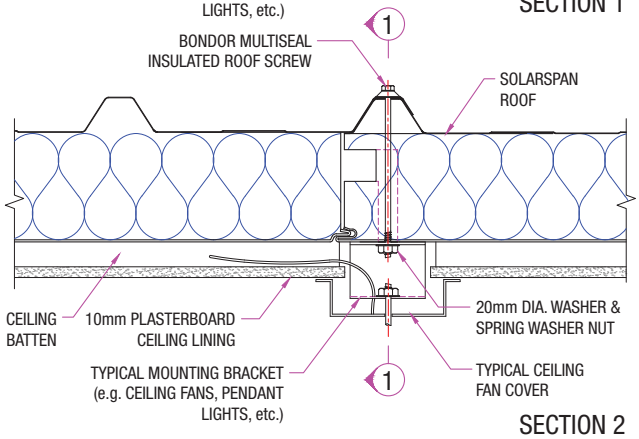
- Direct Plasterboard fixing for light fixtures less than 2kg/m^2
- Total Dead Load on roof panel should not exceed 25kg/m^2 for MetecnoSpan®, SolarSpan® & InsulRoof®; 10kg/m^2 for Equideck®.
- All electrical work to be carried out by Licensed Electrician as per AS 3018

Heavy Fixtures Through Fixing Detail - SSE-EP-RF048

Heavier fixtures (10 – 15 kg/m^2) such as ceiling fans require through-fixing at the ribs/crests. Pan fixing is not recommended as it may compromise roof integrity.



SECTION 1



SECTION 2

- Pan fixing is not recommended as it may compromise roof integrity
- Total dead load on roof panel should not exceed 25kg/m^2 for MetecnoSpan®, SolarSpan® & InsulRoof®; 10kg/m^2 for Equideck®.
- Through fixing for assembly weight 10-15kg/m^2
- All electrical work to be carried out by licensed Electrician as per AS 3018

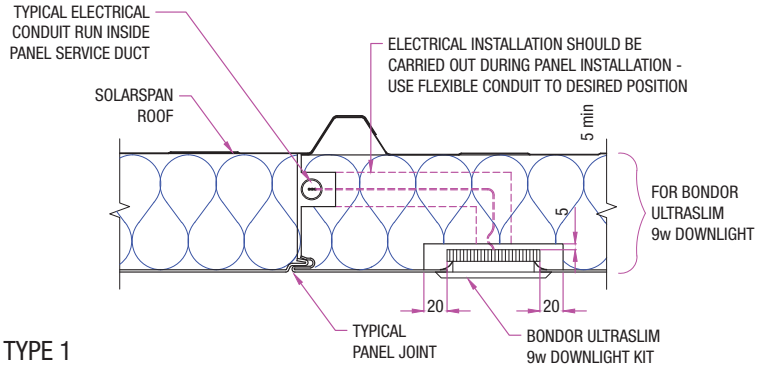
Lighting Options and Services

Standard light fittings (fluorescent lights, light rails) can be attached directly to the underside of Bondor Metecno Insulated Roof Panel, except EconoClad®. Electrical conduits can be attached directly to the underside of the panel or run inside the panel (for EPS core panel only). For LED downlights, underside may need to be cut and sufficient core removed to minimum clearance.

For ceiling with plasterboard, the panel underside may not need to be cut as electrical cable can be run within the space between the Insulated Roof Panels and plasterboard.

Total dead loads on Bondor®/Metecno® Roof Panels should not exceed 25 kg/m² for MetecnoSpan®, SolarSpan® & InsulRoof®; 10kg/m² for Equideck®.

LED Downlight Detail - SSE-EP-RF049



TYPE 1

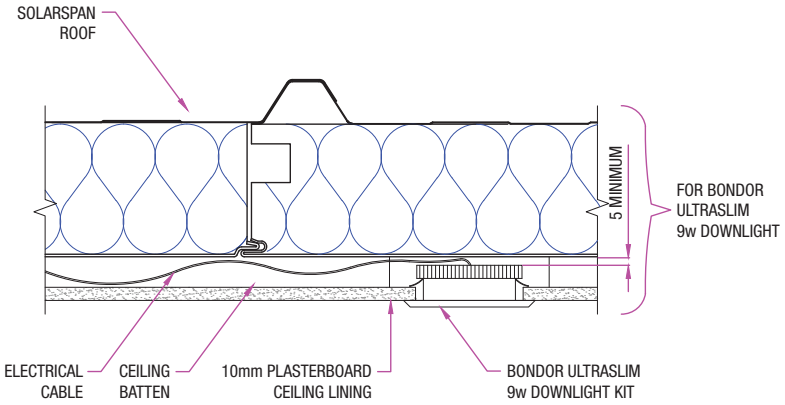
- Insulation material must not be in contact with Downlight fitting as per Australian Standards & Manufacturers Specifications
- Total Dead Load on roof panel should not exceed 25kg/m² for MetecnoSpan®, SolarSpan® & InsulRoof®; 10kg/m² for Equideck®.
- All electrical work to be carried out by Licensed Electrician as per AS 3018

Electrical installation can be carried out at any stage, although it is easier to do this as the roof panels are being installed if possible. As a minimum, feed wires will need to be in place prior to roof installation.

The work of the electrician can be greatly simplified by grouping the location of services to simplify the routing of wires and pipes.

If possible, provide a pre-wired access point for services that may be installed after build completion.

LED Downlight Detail with Plasterboard Ceiling - SSE-EP-RF050



- Insulation material must not be in contact with Downlight fitting as per Australian Standards & Manufacturers Specifications
- Direct Plasterboard fixing for light fixtures less than 2kg/m²
- Total Dead Load on roof panel should not exceed 25kg/m² for MetecnoSpan®, SolarSpan® & InsulRoof®; 10kg/m² for Equideck®.
- All electrical work to be carried out by Licensed Electrician as per AS 3018

Roof Penetrations

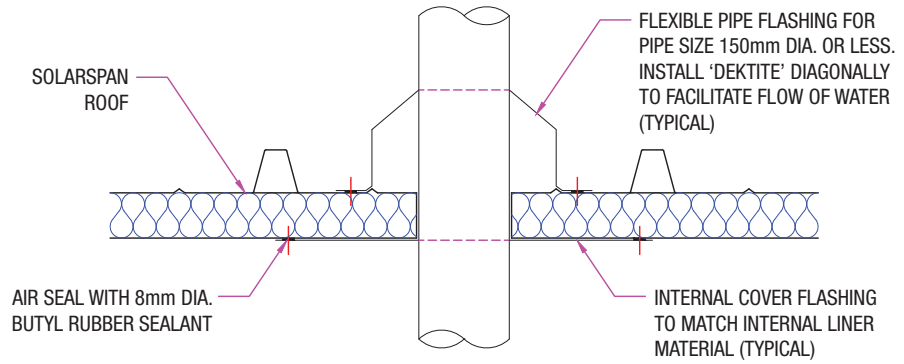
Penetrations on Bondor Metecno Insulated Roof Panels are common for skylights, plumbing vents, air conditioning units, service platforms, TV Antenna cabling and services for external lights. Penetration size up to 450x450mm (300x300mm for EconoClad®) is allowed. Refer to Bondor Metecno for certified penetration tables. The penetration edge distance and allowable spans should be checked from the certified tables to see if extra support is required. If there are more than one penetrations, at least one full panel adjacent to the penetration should be allowed. All penetrations should be flashed-off or encapsulated with channel.

Maintenance access of 140kg (110kg for EconoClad®) on any one panel is allowed per our span table notes.

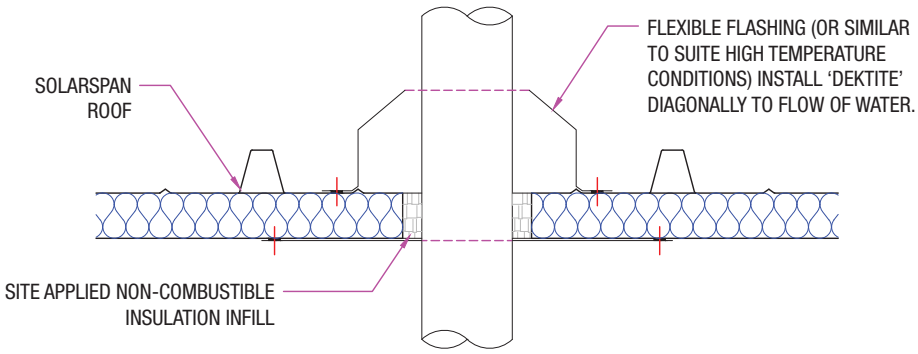
Although penetrations are common on the Insulated Roof Panels, it should be kept to minimum to reduce the impact on the panel integrity. If a roof tray is completely blocked by a penetration, a soaker tray should be considered.

Handy Tips: Shaftless skylight is an ideal alternative to traditional skylight as minimal or no penetration is required. Contact Bondor®/Metecno® for more information.

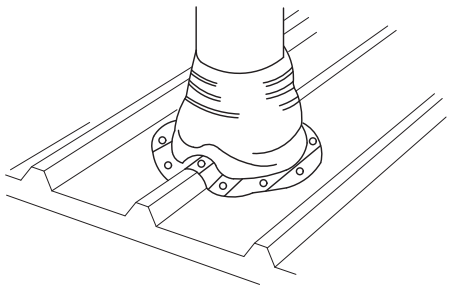
Small Penetration Detail - SSE-EP-RF019



STANDARD TEMPERATURE OPTION

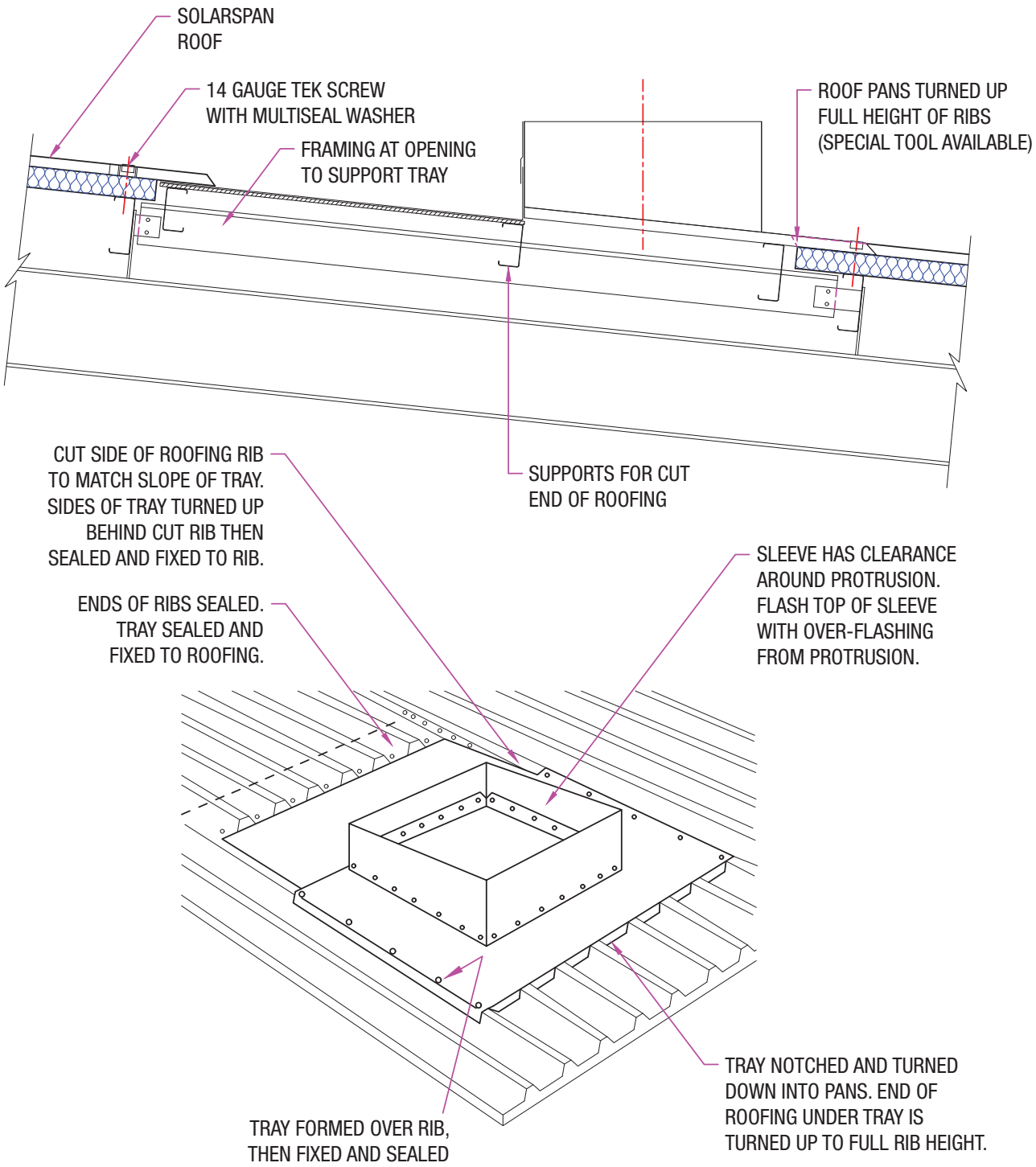


HIGH TEMPERATURE OPTION



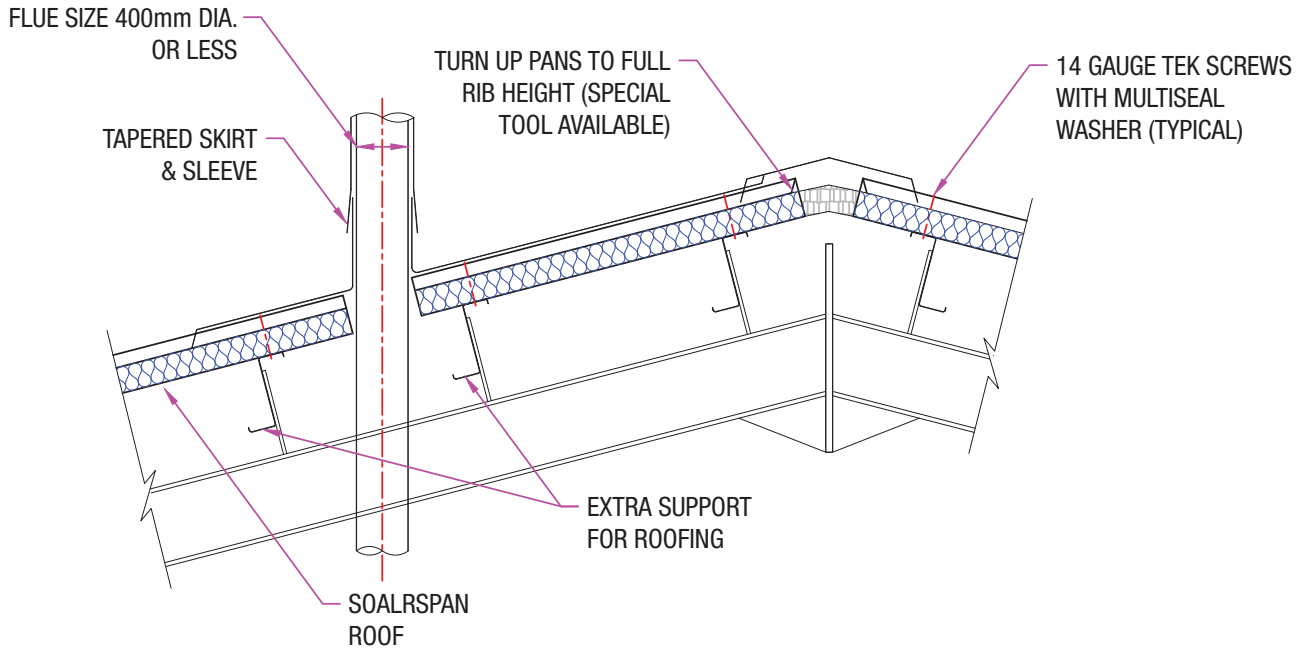
ALTERNATE OPTION FOR RIB PENETRATION

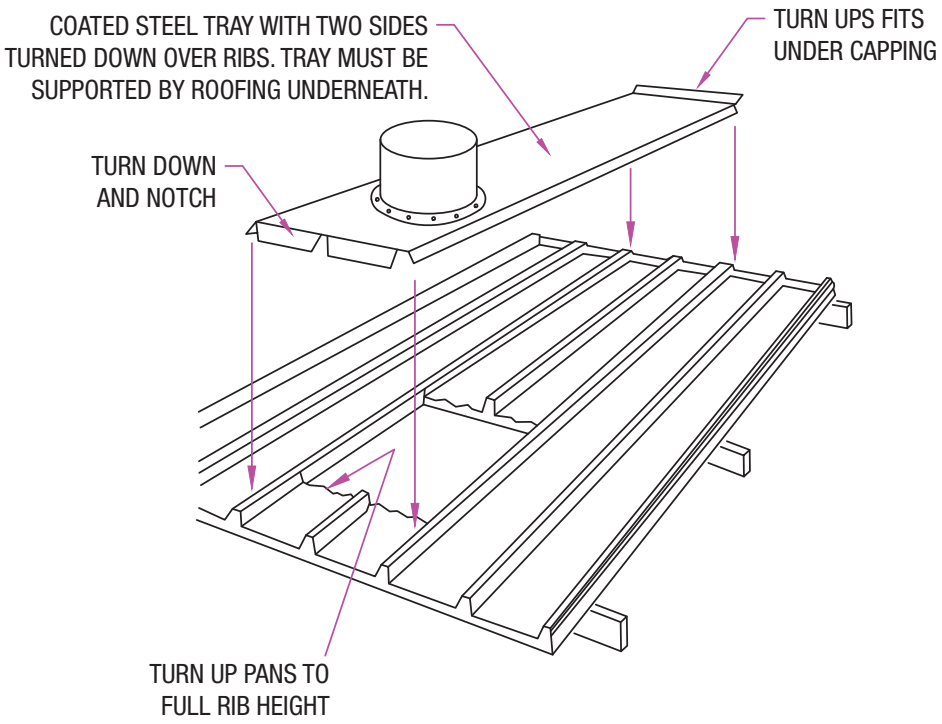
Large Skylight Fitment Detail - SSE-EP-RF022



Penetration Fitment Detail - SSE-EP-RF017

Dry Pan Flashing Option - Excellent choice in high rainfall locations or where multiple ribs are blocked.





Solar Panels (Photovoltaic)

Solar panels can be attached to Bondor®/Metecno® Insulated Roof Panels by using screw-fixed brackets to the ribs.

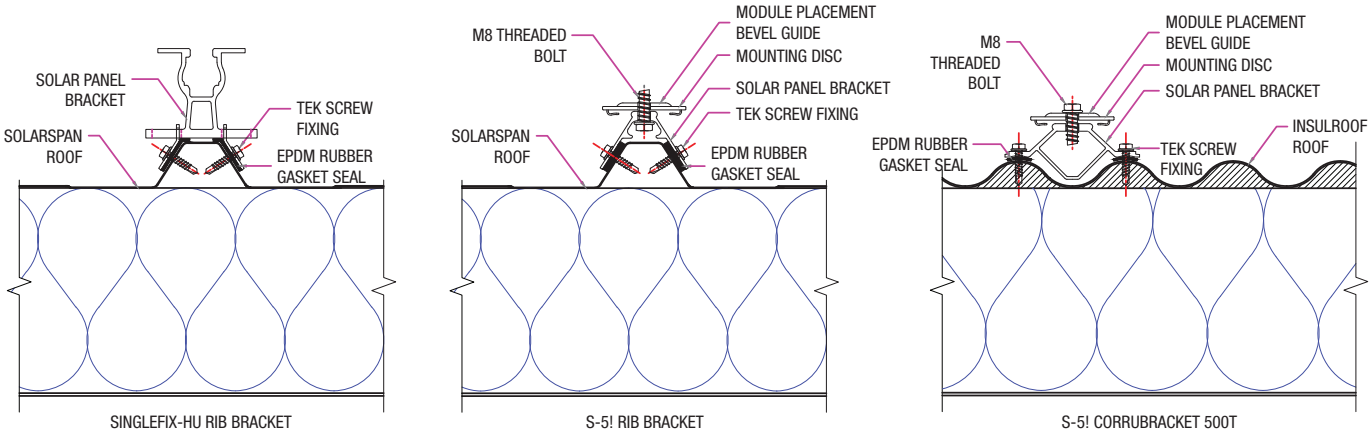
The tested brackets are Schletter SingleFix-HU , S-5! RibBracket and S-5! CorruBracket 500T. All brackets must be installed with reference to the notes below and in accordance with the bracket manufacturers' specifications to achieve the tabulated ULS design load below for non-cyclonic applications only.

Panel Name	Thickness (mm)	Bracket Type	ULS Design Load (kN)
MetecnoSpan®	60,80,100	Schletter Single Fix HU	1.2
EconoClad®	60	Schletter Single Fix HU	0.8
	80,100		1.0
SolarSpan®	All thicknesses	S-5! RibBracket	1.2
		Schletter Single Fix HU	1.0
InsulRoof®	50	S-5! CorruBracket 500T	1.9
	75		2.0
	100		2.2
	125		2.4
	150		2.6
	200		2.9

Notes:

1. The stated capacities are applied perpendicular to the roof panels.
2. Solar panels may be fixed to MetecnoSpan® and EconoClad® ribs using Schletter Single Fix-HU Brackets with Four 12g-14x25 self-drilling screws with EPDM washers as specified by the bracket manufacturer. Stated capacities are based on brackets being spaced at every panel rib or greater.
3. Solar panels may be fixed to SolarSpan® ribs using S-5! RibBrackets with Four 14g-18x25 self-drilling screws with EPDM washers as specified by the bracket manufacturer; or Schletter Single Fix HU brackets with four 12g-14x25 self-drilling screws with EPDM washers as specified by the bracket manufacturer. Stated capacities are based on brackets being spaced no closer than every 2nd panel rib.
4. Solar panels may be fixed to InsulRoof® ribs using S-5! CorruBracket 500T with Six 14-18x25 self-drilling screws with EPDM washers as specified by the bracket manufacturer. Stated capacities are based on brackets being located minimum 3 corrugations from the edge of a panel and 7 corrugations between adjacent brackets.
5. Brackets to be placed no closer than 500mm centres along the panel rib.

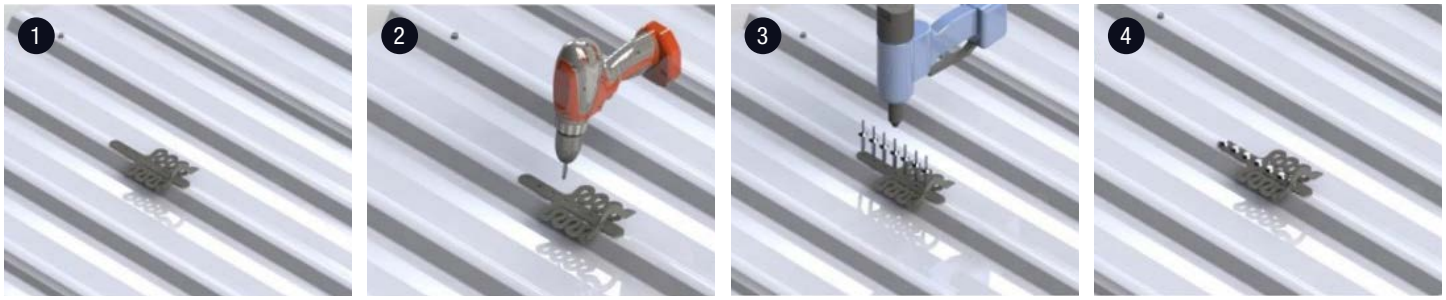
Solar Panel Bracket Fixing Detail - SSE-EP-RF077, SSE-EP-RF072 & IRE-EP-RF049



Safety Anchor

FrogLink surface mounted roof anchors can be installed on MetecnoSpan®, EconoClad® and SolarSpan® to arrest a fall rated up to 15kN. Refer FrogLink Anchor Installation Handbook for installation details.

The anchor must be installed on the panel rib in accordance with the manufacturer's specifications using either 7x 8mm BT Tri Fold Rivets, or 1x 14g Tek screw securing the anchor to the purlin and 6x 8mm BT Tri Fold Rivets. If installed at panel joints, the fixings must penetrate through the top skin of both panels.



The following limitations apply to the roofing design when using FrogLink roof anchors:

- The minimum purlin size is 100-12 C or Z purlin (or other equivalent);
- The span where FrogLink is installed is limited to 2.4m.

The roof anchors must be inspected every 12 months by a competent height safety installer in accordance with the manufacturer's specifications. Refer FrogLink Anchor Installation Handbook for more details.

Delivery & Handling

Commercial Roofing Design & Install Guide

Packing for Shipment

Bondor®/Metecno® Insulated Roof Panels are packed to a maximum pack height of 1.2m with the number of panels per pack dependant on panel thickness, length and overall pack weight. Refer to Bondor®/Metecno® regarding individual panel stack height. The Panels are manufactured with a protective film applied to the ceiling, and can be marked externally on the insulated core with the panel number and/or length, on request. Refer to Product Label for panel weight.

Delivery to Site

Panel packs should be secured using cargo straps spaced approximately every 2m with 600mm plastic cargo angles under the straps (refer to Figure 1a). Long 600mm angles must be placed on top and bottom of panel pack to protect from straps. Do not overtighten straps, no depression in panel should be seen, back off on strap tension, panel skin should be flat (refer to Figure 1b). Unloading remains the client's responsibility. For lifting panels >8.0m use of a spreader bar is recommended (refer to Figures 1c & d). Refer to Figures 1e & f for recommended steps to unload panels of less than and greater than 8m in length respectively. Panels should always be kept dry and if placed on site, stored off the ground, slightly inclined, allowing adequate drainage and ventilation of the panel pack.

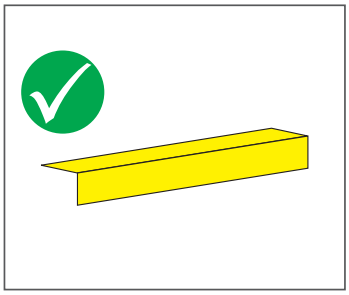


Figure 1a

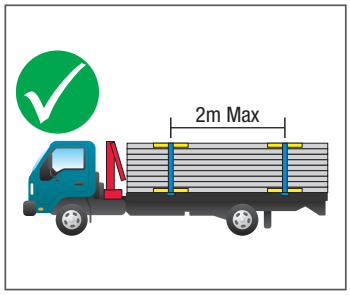


Figure 1b

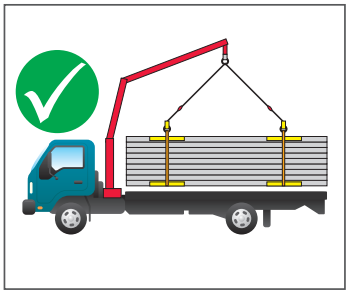


Figure 1c

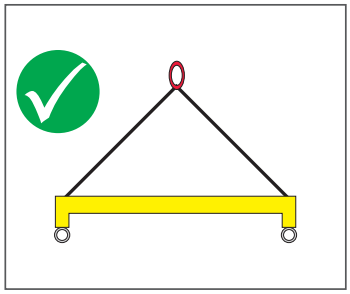


Figure 1d

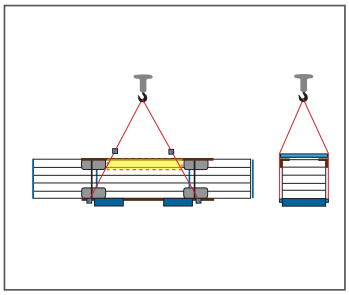


Figure 1e

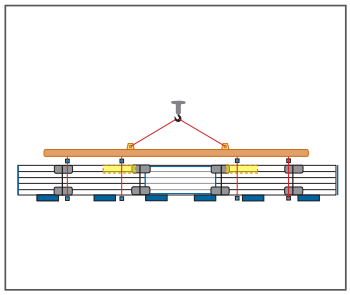


Figure 1f

Safe Panel Handling

Carrying, Positioning, Erecting

- Establish a safe working environment.
- Use lifting equipment wherever possible (crane, forklift, trolleys, pallet jacks, lifter, suction handling grips, etc):
  - Ensure operators are trained and competent in their use and licensed where applicable e.g. high risk work.
  - Where manual handling is required, make use of:
    - Specific Personal Protection Equipment Requirements.
    - Safety Footwear.
    - Cut Resistant Gloves.
    - Cut Resistant Arm Guards.
  - Assess the weight of panel and ascertain number of persons required to lift panels into place and also position into base channel/angle.
- Ensure a two man or multiple person lift is employed when lifting, carrying, standing up heavy or large awkward panels.
  - Persons should be of equal height and build and have been trained in safe manual handling techniques:
- Establish clear travel path free from obstacles or obstructions.
  - Use correct manual handling techniques:
    - Keep load close to you.
    - Back straight.
    - Bend your knees and use leg muscles.
    - Move your feet & never twist at the waist & establish stable footing.
  - When team lifting, ensure you have one person who gives instruction on the lift, etc.
  - Once erected ensure panel is secured and stable.
  - Ensure safe work practices are followed when using powered tools.

Transport Safety Guidelines

Customer Pick Ups

This Transport Safety Guide provides information on state regulations and site requirements for transport of products from our manufacturing sites. This guide applies for customer collected goods that are transported by road and restrained to the minimum standard designed to meet the Australian Load Restraint Performance Standards.

All pick-ups are to be booked via our Dispatch team by phoning your local branch.

1. Site Requirements

- Our sites will require you to wear PPE whilst on site. Each location will have specific requirements that must be followed. PPE may be loaned for the duration of picking up goods and must be returned before leaving site.
- Our personnel have the right to refuse to load inappropriate vehicles or load combinations.
- Customers must stay with their vehicle at all times and take direction from loading staff.
- Customers unable to restrain products to their vehicles from the ground must use appropriate available height safety equipment to safely conduct the task.
- Customers must observe all site speed limits, traffic signs and staff directions.
- Alternative arrangements for delivery may be arranged and may incur a fee if the vehicle or equipment is inappropriate for the load.
- In the event of an emergency or evacuation customers should stay within the customer pick up area where safe to do so and await instructions from staff.

2. Chain Of Responsibility (CoR)

Under the CHAIN OF RESPONSIBLITY laws, all parties who have control or influence over the transport task are deemed responsible for complying with and for breaches of the laws. For more information refer to the National Transport Commission website at www.ntc.gov.au or contact your local state Road and Transport Authority.

3. Load Requirements

Roof Rack Capacities

Vehicles must not be overloaded.

Unless the driver has written verification of the rack and vehicle limits, the safe loading limits are:

- 40 kg for sedans, vans and wagons
- 100 kg for utes with trade racks

Written verification of acceptable higher weights includes:

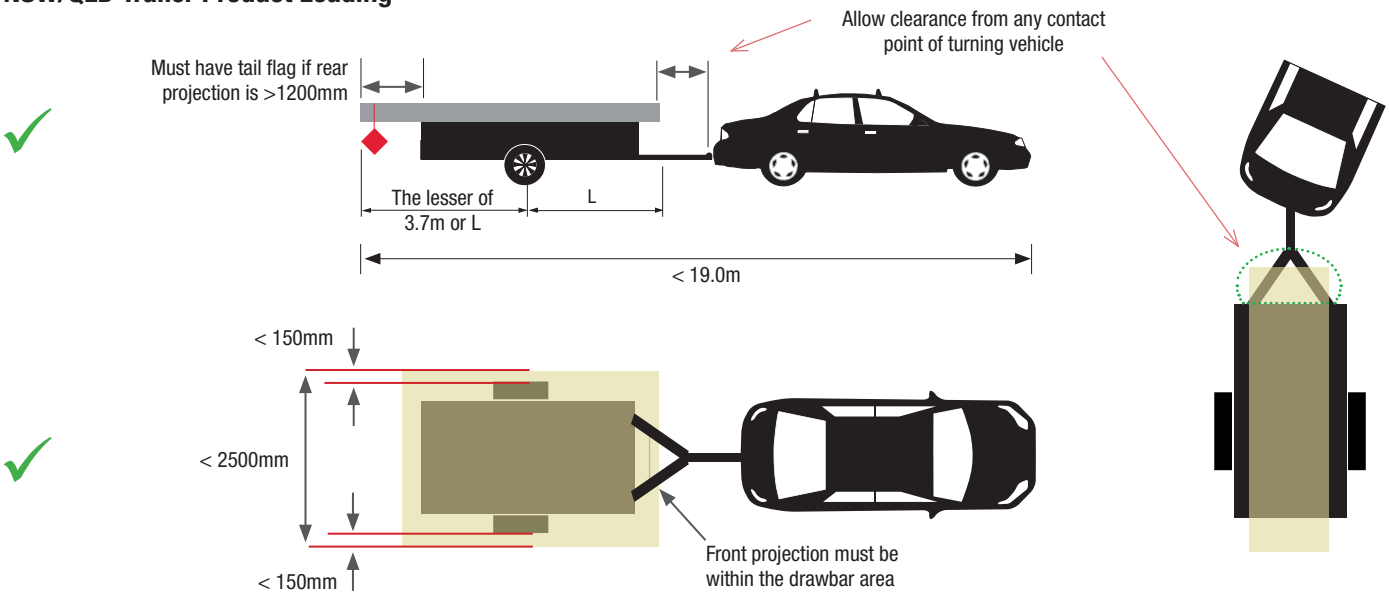
- load rated stickers on roof racks,
- paperwork received with the roof racks,
- information in the vehicle handbook,
- information from the supplier website,
- engineering certificates.

Overhang Requirements

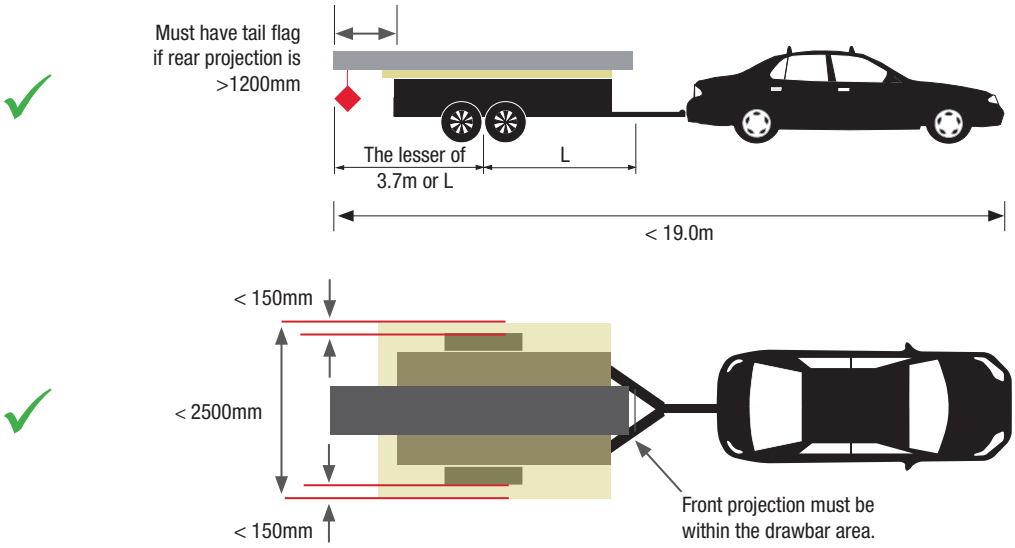
The driver's visions must not be obstructed. Projections/overhangs that are deemed dangerous are not acceptable even if within the limits of the diagrams in this brochure.

For day time travel, a minimum 300mm square bright flag must be used on any overhang that is not easily seen.

NSW/QLD Trailer Product Loading

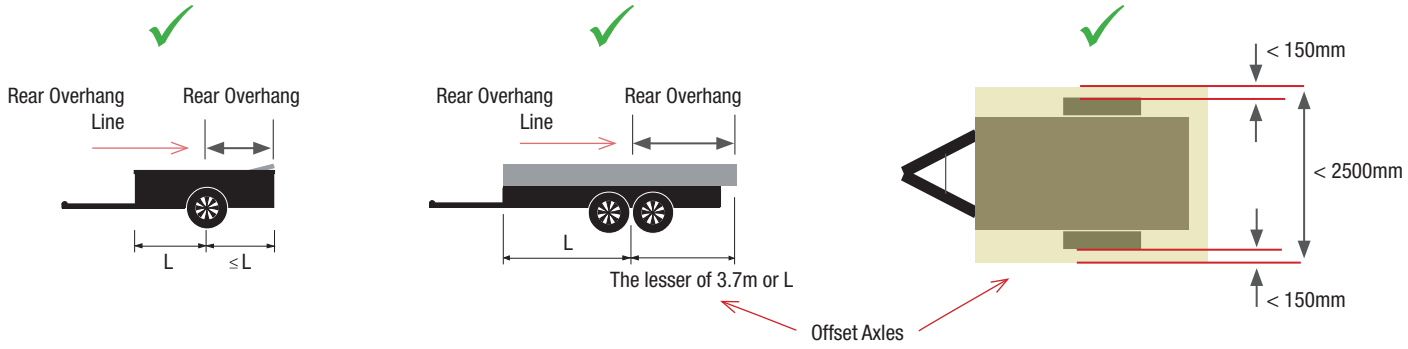


WA/SA Trailer Product Loading



NOTE
Towing a trailer does not change the amount of rear projection that is permitted on the tow vehicle.

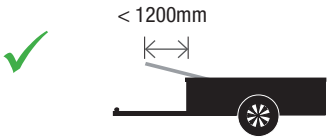
NT/VIC/TAS Trailer Product Loading



NT/VIC Specific Trailer Product Loading

No forward or rearward overhangs for standard box or tradesmen type trailers.

TAS Specific Trailer Product Loading



NOTES

The rear overhang of a trailer must be the lesser of the front load carrying area or body ahead of the centre of the axle group (L) and 3.7m.

Towing a trailer does not change the amount of rear projection that is permitted on the tow vehicle.

Installation

Commercial Roofing Design & Install Guide

Required Tools & Equipment

Personal Protective Equipment

- Long sleeves & pants
- Cut resistance level 5 gloves
- Eye protection
- Hearing Protection
- Mask
- Enclosed footwear

General Tools

- Saw Horse Stools (Padded)
- Rivet gun
- Multi-purpose step ladders
- Socket set (metric) for post bolts
- RH & LH Hand Tin snips
- Spirit Level
- Chalk Line
- Roof Screw Gun with Hex Head Adapters 5/32" R 14g Tek Adaptor
- Turn-Up/Down Tool (See Bondor®/Metecno®)
- Neutral Cure Gun-grade Sealant
- Cordless Drill & Depth Locator
- Tin Snips
- Plastic Paint Scraper
- Measuring Tape
- Towels or blankets to cover patio beams
- Shears to remove overlap (first sheet only)

Components

- Bondor Metecno Insulated Roof Panels
- Barge and Fascia Gutter Flashings
- 3.2mm diameter blind rivet (sealed)
- 14g class 4 metal/timber roof screws with Multiseal Cyclone Washer for Insulated Roof Panels
- Stitching Screws with washer
- Aluminium Rivets (AS 3566 Class 3)
- Profile vermin protection and rib infill strip

Clean Up

- Broom for cleaning swarf from roof
- Blower/Vacuum

Additional Tools for SecureLap®/ SolarLap®

- SecureLap® Turn-up Tools (SELAP-Turn-Up)
- MetecnoSpan® Turn-up / Turn-down Tools (219448)
- SolarLap® Turn-up Tools (SOLAP-Turn-Up)
- SolarSpan® Turn-up / Turn-down Tools (219447)
- SolarLap® & SecureLap® Fixing Locator (black) (SLAP-Fix-Locate)
- Cold Cut Saw (48TH blade) or Bondor® Panel Saw
- Tungsten Carbide Hole cutter
- Collated Screw Gun for trim fasteners

Additional Components for SecureLap®/ SolarLap®

- SecureLap® roof joint system (SLAP-SEALSTRIP2)
- SolarLap® roof joint system (SLAP-SS-SEALSTR2)
- 14-14 Hex Head Tek screw with Neoprene washer (length to suit)
- 14-10x45mm CSK RIB Wingtek screw
- M6-11x25mm Hex Head RoofZip screw with Multiseal washer
- 14-14 Hex Head Roofzip screw with Multiseal washer (length to suit)
- Step Packer (38 x 25mm) (SLAP-CHANNEL25)
- Step Packer (38 x 10mm) for purlin spacing less than 1500mm (SLAP-CHANNEL10)

Background

This section provides recommended installation sequence and techniques for Bondor Metecno roofing products. The Australian Standards HB39 Installation Code for Metal Roofing and Walling has been referenced. The installation techniques detailed here are to be considered as a guide and used in conjunction with all relevant standards. While this guide provides basic installation procedures, further project specific details may need to be considered. For non-standard installation applications, please contact our technical team.

Bondor Metecno supply a network of licensed roofing contractors around Australia but do not contract to install roofing products directly. As such, all aspects of Workplace Health and Safety associated with these installations remain the domain of the licensed roofing contractor. It is likely that the contractor will liaise with the head contractor/builder to develop a site-specific plan.

Installation Techniques

As outlined previously in this guide, Bondor®/Metecno® offers two distinctly different Insulated Roof Panel options: The first option is the conventional insulated roofing panels with the core encapsulated between two layers of COLORBOND® steel. The second option utilizes a single layer of steel on the exterior side with a PIR core bonded to a multi-layer flexible foil/fiberglass internal face.

Dual Skin Profiles

Rigid composite panels with steel on both sides

metecnospan®

solarspan®

insulroof®

equideck®

Single Skin Profile

Steel on the external face with foil/fiberglass interior layer

econoclad®

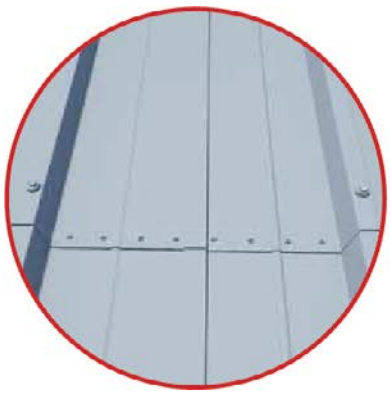
Because the conventional two-layer steel roofing panels are rigid and supplied in varying thicknesses up to 250mm, they require different installation techniques to that of the single layer steel panel option. The single layer insulated panel profiles require installation techniques that are similar to standard single skin roofing products.

Sheet Lengths and End Lapping

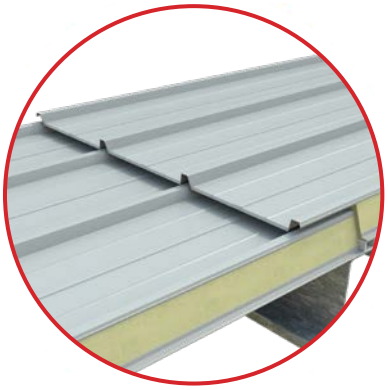
While some commercial roofs can be laid in a single continuous length, most large-scale roofing projects will require end lap connections with adequate detailing and specification. This is generally achieved by a standard Expansion Step Joint or sheet to sheet end lapping. Bondor®/Metecno® does not recommend sheet to sheet end lapping for roofs exposed to Australia's harsh and dynamic climate with potential concerns related to water ingress, thermal expansion and sheet to sheet contact corrosion. Bondor®/Metecno® recommends utilizing an Expansion Step Joint or our hybrid SecureLap®/SolarLap® system endorsed by BlueScope Steel for Australian conditions. Designed as a complete commercial roofing solution, SecureLap®/SolarLap® eliminate the common problems associated with the detailing and specification of long span sheets. A decision on which end lap technique will be used is required early in the construction planning process.

The Expansion Step Joint method involves joining the roof over two separate purlins and as such represents an increase in cost in both material and labour. It requires extra purlins at the connection point and longer purlin cleats on the upper-level roof run to facilitate the "step".

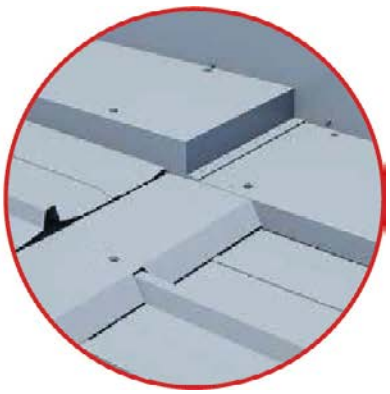
The SecureLap®/SolarLap® System allows connection over a single purlin and does not require alteration to structural steel. Key benefits include turning up the underlap panel at the joint, forming a mechanical barrier to water ingress. Furthermore, instead of relying on a sealant that may be compromised during sheet alignment, an inbuilt compressive closed cell sealing system can prevent wind driven rain through the lap connection. Additionally, SecureLap®/SolarLap's® fixing assembly is a self-contained expansion joint, allowing the primary and overlapping sheet connection to slide along the longitudinal axis, providing minor thermal movement likely in long panel roof runs. Particular care with purlin alignment is required in the lapping zone for both systems and particularly the single purlin option.



Sheet to Sheet Connection
not recommended



Securelap



Expansion Step

Notes Prior to Commencement

- ☐ Check all steel purlins for correct alignment, poor alignment particularly in end lapping areas would require rectification prior to commencement.
- ☐ Check the direction that the roof panel will be laid, left to right or right to left as this will affect the selection from the panel bundles in relation to the core cut-back.
- ☐ Confirm with Head Contractor that all the necessary site safety requirements are met and that the installers fall protection plans are approved.
- ☐ Confirm safe access is allocated for delivery vehicles and an area for roofing panel storage and ground preparation prior to hoisting.
- ☐ Confirm cranes & lifting equipment are booked.
- ☐ Check that there are no overhead risks associated with the panel hoisting.
- ☐ Remove protective core strip from the sheeting underside prior to hoisting.
- ☐ Ensure where possible roofing panel turn-up/turn down functions are performed on the ground prior to hoisting.
- ☐ When using vacuum lifting devices or spreader bar/slings for hoisting, determine the balance points for lifting and mark that location on the panel bundle.
- ☐ Confirm correct grade and length of fasteners are available for installation.

Installation Steps

The following illustrations depict MetecnoSpan®, however the same details are generally applicable to other roofing products.

For single continuous length roof, install per Step 1, 5 & 6.

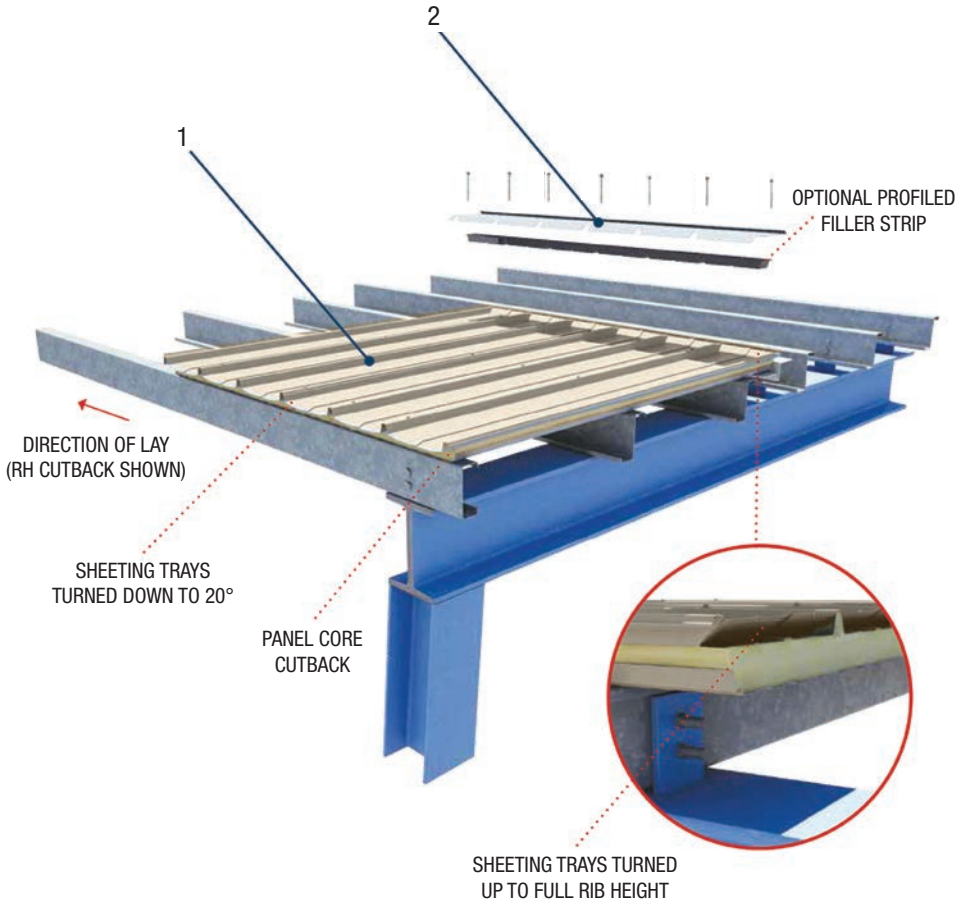
Option 1 - Roof Expansion Step Joint Installation Instructions

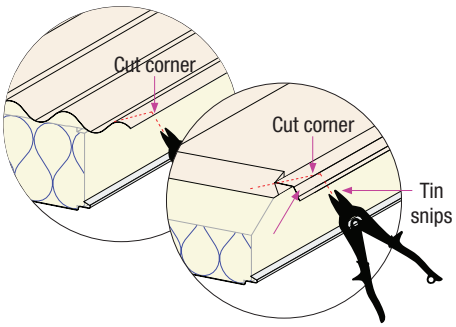
Step 1:

Lay lower-level roof sheets after core cutback, turn-up / turn-down preparation, overlay rib trim and core strip removal.

Step 2:

Install baffle flashing, notched over lower roof.





Trim the overlay rib to prevent fouling with the turned-up pan of the adjacent panel.

Handy Tips:

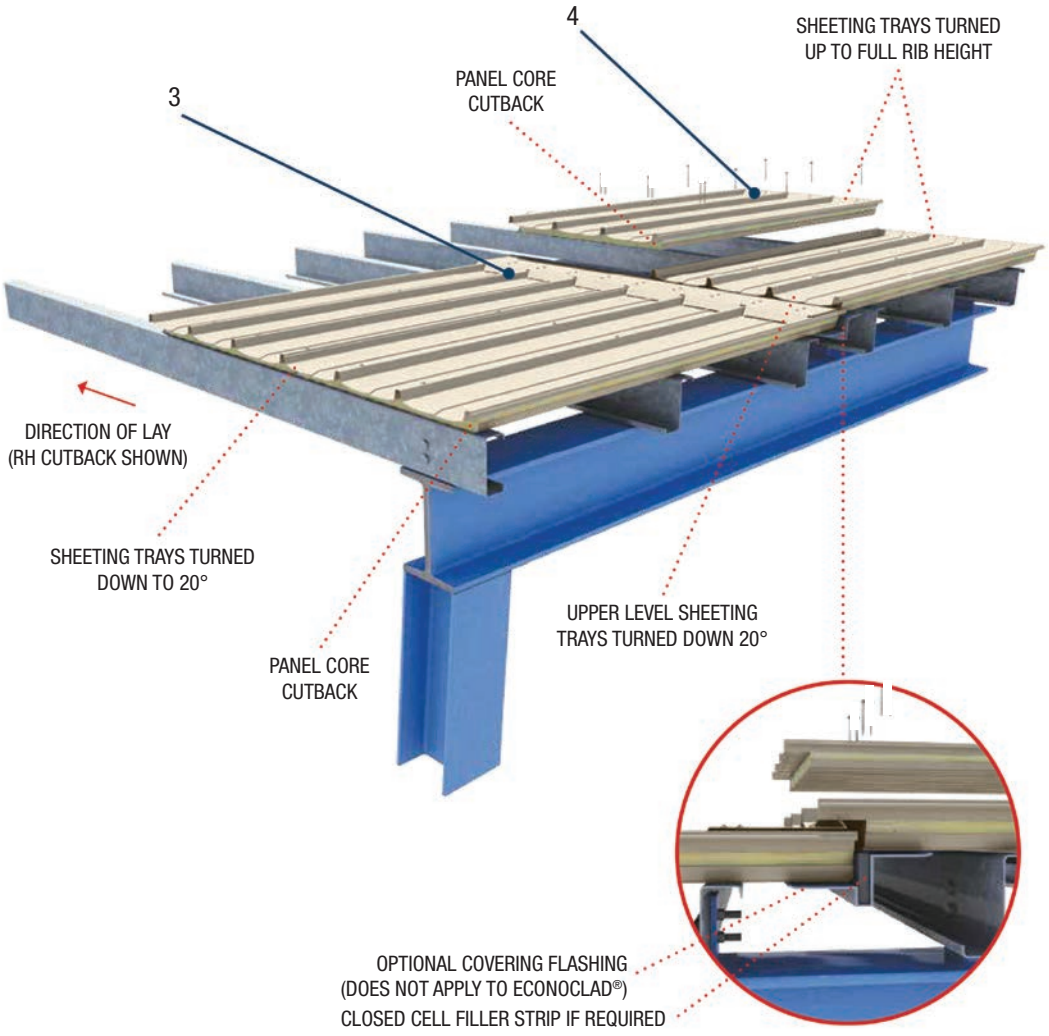
- Where possible, prepare core cutbacks and sheet turn-up/turn-down on the ground before hoisting, special tool available
- Care required when nominating factory core cutback shown is left to right
- Remove protective core strip on underside prior to installation. Peel back core strip from underlap on roof side prior to laying - completely remove core strip within two days.
- For added weather protection, profiled filler strips can be added to lower level sheet before installing baffle flashing

Step 3:

Baffle flashing notched and fastened to lower roof.

Step 4:

Lay upper-level roof sheets after core cutback, turn-up / turn-down preparation and core strip removal.



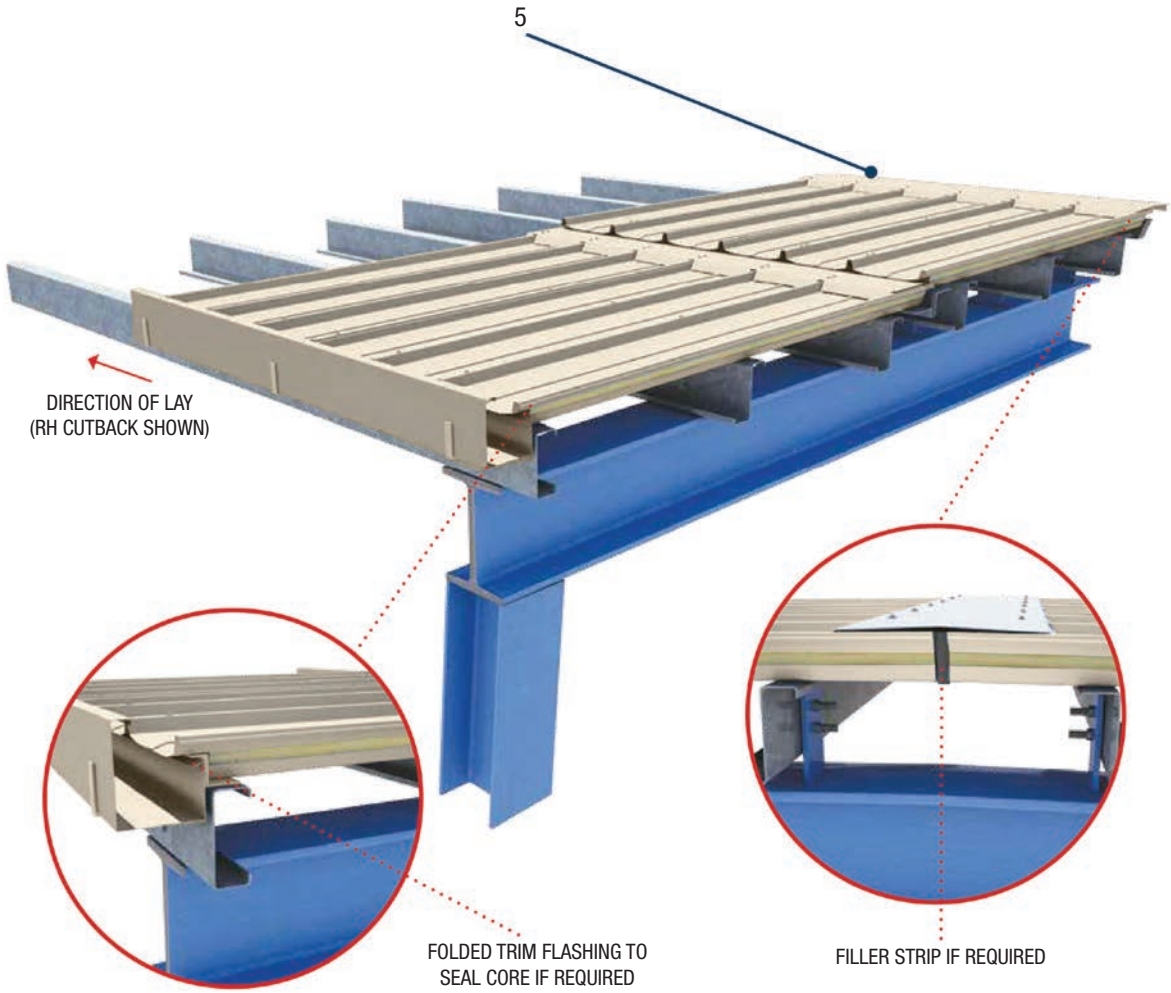
Step 5:

Notch ridge capping to sheet profile.

Step 6:

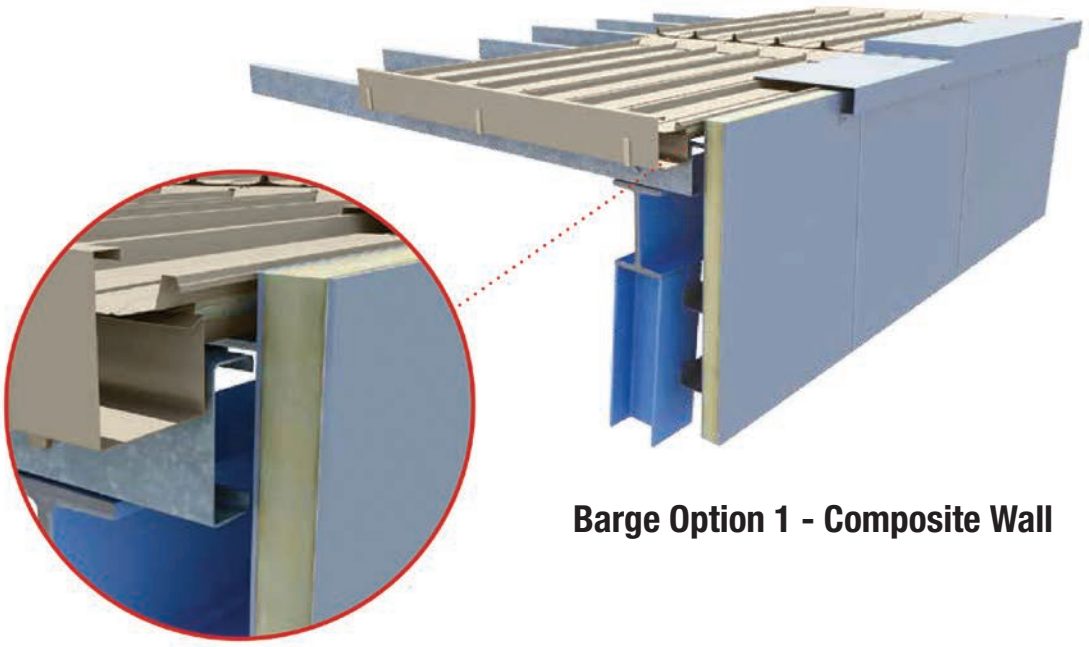
Seal roof panel core at gutter end with folded trim flashing, if required. Install filler strip at ridge connection, if required.

Note: It is important to completely remove any Polystyrene or Polyurethane foam from under the gutter cutback. Neglecting this crucial step may lead to potential roof leaks caused by capillary action and corrosion of the roof panels. Use a cordless drill fitted with a round wire brush attachment to effectively remove the PUR (Polyurethane foam) from InsulRoof® gutter cutback.

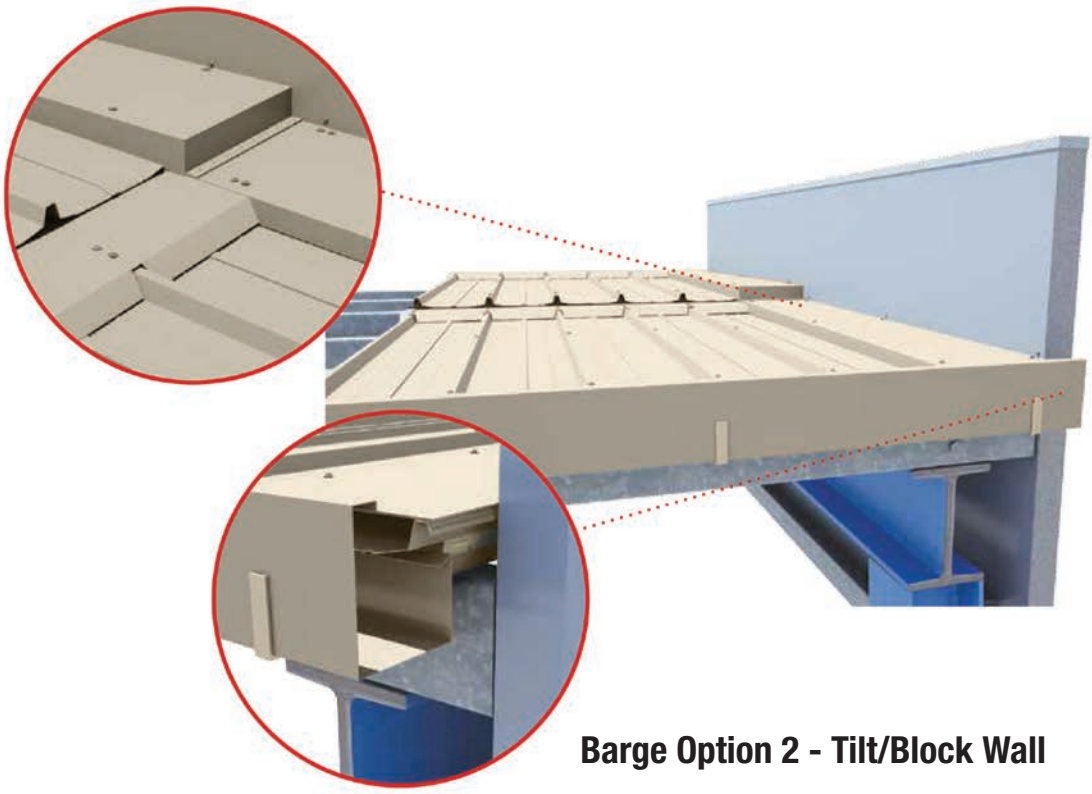


Barge Options

Side barge should cover at least 2 ribs.



Barge Option 1 - Composite Wall



Barge Option 2 - Tilt/Block Wall

Option 2 - SecureLap® /SolarLap® Installation Instructions

Note: The following illustrations depict SecureLap® and MetecnoSpan®, however the same details are generally applicable to other roofing products.

1 MetecnoSpan® Insulated Roofing Panel (lower roof run)

2 Z / C Purlin (by others)

3 SecureLap® Sealing Strip

4 Fixing Plate with thermal movement control

5 14-14 Hex Head Tek Screw with **Neoprene Washer** (length to suit roof panel thickness)

6 Step Packer (38 x 25mm)

7 14-10x45mm CSK RIB Wingtek Screw through top of Step Packer

8 MetecnoSpan® Insulated Roofing Panel (upper roof run)

9 M6-11x25mm Hex Head RoofZip Screw with Multiseal Washer

10 Step Packer (38 x 10mm) / Additional for purlin spacing less than 1500mm

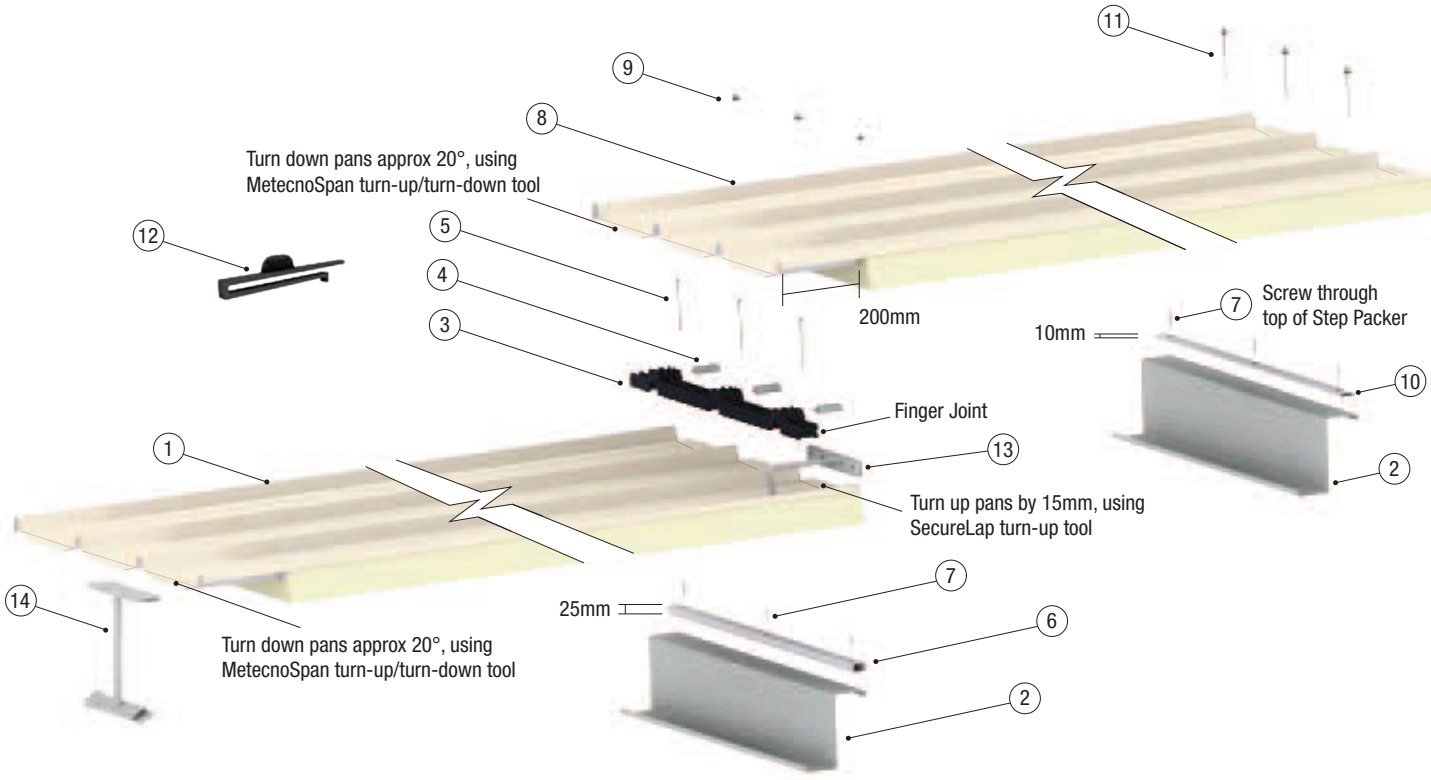
11 14-14 Hex Head Tek Screw with **Multiseal Washer** (length to suit roof panel thickness)

12 SolarLap® & SecureLap® Fixing Locator (black)

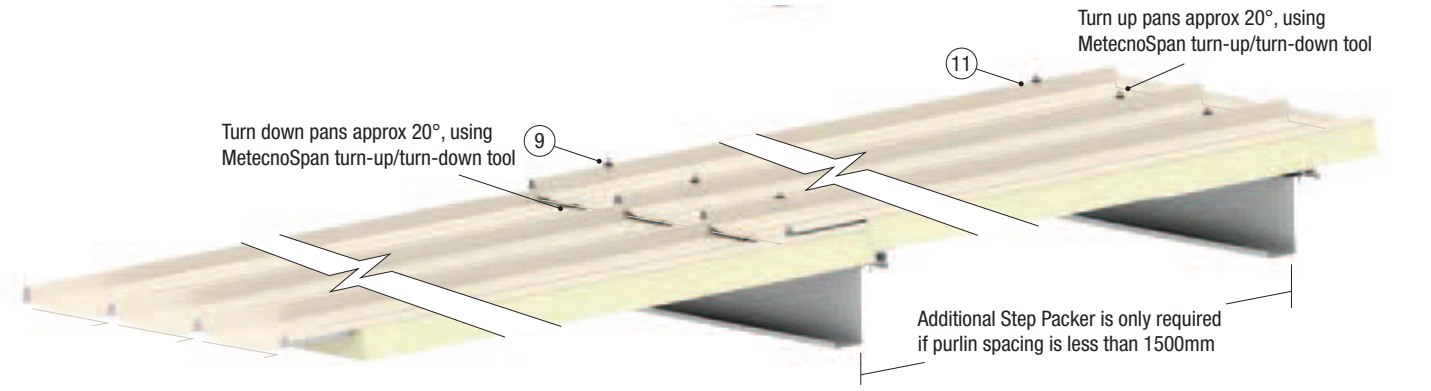
13 SecureLap® Turn-up Tool

14 MetecnoSpan® Turn-up / Turn-down Tool

Disassembled



Assembled



Step 1: Prepping

Where possible panel preparation is performed on the ground before hoisting. This includes tray turn-ups (Figure 1a) for the lower level panles and turn-downs (Figure 1b) for the upper level panels. A standard turn-up using MetecnoSpan® turn-up/turn-down tool is a 20° turn-up at the ridge end and a 20° turn-down at the gutter end. Where SecureLap® roof joint system is used, at the lap joint location the SecureLap® turn-up tool is used to turn-up the lower level panel trays by 15mm. SecureLap® turn-up tool and MetecnoSpan® turn-up/turn-down tool are available from Bondor®/Metecno®.

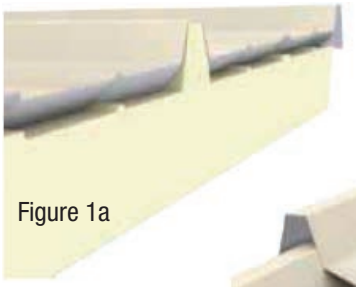


Figure 1a

Figure 1b

Step 2: Install lower roof run

The entire lower panel roof run should be carefully aligned and laid first. As with all lapping connections over one purlin, positioning of the panel to the centre of the lapping purlin is critical. Tack the panel into place at the overlapping rib to multiple purlins before moving onto the SecureLap® connection. In cyclonic applications, before fixing the sealing strip, a 14-14 Hex Head screw with Neoprene washer is required in each pan in addition to the normal rib fixing. Purlin with flanges of 74mm or greater are required to allow sufficient bearing for both the upper and lower roof panels.

Figure 2

Step 3: Install SecureLap® sealing strip

Align the SecureLap® roof joint system to the bottom edge of the 15mm tray turn-up (performed earlier). Use 14-14 Hex Head Tek screws with Neoprene washer (length to suit Metecnospan® roof panel thickness) to secure the primary fixing plate through the large hole in the top of the fixing plate to the lapping purlin. While the SecureLap® roof joint system is quite stable, you should ensure the “finger joint” joining the assemblies, are firmly locked together.

Figure 3a

Figure 3b

Step 4: Step Packer

Fit the 38x25mm step packer to the remaining surface of the lapping purlin with14-10x45mm countersunk RIB Wingtek screws that will pass through the upper wall of the step packer and secure the packer to the purlin via the lower packer wall.

Figure 4a

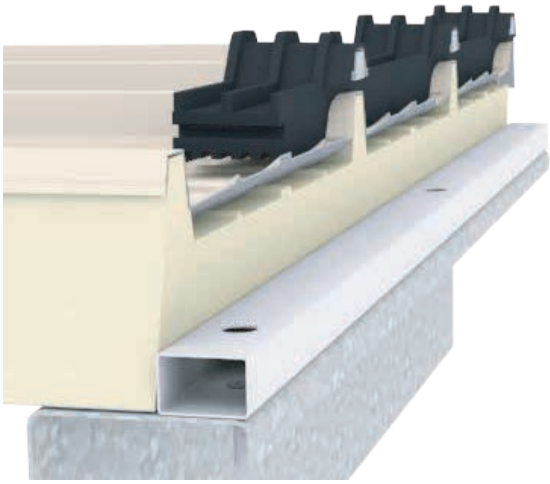


Figure 4b

Where the end span adjacent to the joint on the upper level of sheeting is less than 1500mm, 10mm durable packer should be placed on the purlin below the panel. This reduces the ramping effect caused by the panel step at the lapping purlin and ensures adequate surface water velocity is maintained.

Step 5: Install upper roof run

The upper level roof panel should be ordered with a 200mm panel cut-back already prepared. Fit the upper level roof panels, aligning ribs and trays to match the lower level roof panels. The bottom surface of the panel now rests on the 25mm step packer and should be firmly butted against the end of the lower panel (Figure 5). The cut-back of the upper level roof panel will overhang the lapping purlin by the nominated 200mm. Stepping is allowed on the roof pans only. Avoid stepping on the panel ribs, or the 200mm overhang at the SecureLap® joint. Tack the upper level roof panels in place through the over-lapping rib on multiple purlins before moving to the SecureLap® connection.

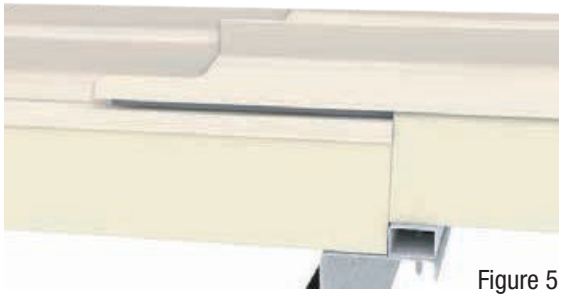


Figure 5

Step 6: Secure via SecureLap® fixing plate

To identify the fixing position on the rib of the upper roof panel into the concealed fixing plate, insert the SolarLap® & SecureLap® Fixing Locator into the rib of the upper panel as shown below. Slide the Fixing Locator in until it comes to rest against the Fixing Plate. Secure the upper panel through the rib to the Fixing Plate using M6-11x25mm Hex Head RoofZip screws. Verify the steel washer is compressed, ensuring the fixing is engaged adequetly into the Fixing Plate. This connection will compress the SecureLap® assembly against both metal surfaces forming a water tight barrier.

Figure 6a

Figure 6b

Step 7: Clean up

To prevent surface staining and damage, ensure all the metal swarf and debris is removed from the roof at the end of each day.

Equideck® Installation Instructions

Step 1:

To commence roof lay, rip a panel length approximately 200mm wide to provide a stable fixing ground for first connection.

Step 2:

Clamp / secure the 200mm panel and locate first full panel into position.

Step 3:

In the cavity between the panel end upstands, install the 900mm fixing batten. This batten is fixed centrally over the purlin. On the gutter and ridge fixings, the batten can be reduced to 450mm.

Step 4:

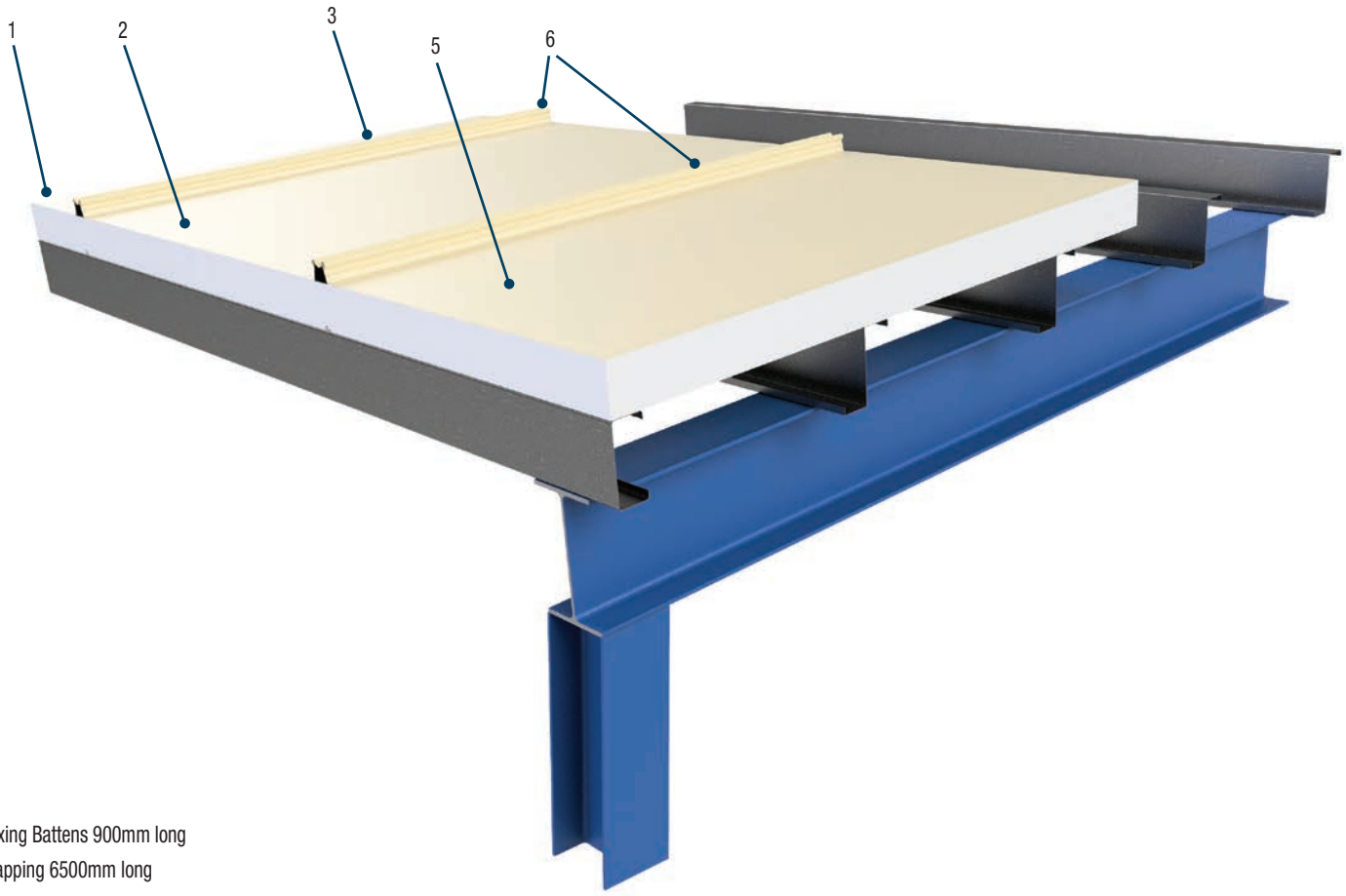
Before securing the batten to the purlin with screws or threaded rod, the panels must be clamped / secured tightly in place as the fixing screw passes through the underside of the panel locking seam; and if unsecured, will possibly force the panels apart.

Step 5:

Secure further panels and apply the same technique on commencement at the other gable end.

Step 6:

Secure the snap on capping over the panel upstand and fixing batten. Install barge and ridge capping as usual.



Fixing Battens 900mm long
Capping 6500mm long

Rough-in-Lighting and Other Electrical Services Instructions

WARNING: Always consult your licensed electrician for advice on details for cable installation. Ensure all services are clear of the top wall plate centre cavity where roof fixing screws will penetrate.

SolarSpan/InsulRoof panels have a services duct (at least 20mm x 20mm) on the female (under lap) joining edge which accommodates a standard size conduit for electrical cables for ceiling lights and fans.

Step 1: Mark Entry

Mark the entry location of the feed wires on the SolarSpan/InsulRoof underside.

Step 2: Mark Exit

Mark the exit location of the feed wires for fan/light fittings on the SolarSpan/InsulRoof underside.

Step 3: Drill Underside

Drill through the underside metal skin at the marked locations and remove the excess polystyrene.

Step 4: Form Hole

Drill and form a hole through the services duct to the exit and entry hole on the underside.

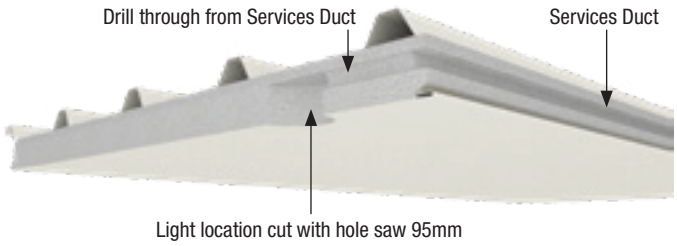
Step 5: Feed Conduit

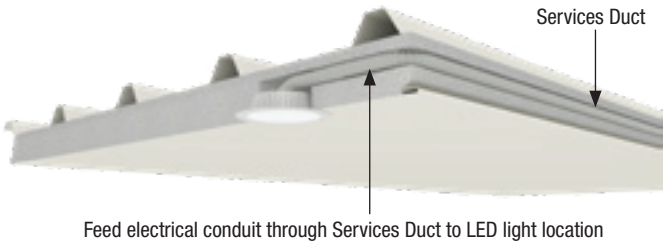
Lift the InsulRoof®/SolarSpan® panel into position. Feed the conduit up from the wall panel into the entry hole on the InsulRoof®/SolarSpan® panel, along the services duct and out the exit hole.

Step 6: Screw Off

Complete the final screw off, fixing through the SolarSpan/InsulRoof panel ribs/crests into the top wall plates or support beams.

Handy Tips: Other options of electrical services are running above dropped ceilings or bulkheads or under slab.





Plasterboard Ceiling Installation Instructions

This example shows a typical installation of 10mm plasterboards to underside of SolarSpan/InsulRoof. Refer to plasterboard supplier website for recommendations and other examples.

Step 1: Installing Ceiling Batten

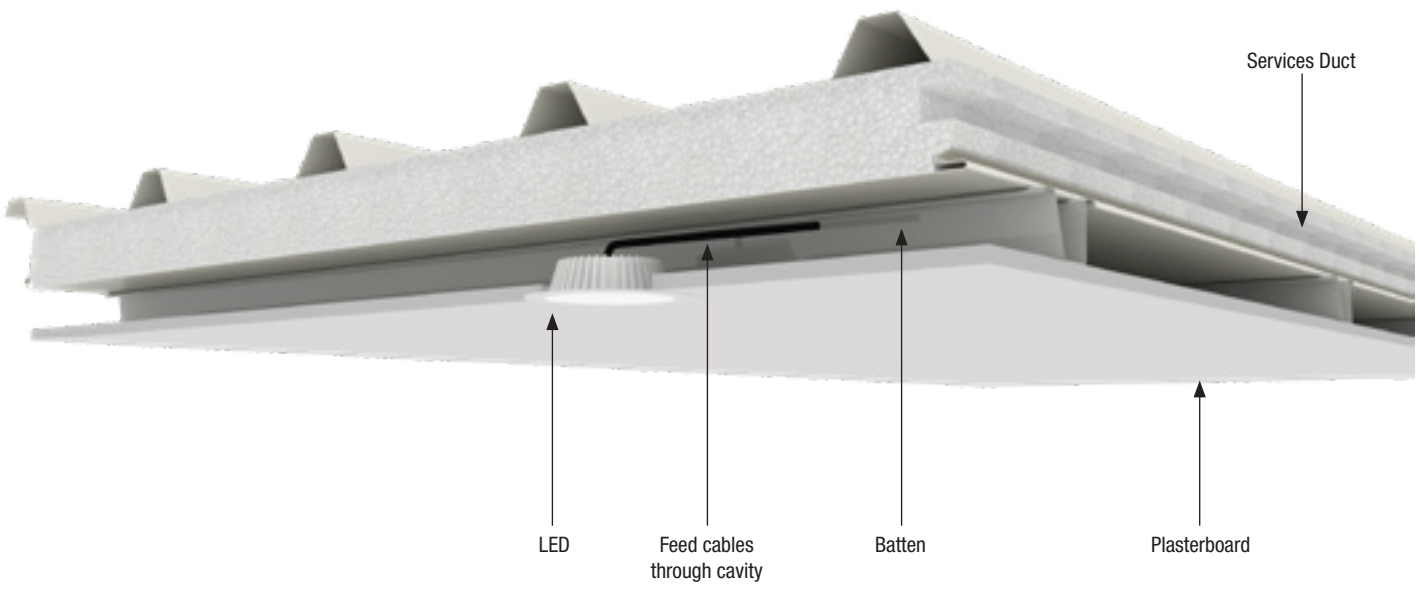
Fix ceiling battens to the underside of SolarSpan/InsulRoof at 600 or 450mm centres according to wind category (refer to the plasterboard supplier installation guide) with 10g-24x16mm wafer head screws @ 300mm centres. Ceiling battens should be perpendicular to the roof run.

Step 2: Rough-in-Lighting and Other Electrical Services

(If Necessary)

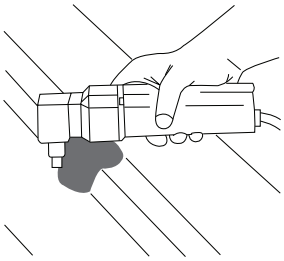
Step 3 : Installing Ceiling Plasterboard

Fix 10mm plasterboards to the ceiling battens according to plasterboard supplier installation guide with 25mm Type S screws.
Plasterboard should be parallel to the roof run.



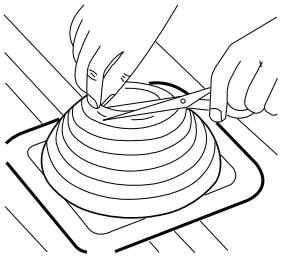
Roof Penetration Instructions

1



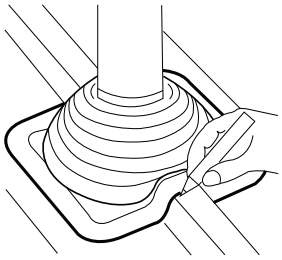
Prearrange the hole for the pipe. Muffs must always be placed on top of the profiled sheet top in order to permit the water flow.

2



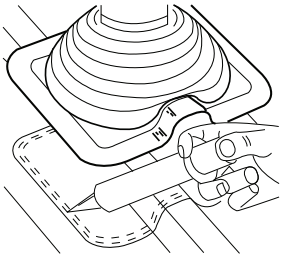
Adapt the muff to the pipe. Cut the opening so as to be at least 25mm smaller than the pipe diameter in order to overlap the pipe at least 20mm.

3



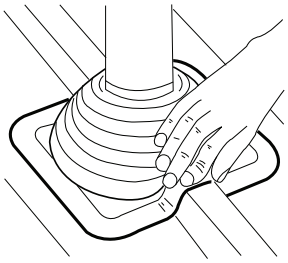
Fold up the muff on the pipe, eventually using white liquor (soap) adapt the muff to roof profile and mark out the contour.

4



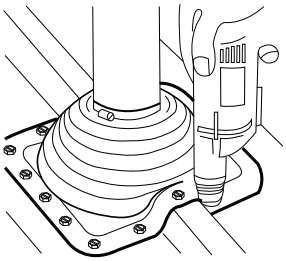
Apply sealant along the trace.

5



Place the muff by pressing it to the roof surface.

6



Fasten the muff on to the SolarSpan® external profiled sheet (distance between screws equal to 50mm); then install the collar.

Clean Up and Maintenance

Commercial Roofing Design & Install Guide

Ensure all metal filings (swarf) are swept off and disposed of into bins as you install each sheet. These filings can leave unsightly stains on the surface of the sheet and also on floor tiles/pavers, etc., in the near vicinity.

Hose Down

A regular hose-down, once a month or so, is an important maintenance step for your exterior cladding. With a quick spray, you will remove most of the surface dirt created by dust or rain residue. Special attention should be directed at areas that miss the rain, like eaves, awnings and under verandahs. Hosing of the ceiling is to be avoided as it will cause water to sit inside panel joins and flashings leading to possible corrosion.

Wash Away

Stubborn surface grime can be washed away with a soft brush or sponge soaked in warm water or mild detergent. Use one teaspoon of regular dishwashing liquid with four litres of water. To be most effective, the water should be changed frequently and wipe over a second time to remove any smears. Best results occur when washing is undertaken in the shade.

Remove Mould

Areas constantly damp could suffer from the formation of mould. The mould can be removed with a solution of household bleach and water, at a ratio of 3:1. Rub the solution onto the surface with a soft sponge, leave for 10-20 minutes, and then rinse off with clean water. When dry rinse once more with clean water.

Gutter Maintenance

Gutter should be cleared regularly so that it is free of leaves and dirt build-up.

Roof Access

Maintenance access on the roof panels of up to 140kg (110 kg for EconoClad®) on any one panel is allowable.

Renovations

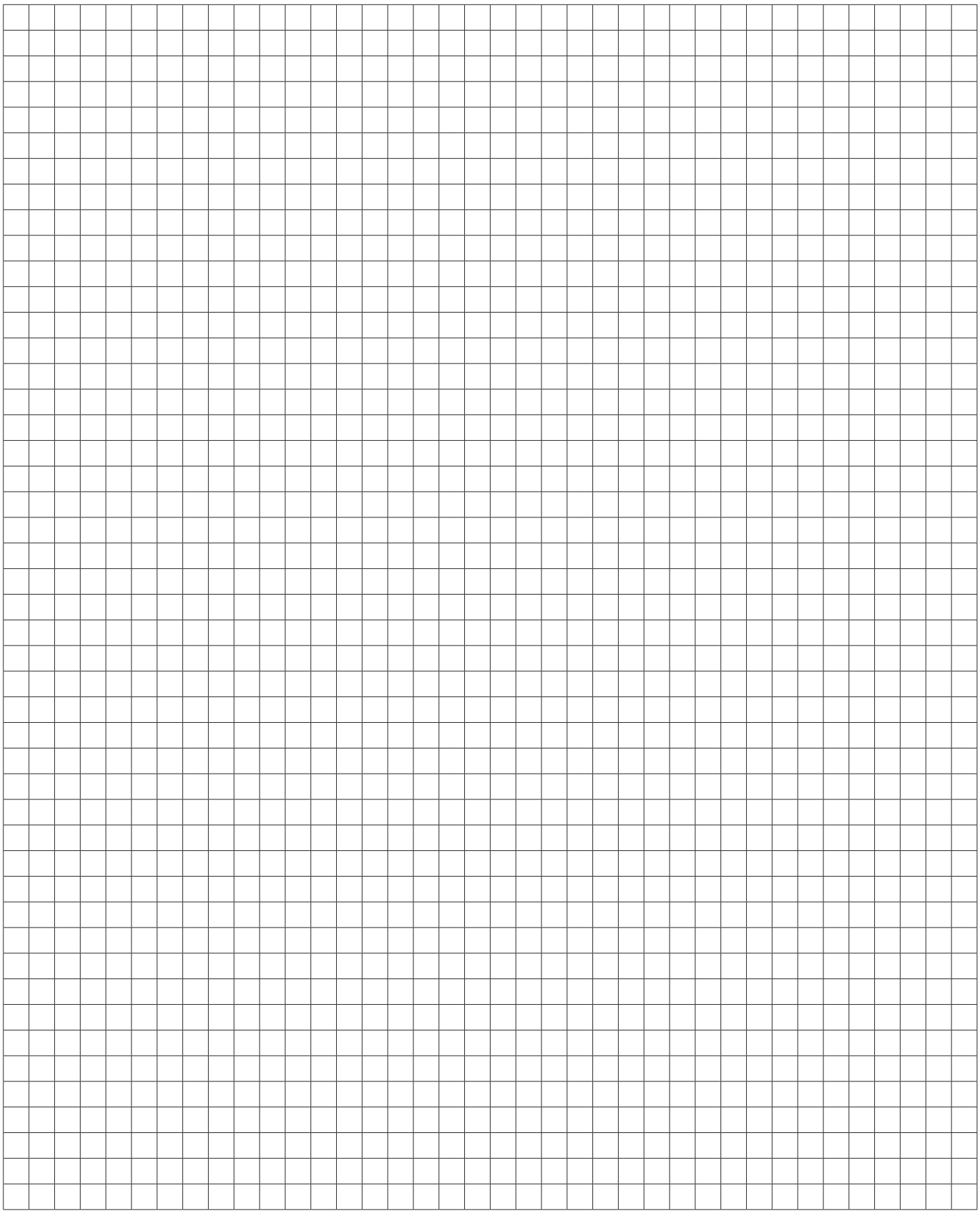
Future renovation such as adding fixtures on roof, roof modification, patio addition, internal wall reconfiguration is possible. It should be done with caution and planning with engineering considerations.

Coastal Region

Panels which are exposed to salt air i.e. coastal regions should be periodically cleaned and washed down to minimize the effect of corrosion forming. This would apply to exposed skins of the panel e.g. soffit overhangs which have not been treated or painted.

Handy Tips: Regular visual inspection (max 6 monthly) of all external surfaces would be advised in coastal regions.

Refer to BlueScope COLORBOND® Technical Bulletin.



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