MetecnoSpan® Information Guide

BONDOR®

Leaders in Thermal & Architectural Building Solutions

FM APPROVED

metecnospan®

Contents

Introduction

Bondor® has been the market leader in providing light weight thermal building products to the Australasian market since the 1950's. We understand the Australasian market, its harsh climatic conditions and local building standards and regulations.

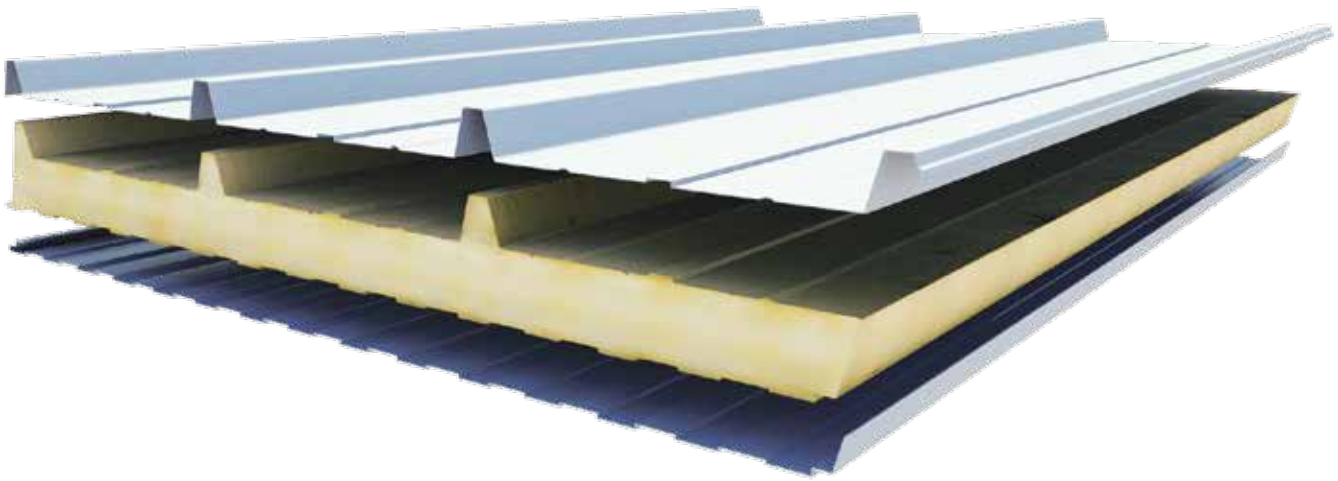
MetecnoSpan® is a cost effective, fire retardant commercial roof/ceiling/insulation system designed and manufactured in Australia. MetecnoSpan® is made from BlueScope Colorbond® steel with the top sheet being 0.42 hi-tensile steel, a standard upheld by all reputable Australasian steel roofing product manufacturers.

MetecnoSpan® is suitable for a wide range of developments including supermarkets, bulk goods, fast food and retail outlets as well as commercial and industrial premises. It is ideal where superior thermal performance and FM approval is required. As well as providing a high rib roofing profile, it also provides a clean, hygienic, painted surface to the underside, often completely eliminating the need for suspended ceiling systems.

The manufacturing process involves expanding PIR (rigid foam) between two skins of Colorbond steel, forming an exceptionally strong and durable, fire retardant building panel. MetecnoSpan® uses pentane as the blowing agent which has zero ozone depleting potential. Panel thicknesses of 40mm, 60mm, 80mm and 100mm provide varying levels of thermal, fire and span performance to meet the most stringent design criteria. The panel's exceptional strength allows greater spans and a substantial reduction in the buildings support structure.

MetecnoSpan® is a through fixed system suitable for roof pitches of 2 degrees or more. It is manufactured in lengths up to 16 metres. For projects with longer roof runs, it can be either be "end lapped" in one plane or "stepped" forming a superior expansion joint.

NB. Design roof pitches can often suffer structural steel deflection. Our minimum pitch of 2 degrees refers to the actual pitch achieved after any deflection.



MetecnoSpan® is the Answer

If you're looking for increased energy efficiency with reduced life cycle costs, MetecnoSpan® is the answer.

It offers superior thermal performance, which current multi-layered conventional roofing systems find hard to match. By adjusting panel thickness, MetecnoSpan® can exceed BCA part J compliance, allowing property owners to "option up" thermal performance and further reduce their energy footprint.

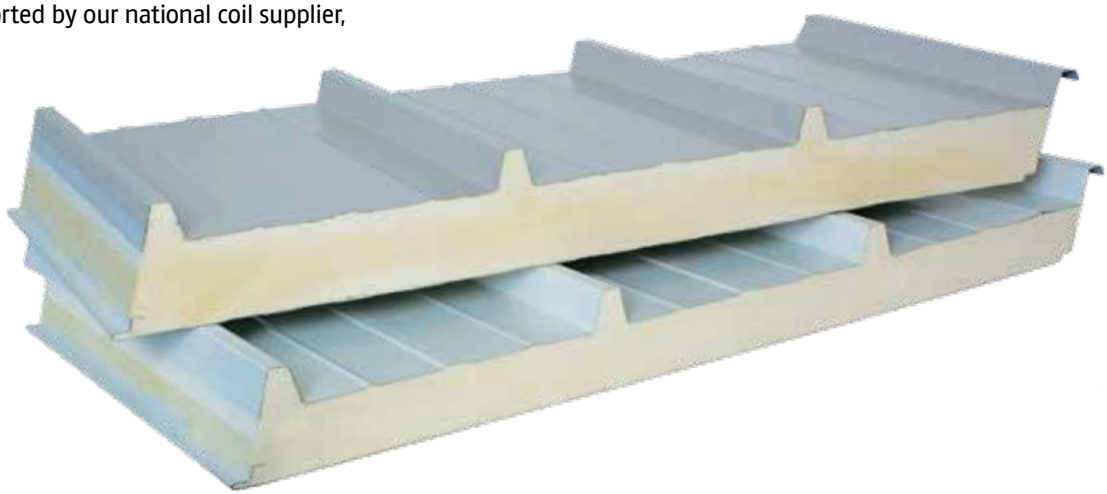
MetecnoSpan® single component install process reduces site installation time by as much as 50%. By halving installation time, property owners and retailers are often generating vital cash-flow from their property investments, weeks or months earlier.

As important as cost savings are, specifying a roof/ceiling system with excellent fire credentials is paramount. The MetecnoSpan® system is fully FM Approved. FM Approvals certifies industrial and commercial products and services for companies worldwide.

For further peace of mind, MetecnoSpan® was developed in Australia in consultation with the international Metecno Group of companies. Bondor®'s technical literature and engineering support is Australian based. Bondor® provides extensive product warranties, supported by our national coil supplier, BlueScope Steel.

Features and Benefits

- Provides BCA Part J compliance
- Fast, simple, safe install techniques allowing easy compliance checks
- Excellent fire safety credentials – FM Approved
- Environmentally responsible systems – Zero ODP, reduced carbon emissions
- Energy efficient performance reducing costs over the life of the building
- Composite panel strength allowing reduced structural costs
- Durable construction, long life cycle and extensive warranty support
- Insulation maintains its integrity over time
- Earlier occupation generating vital cash flow



Insulated Panel Roofing Systems Versus Traditional Steel Roofing Systems

- Provide easy compliance to Part J of the BCA by providing roofing, insulation and ceiling in one product, eliminating the need for messy wire mesh, batts and spacer battens
- Insulation does not compress or crumble losing its effectiveness over time
- Because panels lock together they offer an airtight seal that prevents air leakage and improves energy efficiency therefore saving heating or cooling costs
- Significantly higher spanning capability means a reduction in structural steel
- Up to 50% quicker installation means end users can take up occupancy weeks ahead of schedule therefore generating earlier cash flow
- Ease of installation means less labour required to install roof
- Eliminates thermal transfer
- Savings in structural steel, mesh and labour means the project is completed much quicker for roughly the same install cost of conventional methods

Cost and Time Comparison

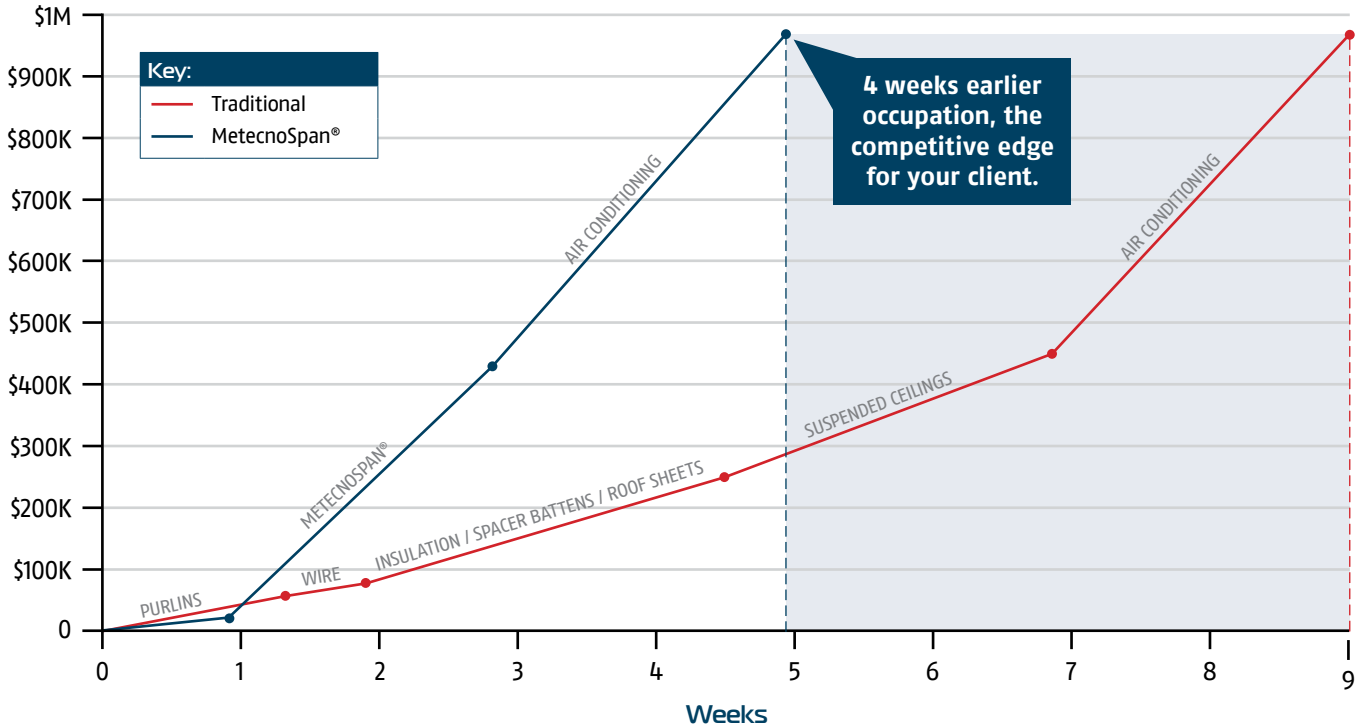
Complying with Part J of the BCA has, without a doubt, added cost to conventional roofing installations. Designers and installers have been forced to increase bulk insulation thicknesses and add components to control insulation compression at the fixing point.

Independent cost analysis has confirmed that composite roofing products like MetecnoSpan,® provide cost savings over traditional systems. The higher cost of the composite panels is more than offset by substantial savings in structural steel, labour and time required with conventional installations.

The numbers shown here compare the two systems' raw costs. They do not reflect the significant time saved on site or disruption to the construction flow presented by conventional systems.

Once the MetecnoSpan® system is fastened in place, both the roof and ceiling systems are effectively complete – further weeks are not lost while gyprockers or suspended ceiling installers complete the ceiling linings.

Cost and time frame comparison table



Typical construction segment timeline – 3,000m² air conditioned showroom.

Note: Independent costing carried out in 2009 is for comparative purposes only. See your local representative for up to date pricing.

Conventional Roofing Method

Conventional commercial roofing systems have become labour intensive, with multiple steps and subsequent increased costs. Safety mesh is the most common fall protection method in use on commercial roofing projects in Australasia.

Step 1: Wire

Painstakingly labour intensive, often requiring multiple scissor lifts to prepare & pull the wire across un-protected roof spans. Then the installers must "crawl" the scissor lift from below the roof area along each wire overlap to stitch the lap together.

Step 2: Insulation

Once the safety mesh is in place, the awkward size rolls are "man-handled" across previously laid roof areas to be un-wrapped and cut to size – then rolled out into position.

Step 3: Spacer Batten

Spacer battens, a relatively new addition to the install process are required to reduce compression of the bulk insulation when the roof sheeting is fastened to the purlin.

Step 4: Roof Sheet

Roof sheets, previously loaded onto the roof, are carried into position and carefully aligned with previous sheets, over the insulation. The roof sheet is then tacked in place.

Bondor® Composite Roofing

Bondor® composite panels are craned directly from the ground or truck and carefully swung into position on the roof.

Step 1: Crane

Panels are lifted from the ground directly into position on the roof.

Step 2: Secure

Panels are secured

"A whole lot easier... we're in and out in half the time!"

"I've been installing commercial roofing for the past 20 years. Over that time, very little has actually changed in the way conventional roofing is done. Safety has driven some changes with mesh and edge protection, while more recently we've had to use thicker and thicker insulation and add spacer battens to improve R values.

In effect, we've just kept adding "bits" to the old system to make it comply.

Laying Bondor®'s composite roofing systems makes life a whole lot easier for us. Forget all the steps associated with conventional roofing, we simply crane the panel off the truck and straight into place on the roof.

Sure, we need the crane longer, but in most cases we would have up to 40% of a composite system laid before we'd even finished "wiring off" a normal roof. Builders can't believe how fast we cover a roof. We're in and out of the job in half the time."

Phil Williamson

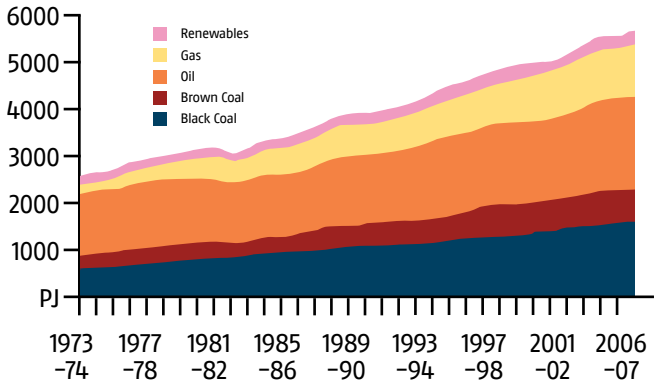
Phil Williamson Richardson Plumbing P/L

Thermal Efficency and Energy Consumption

Thermally efficient buildings require less heating and cooling, which in turn draws less electricity. Reducing energy consumption lowers fossil fuel dependency, ultimately reducing green house gas emissions.

Anticipated electricity price increases will also have a major impact on building design and construction. Ensuring each building is as energy efficient as possible will be the key factor for those with awareness for cost savings. Each part of saving adds up over the year and lifetime of the building.

Primary Energy Consumption in Australia by fuel



Source: ABARE, Australian energy statistics

Thermal

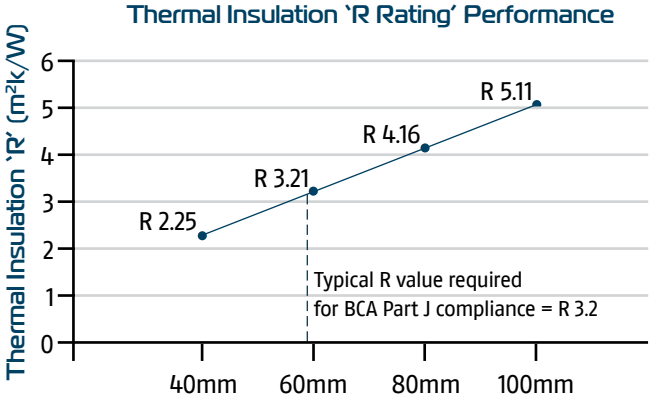
PIR thermal conductivity has been tested in accordance with ASTM C518–04 and assessed in accordance with relevant Australian Standard and BCA provisions, including AS/NZS 4859.1:2002 "Materials for the thermal insulation of buildings". The test condition is 23ºC.

MetecnoSpan® offers varying levels of thermal performance. As you can see from the following graph, simply by increasing panel thickness, your building's overall thermal performance can be substantially improved, providing lower energy costs over the life of the building.

Thermal Insulation - Total Values

Panel Thickness	40	60	80	100
'R' (mK/W)	2.25	3.21	4.16	5.11
'U' (m^2k/W)	0.44	0.31	0.24	0.19

Thermal Insulation 'R Rating' Performance

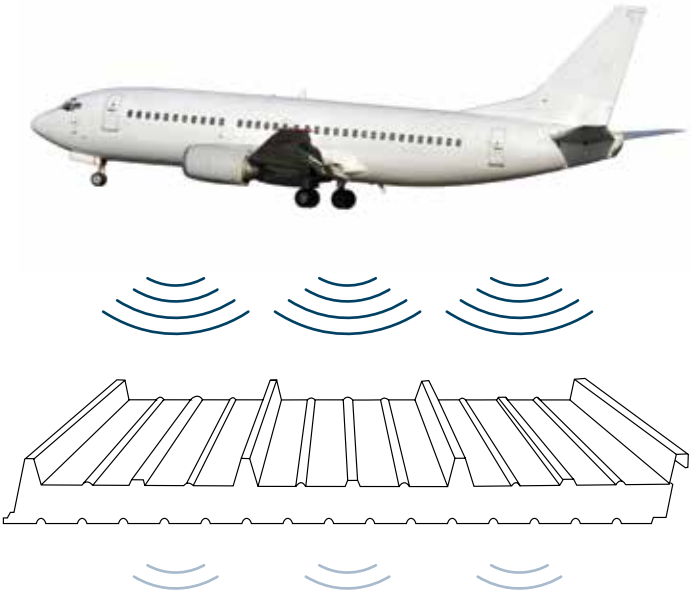


MetecnoSpan® Panel Thickness

Acoustic

Acoustic testing of MetecnoSpan® has been performed in compliance with the requirements of AS 1191–2002 "Acoustics – Method for Laboratory Measurement of Airborne Sound Insulation of Building Elements".

The Sound Transmission Class (STC) and the Weighted Sound Reduction Index (R_w) of the roof panel were calculated using the procedures respectively specified by AS 1276–1979 and AS/NZS ISO 717.1:2004.



Reduce the noise pollution both inside and out.

Freq Hz	100	160	200	250	315	400	630	800	1000	1250	1600	2000	2500	3150	5000	STC	Rw
(a) 40mm	16.0	16.8	19.6	19.8	21.4	22.4	23.7	24.5	24.0	20.3	20.3	28.5	30.4	33.4	36.6	24	25
(b) 100mm	16.4	16.6	19.0	20.4	20.9	19.4	17.7	16.2	23.9	30.7	35.0	34.4	32.9	35.3	39.9	22	24

Spans

Bondor® provides the latest Ultimate Limit State load tables specifically developed for Australasian conditions. Whether you are selecting MetecnoSpan® for cyclonic or non cyclonic locations, our tables make selecting the right span and panel thickness easy.

3-Step Panel Selection

- Determine thermal and fire performance requirement
  (If FM Approval is required maximum span is 1830mm)
- Determine worst case fully factored design wind load that applies to any roof panel (kPa) in ULS (Ultimate Limit State)
- Select appropriate span vs. thickness from Region A, B, C or D table for single or multi-span case

Note that spans can be reduced at building edges by appropriate building design.

Non-Cyclonic Region A and B

Single span, wind pressure acting outwards

Maximum uniformly distributed load (kPa) for the given span:

Span (m)	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4
40mm	4.99	4.17	3.50	2.70	2.15	1.76	1.47	1.25	1.08	0.94	0.83	0.74	0.67	–	–	–	–	–	–	–	–	–	–	–
60mm	6.94	5.80	4.63	3.57	2.84	2.32	1.93	1.64	1.41	1.23	1.08	0.96	0.86	0.78	0.71	0.65	–	–	–	–	–	–	–	–
80mm	8.56	7.15	5.83	4.49	3.57	2.91	2.42	2.05	1.76	1.53	1.35	1.20	1.07	0.97	0.88	0.80	0.74	0.68	0.63	–	–	–	–	–
100mm	9.83	8.21	7.06	5.43	4.31	3.51	2.92	2.47	2.12	1.85	1.62	1.44	1.29	1.16	1.05	0.96	0.88	0.81	0.75	0.70	0.65	0.61	0.58	0.54

Multi-span, wind pressure acting outwards

Maximum uniformly distributed load (kPa) for the given span:

Span (m)	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4
40mm	4.01	3.36	2.89	2.54	2.27	2.05	1.87	1.72	1.48	1.29	1.14	1.01	0.90	–	–	–	–	–	–	–	–	–	–	–
60mm	5.57	4.66	4.01	3.52	3.14	2.83	2.58	2.38	2.20	2.02	1.77	1.57	1.40	1.26	1.14	1.04	–	–	–	–	–	–	–	–
80mm	6.87	5.74	4.93	4.33	3.86	3.48	3.18	2.92	2.70	2.52	2.32	2.05	1.83	1.64	1.48	1.35	1.23	1.13	1.05	–	–	–	–	–
100mm	7.31	6.11	5.25	4.61	4.11	3.71	3.38	3.11	2.88	2.68	2.51	2.63	2.20	1.98	1.78	1.62	1.48	1.36	1.25	1.16	1.08	–	–	–

Cyclonic Region C and D

Single span, wind pressure acting outwards

Maximum uniformly distributed load (kPa) for the given span:

Span (m)	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4
40mm	4.99	4.17	3.50	2.70	2.15	1.76	1.47	1.25	1.08	0.94	0.83	0.74	0.67	–	–	–	–	–	–	–	–	–	–	–
60mm	6.94	5.80	4.63	3.57	2.84	2.32	1.93	1.64	1.41	1.23	1.08	0.96	0.86	0.78	0.71	0.65	–	–	–	–	–	–	–	–
80mm	8.56	7.15	5.83	4.49	3.57	2.91	2.42	2.05	1.76	1.53	1.35	1.20	1.07	0.97	0.88	0.80	0.74	0.68	–	–	–	–	–	–
100mm	9.83	8.21	7.06	5.43	4.31	3.51	2.92	2.47	2.12	1.85	1.62	1.44	1.29	1.16	1.05	0.96	0.88	0.81	0.75	–	–	–	–	–

Multi-span, wind pressure acting outwards

Maximum uniformly distributed load (kPa) for the given span:

Span (m)	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4
40mm	4.01	3.36	2.89	2.54	2.27	2.05	1.87	1.72	1.48	1.29	1.14	1.01	0.90	–	–	–	–	–	–	–	–	–	–	–
60mm	5.57	4.66	4.01	3.52	3.14	2.83	2.58	2.38	2.20	2.02	1.77	1.57	1.40	1.26	1.14	1.04	–	–	–	–	–	–	–	–
80mm	6.70	5.60	4.82	4.23	3.77	3.40	3.10	2.85	2.64	2.46	2.30	2.05	1.83	1.64	1.48	1.35	1.23	1.13	–	–	–	–	–	–
100mm	7.89	6.59	5.67	4.97	4.43	4.00	3.64	3.35	3.10	2.89	2.70	2.47	2.20	1.98	1.78	1.62	1.48	1.36	1.25	–	–	–	–	–

Notes:

1. Pressures specified are for wind gusts only.
2. Self weight of the panel has been allowed for, plus an allowance of up to 10kg/m² for light duty fittings (lights, etc.). No other dead loads permitted.
3. Non-trafficable maintenance access (concentrated load) of 140kg (exceeding min. requirements of AS/NZS 1170.1:2002) on any one panel has been allowed for.
4. Distributed live load of 0.25kPa (as per AS/NZS 1170.1:2001) has been allowed for.
5. Deflection limit of span/150 applies, and in accordance with Serviceability Limit State criteria per AS1170.0 – TABLE C1

6a. For non-cyclonic application, fixing with 14g tek screws (or equivalent) at each rib are required.
6b. For cyclonic application, fixing with 14g tek screws (or equivalent) at each rib and pan are required.
7. Cyclonic span table developed in accordance with lo-hi-lo cyclic test regime per BCA 2009.
8. Spans for 'wind pressure acting inwards' are also available. Refer Bondor®.
9. Min. roof slope of 2 degrees applies.
10. For FM Approved applications, a) a max. span of 1830mm applies, b) approved fasteners must be used. Refer Bondor®.

Fire Tested and Approved

A combination of tests by accredited external facilities and our own in house laboratories assure MetecnoSpan® quality and performance.

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Fire

In many cases, MetecnoSpan® PIR panel is installed simply because of its superior thermal performance, cost savings and buildability. In these applications, MetecnoSpan's fire retardant characteristics are an added benefit.

In other cases, where specific fire certification is required, MetecnoSpan® can meet the most stringent performance requirements. Bondor® has gained approval for both PIR & Mineral Wool core panels for FM 4880 – No Height Restriction & FM 4471 – Approval Standard for Class 1 Panel Roofs.

Certification for Insurers

FM Approvals certifies industrial and commercial products and services for companies worldwide. They test materials and carefully appraise the construction methods vital to fire protection system certification.

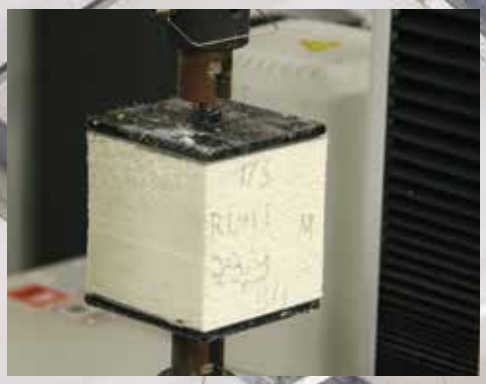
Various FM approvals apply for different applications:

- The most stringent for Class 1 fire certification with no height restrictions
- Wall construction requiring non combustible ceilings
- Wall and ceiling construction Class 1, rated to a ceiling height of 9.1 metres or unlimited height approval as required

To achieve Class 1 approval, performance in the following classifications must be satisfied:

- ASTM E 108 fire classification for insulated roof panels
- FMRC Room corner test
- ATSM E711 Oxygen bomb test
- UB 26-3 Room test
- ATSM E84 Surface burning characteristics
- ASTM D482 Ignition residue test

Bondor® has gained approval for both PIR & Mineral Wool core panels for FM 4880 – No Height Restriction & FM 4471 – Approval Standard for Class 1 Panel Roofs.



MetecnoSpan® Finishes and Specifications

Product Suitability

MetecnoSpan® trapezoidal insulated roof panel is suitable for supermarkets, warehouses, factory buildings, retail outlets and covered outdoor areas.

A roof slope of 2 degrees or more is required.

It is the perfect choice where BCA Part J thermal performance or FM Approved products is required.

Product Specification

MetecnoSpan® insulated roof ceiling panels have the following specifications.

The external cladding skin is manufactured 0.42mm G550 high tensile AZ150 coated steel to AS 1397. Colour to be nominated from BlueScope 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 manufacture.

Internal cladding skin is 0.50mm G300S, Z275 coated steel to AS 1397 formed with Micro V Rib, Satinline or Fineline profile finish. Standard colour Surfmist® (others available, minimum order quantity applies).

External side laps are weather sealed with a continuous bead of approved sealant (when required).

End laps may be formed by either standard expansion step (requires support steel step) or sheet end lapping in one plane. End laps must be 225mm long and sealed using two unbroken beads of approved sealant.

Infill strips manufactured from closed cell polyethylene may be installed where flashings are fixed across the sheet profile. The infill strips assist to stop wind driven rain from entering under flashing trims.

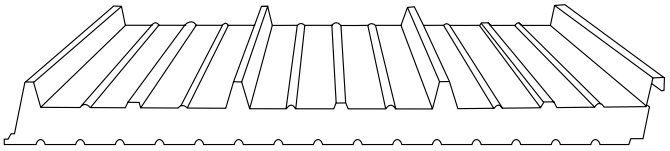
Fasteners must be installed through every rib and manufactured from high grade carbon steel with a minimum Class 4 anti corrosion coating. Fasteners are to be fitted with bonded washers of either stainless steel or aluminum (16mm or 25mm diameter.) Side laps should be stitched at 450mm centres.

Flashings are manufactured from 0.55 G300, AZ150 BlueScope Colorbond® steel and installed to Australian Standards.

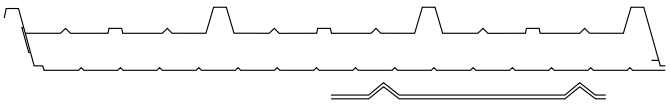
MetecnoSpan® Finishes

MetecnoSpan® is available in 4 different thicknesses (40, 60, 80 & 100mm) and 3 different finishes for the face.

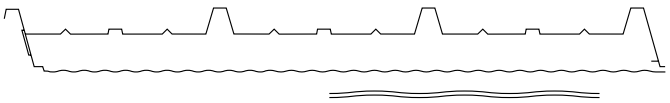
Composite panels are interlocked together.



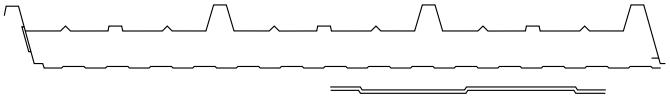
Detail of MetecnoSpan® joint. MetecnoSpan® roof section.



Micro V Rib



Satinline



Fineline

Professional Design Assistance

Bondor® offer specialist assistance during the early design and documentation phase. We have a dedicated in house technical team ready to assist with all design and engineering aspects of material finish, fire performance, panel spans, installation, thermal & acoustic performance. If you have a question, just ask. We're here to help. Refer to figures 1–3, product samples of the turn up / turn down tool, specifier sample kit and skylight system.

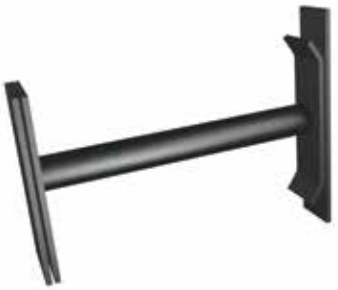


Fig. 1. Turn Up / Turn Down Tool.

Fig. 2. Specifier Sample Kit.

Packing For Shipment

MetecnoSpan® panels are manufactured with a protective film applied to both the internal & external skins. Sheets are packed external sheet to external sheet to reduce pack height. Panels per pack depend on the panel thickness. Long lengths are subject to reduced pack height. The maximum sheet length is 16.0 metres and the maximum pack height is 1.2 metres. All packs have MDF liner sheets applied to the top and bottom as well as metal packing angles to protect the panel during transport (Fig. 4).

Fig. 3. Skylight System.

Delivery To Site

All deliveries are by road transport direct to site or store as arranged. To secure panels, cargo straps should be spaced approximately every 2.0m (Fig. 5). Unloading remains the client's responsibility. For lifting panels > 9.0m or flexible panels (e.g. Purline), use of a slip-on fork spreader is recommended (refer Fig. 6). Refer to figures 7 and 8 for recommended steps to unload panels of less than and greater than 8m in length. 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. For additional information, see MetecnoSpan® Installation Guide.

Fig. 4. Sample of Packing Arrangement for Shipping.

Fig. 9. Bluescope Technical Bulletin.

Maintenance Recommendation

All exterior metal surfaces not exposed to wash down by rain will benefit from occasional washing to remove a build-up of pollutants and corrosive salts. Refer to BlueScope steel Technical Bulletin, figure 9.

Warranties

Bondor® provides project specific product warranties. Project warranty assessments can be provided during the design phase to assist with material finish selection. Our warranties are supported by our exclusive steel supplier, BlueScope Steel.

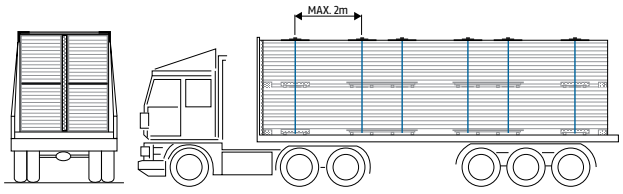


Fig. 5. Positioning of Panel Packs and Cargo Strap.

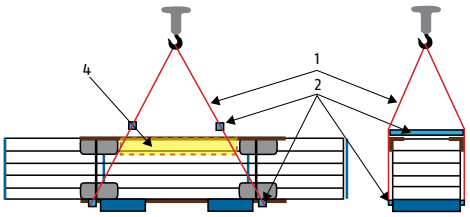


Fig. 7. Unloading of Panels of < 8.0m: 1. Lifting Sling; 2. Sling Separator (Timber/Channels).

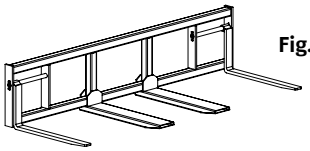


Fig. 6. Slip-On Fork Spreader.

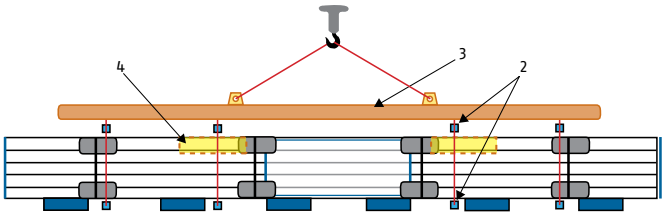
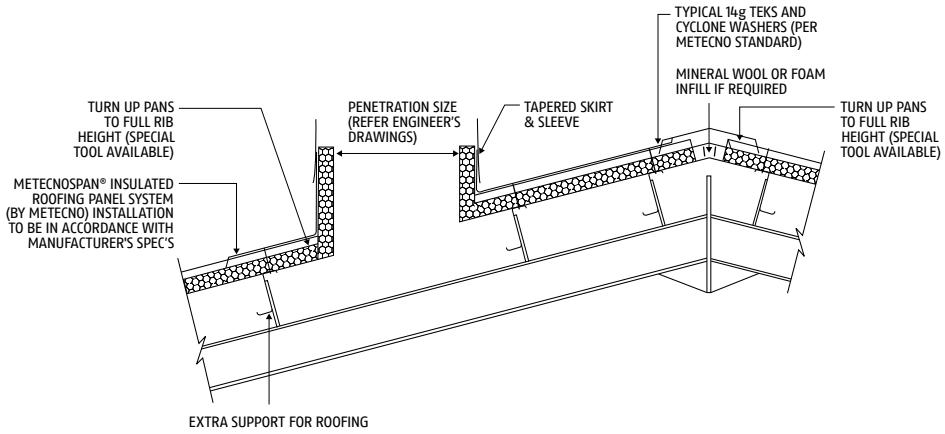


Fig. 8. Unloading of Panels of > 8.0 m: 3. Spreader Beam; 4. Strap-down Corner Angles.

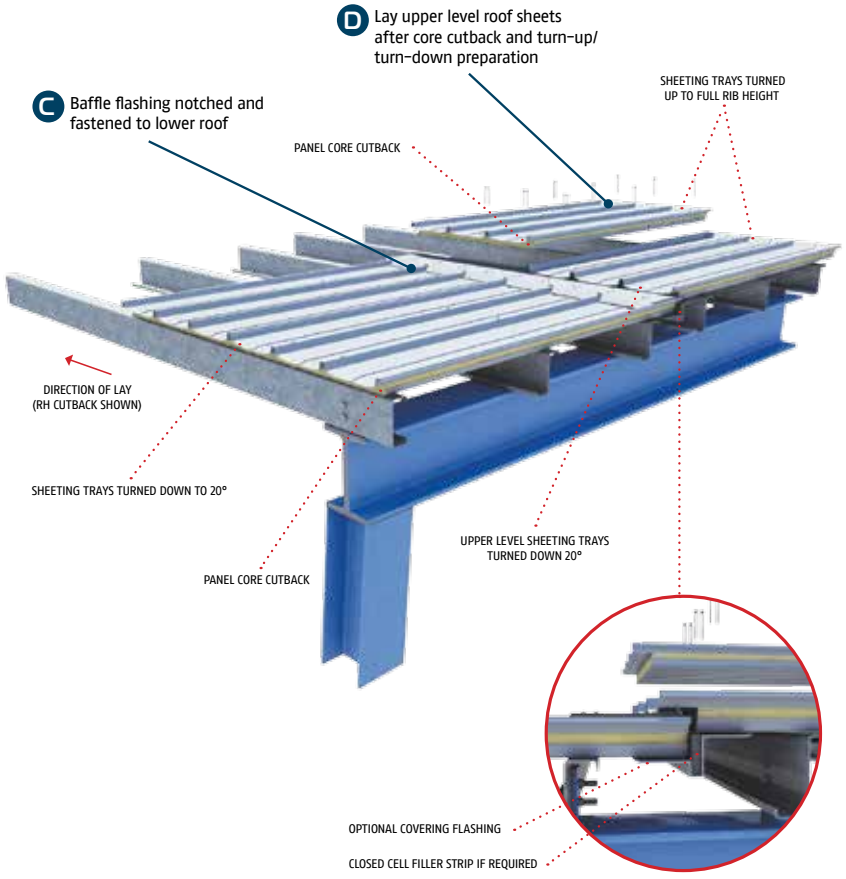
Standard Construction Drawings

This brochure provides recommended construction drawings for MetecnoSpan® installations. The Australian Standards HB 39 Installation Code for Metal Roofing and Walling has been referenced.



Installation Guide

Our Installation Guide is supplied in a separate brochure and provides easy to follow, step by step sequence illustrations, common sense instructions and handy tips, particularly relevant to composite roofing installations.



Pocket Size Installation Guide

Our Pocket Size Installation Guide is available for use onsite.

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