

SolarSpan® Information Guide



Introduction

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

SolarSpan® is an ingenious, cost effective combination of roofing insulation and ceiling in one durable, functional and attractive panel, ideal to meet these Australian conditions. Its outer "skins" are made from BlueScope Colorbond® steel, with the top sheet being high tensile steel, a standard upheld by all reputable Australian steel roofing product manufacturers. SolarSpan® utilises an EPS (Expanded Polystyrene) core which has been used extensively in Australia for over 50 years. It is the traditional, economical building solution for applications requiring long term thermal performance and efficiencies. The panels are available in thicknesses ranging from 50mm to 150mm, with the top skin being an attractive roof profile, and the underside being available in a flat or lightly profiled Colorbond® finish.

SolarSpan® offers an efficient solution for the construction of today's sustainable buildings, whether they be domestic housing, multi residential or light commercial developments. Apart from its superior thermal performance, SolarSpan® construction offers the opportunity to reduce structural components, shorten installation time and reduce overall construction costs.

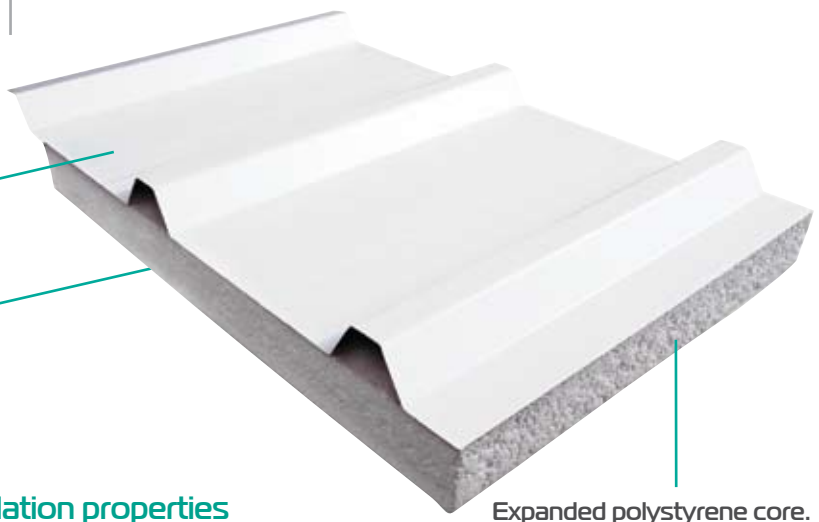
SolarSpan® is a through fixed system suitable for roof pitches of 2 degrees or more. It is manufactured in lengths up to 18 metres. For projects with longer roof runs, a "stepped" expansion joint is recommended.

N.B. Design roof pitches can often suffer structural steel deflection. Our minimum pitch of 2 degrees refers to the actual pitch achieved after deflection. Please note that technical information contained in this brochure supercedes all previous published data where applicable.

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High tensile COLORBOND® steel roof sheet.

Continuous COLORBOND® steel ceiling finish.



Expanded polystyrene core.

SolarSpan® delivers outstanding insulation properties and unrivalled strength in a roofing panel.



SolarSpan® is the Answer

SolarSpan® is a versatile composite panel system providing thermal benefits and simplified installation techniques resulting in shorter construction times, reduced congestion on today's busy building sites, and lower overall cost. It was first pioneered in Australia by Bondor® for Brisbane's "Expo 88" pavilions. Since then thousands of Australian homes and commercial buildings have been transformed through the use of SolarSpan®.

With increasing legislation for more energy efficient building envelopes, SolarSpan® composite technology has become a popular choice because it provides superior thermal performance with reduced structural components. In the summer months the sun regularly heats up your roof to temperatures of 65 degrees and above. Traditional single skin steel, aluminium and polycarbonate roofing allow as much as 75% of this heat to be radiated through. SolarSpan® is an insulated roofing system that lets you enjoy the ambient air temperature without this radiated heat. You can relax in cool comfort during the summer months with SolarSpan®, and equally, enjoy the winter months in insulated warmth.



Features and Benefits

- ✓ Up to 50% faster to install than conventional roofing.
- ✓ Easy installation of a complete roofing system.
- ✓ Large spans, reducing the need for costly additional support structures.
- ✓ A complete roofing system including insulation and smooth ceiling all in one.
- ✓ Superior BCA Part J Compliant thermal properties up to R4.22.
- ✓ Tested for Australian Cyclonic Regions using "lo-hi-lo" cyclonic tests in accordance with latest BCA provisions.
- ✓ 10 year manufacturing warranty.
- ✓ Genuine BlueScope Steel.
- ✓ Strong, Durable and Low maintenance roof system.
- ✓ Short Lead times.
- ✓ Affordable.

Why use Composite Roofing Systems?

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, crumble or lose its effectiveness over time.
- Panels lock together offering a near airtight seal that reduces 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 bridging and reduces 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.



Independent cost analysis has confirmed that composite roofing products like SolarSpan® and 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.

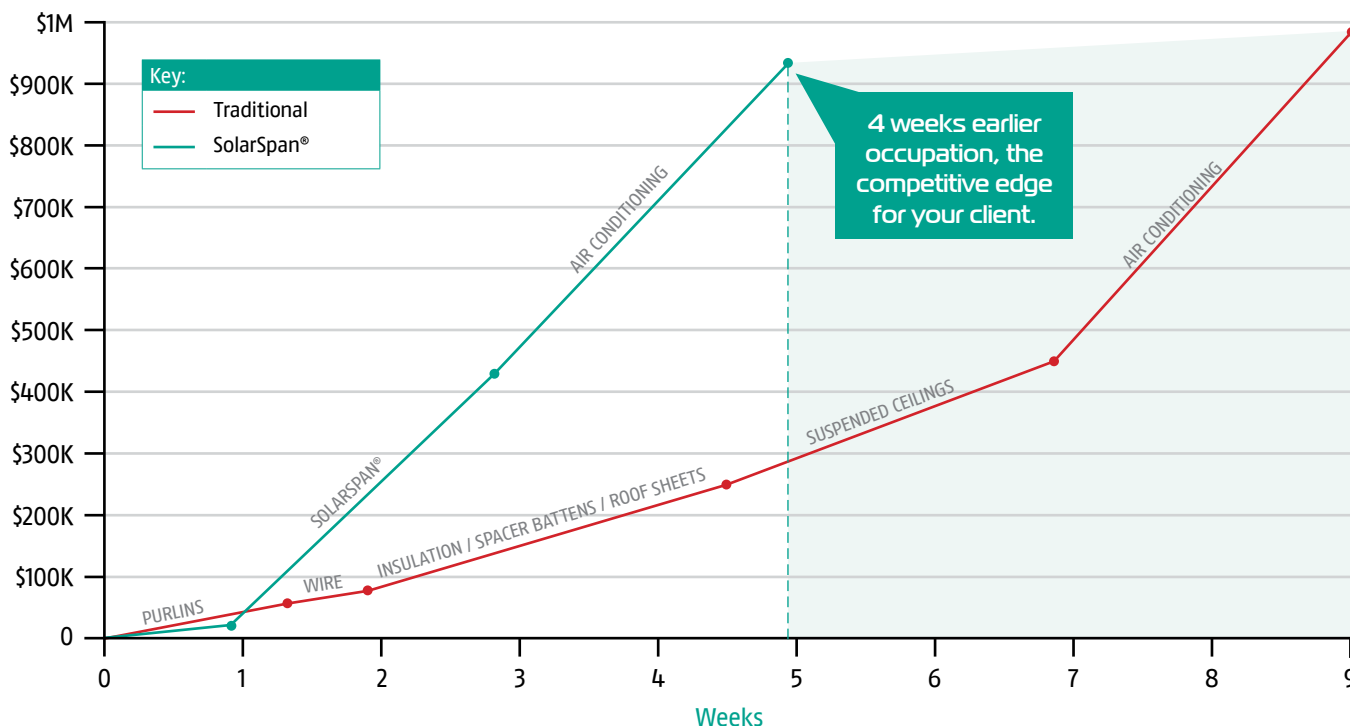
The numbers shown here compare the two systems' raw costs. They do not reflect the significant time saved on site or disruption to the construction flow presented by conventional systems.

Once the SolarSpan® 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 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.

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 Australia.



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® insulated composite panels such as SolarSpan® 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 complete Roofing and Insulation System in one simple to install product."

"I wish I'd found SolarSpan® many years earlier than I did. For so many years I installed roofing the 'conventional' way - laying safety mesh, rolling out bulk insulation, and then spreading and fixing roof sheeting. It was slow and labour intensive. Recent regulations to improve safety and energy efficiency, have made this process even more cumbersome.

Composite roofing systems, combining several of these features into one product, are definitely the way of the future. Products like Bondor® SolarSpan® make life a whole lot easier for the roofing installer. Essentially the several steps used in conventional roofing, are replaced by a single lift of the SolarSpan® product onto the roof, where it is immediately fastened in place. It provides, roof, insulation and often ceiling, all in one. The roofing system is completed in a fraction of the time it would take to install all the other products individually.

I've found that working with composite products like SolarSpan® is safer and more efficient. It truly is a complete roofing and insulation system in one simple to install product."

J. Gibbons.

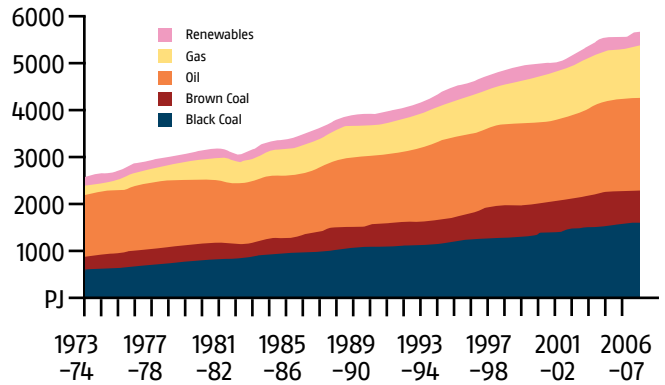
Jason Gibbons Quality Coldroom Constructions

Thermal Efficiency 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 is the key factor for those conscious of cost and environmental savings. The savings earned will continue throughout the life of the building.

Primary Energy Consumption in Australia by fuel



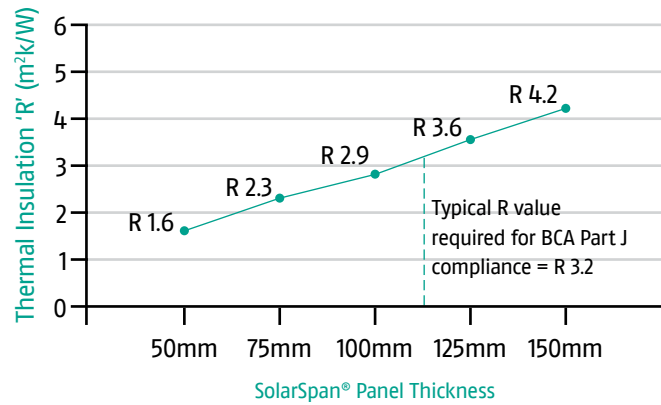
Source: ABARE, Australian energy statistics

Thermal

Expanded Polystyrene (EPS) thermal conductivity has been tested in accordance with relevant Australian Standard and BCA provisions, including AS/NZS 4859.1:2002 "Materials for the thermal insulation of buildings".

SolarSpan® 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 'R Rating' Performance



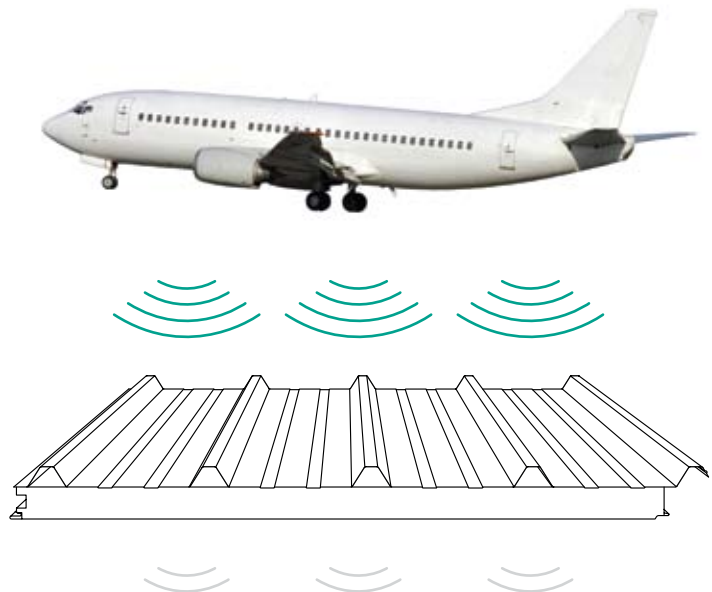
Thermal Insulation - Total Values

Panel Thickness	50	75	100	125	150
R value at 8°C (m²k/W)	1.6	2.3	2.9	3.6	4.2
R value at 20°C (m²k/W)	1.6	2.2	2.8	3.5	4.1

Acoustic

Acoustic testing of SolarSpan® 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 7171:2004.



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	R_w
(a) 50mm	15.4	16.4	18.8	19.7	21.4	22.3	23.4	23.7	25.6	21.0	20.0	34.8	41.7	44.1	44.6	24	25
(b) 125mm	15.0	15.1	17.7	18.5	19.4	19.7	19.1	17.3	18.3	30.1	36.2	37.3	37.1	35.7	39.9	23	24

Span Tables Tested to Australian Standard

Spans

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



Non-Cyclonic

Wind Class		ULS Design Wind Pressure (kPa)		Panel Thickness														
				50mm			75mm			100mm			125mm			150mm		
				Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)
Single Span	Multi-Span	Single Span	Multi-Span	Single Span	Multi-Span		Single Span	Multi-Span		Single Span	Multi-Span		Single Span	Multi-Span				
N2	1.51	3.9	3.6	550	4.5	5.1	900	5.1	6.0	1200	5.7	6.6	1600	6.0	7.2	2400		
N3	2.35	3.0	2.7	550	3.6	3.9	900	3.9	4.8	1200	4.5	5.1	1600	4.8	5.1	1900		
N4	3.50	2.1	1.8	550	2.7	2.4	900	3.3	3.3	1200	3.6	3.3	1400	3.9	3.3	1500		
N5	5.17	1.5	-	550	2.1	1.5	800	2.7	2.1	900	3.0	2.1	900	3.0	2.1	900		

Cyclonic

Wind Class		ULS Design Wind Pressure (kPa)		Panel Thickness														
				50mm			75mm			100mm			125mm			150mm		
				Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)	Max Span (m)		Max. Cantilever (mm)
Single Span	Multi-Span	Single Span	Multi-Span	Single Span	Multi-Span		Single Span	Multi-Span		Single Span	Multi-Span		Single Span	Multi-Span				
C1	3.42	2.1	1.8	550	3.0	2.1	900	3.3	2.7	1200	3.6	3.3	1600	3.9	3.6	1800		
C2	5.08	1.5	-	550	2.1	1.5	800	2.7	2.1	1000	3.0	2.4	1200	3.3	3.0	1300		
C3	7.51	-	-	-	-	-	-	1.8	1.5	700	2.1	1.5	800	2.7	1.5	1000		
C4	10.12	-	-	-	-	-	-	-	-	-	1.5	-	600	2.1	-	600		

Notes:

- Wind speeds and coefficients based on AS 4055 – Wind Loads for Housing.
- Roof pressure coefficients based on the following worst case assumptions:
 - External Pressure – Ratio of building height to least horizontal dimension on plan, $h/d < 0.5$. $C_{pe} = -0.9$
 - Internal Pressure – Non-Cyclonic: Building has no dominate openings & more than one permeable wall or is effectively sealed. $C_{pi} = +0.2$
– Cyclonic: Based on dominate opening pressure. $C_{pi} = +0.7$
 - Local Pressure – Least Horizontal Dimension on Plan $< 20m$ ($a = 4m$). $K_l = 1.5$
 - Combination Factor – $K_c = 0.95$
 - Non-cyclonic – $C_{fig} = -1.57$, Cyclonic – $C_{fig} = -2.28$
- Serviceability deflection limit of span/150 has been allowed for.
- Self weight of the panel has been allowed for, plus an allowance of up to 10kg/m² (0.1kPa dead load) for light duty fittings (lights, etc.)
- Concentrated load of 140kg (as per AS/NZS 1170.1) on any one panel has been allowed for as a separate loadcase.
- Distributed live load of 0.25kPa (as per AS/NZS 1170.1) has been allowed for.
- Fixing at each rib for non-cyclonic regions and each rib and pan for cyclonic regions with 14g tek screws (or equivalent) are required.
- Overhangs:
 - Max. Overhang min. of value stated or 40% of backspan.
 - Overhangs include an allowance for a 1.1kN concentrated load based on strength limit state as a separate loadcase.

Production Coverage, Service, & Support from Bondor®

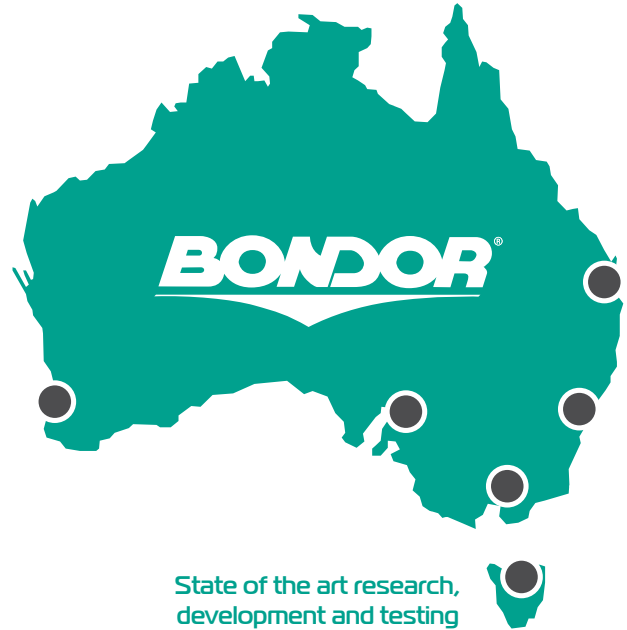
SolarSpan® Availability

The growth in SolarSpan® market acceptance has been so great that Bondor® have increased their production capacity and established a national network that offers the availability of the product on short lead times, generally less than 5 days. The product is manufactured throughout our network of manufacturing facilities, ensuring all customers throughout Australia have ready access to SolarSpan® in a wide colour range, backed up with excellent service and technical support.

SolarSpan® is readily available, with Bondor® manufacturing and distribution facilities across Australia.

SolarSpan® Service

The long term popularity of SolarSpan® as a proven composite roof has enabled Bondor® to deploy a dedicated national SolarSpan® sales team with a customer orientated approach providing indepth product knowledge and superior service.



Testing and Technical Support

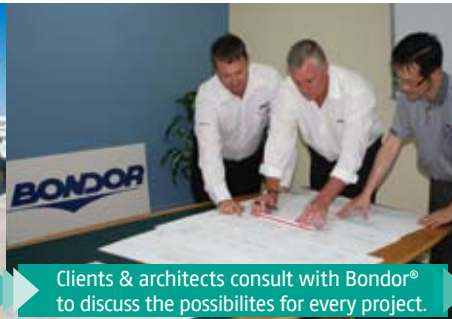
Bondor® has been producing composite panels in Australia for over 50 years, and has developed a detailed understanding of what is required to meet our harsh climates and energy efficiency regulations. Through its own Research and Development, Bondor® is constantly looking for ways to improve their products, targeting greater thermal efficiency, techniques to reduce construction time and ultimately reduce installation costs.

State of the art research, development and testing facilities ensures you always have the best material and advice for your projects.

Production Process



Bondor® manufacture SolarSpan® in their factories across Australia.



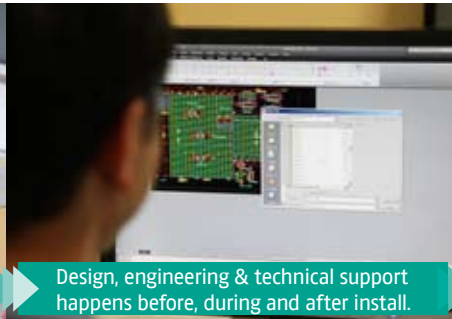
Clients & architects consult with Bondor® to discuss the possibilities for every project.



Bondor® work with architects through the design & concept stage.



SolarSpan® have a range of finishes available for every situation.



Design, engineering & technical support happens before, during and after install.



SolarSpan® panels are made to order & manufactured to strict standards.



Bondor® provide safe & secure delivery to ensure a quality product, delivered on time.



Simple installation of SolarSpan® panels facilitates easy & quick construction.



Small to large scale projects completed, meeting/reducing times & on budget.



SolarSpan® Panel Specifications

Width	Core Material	Length	Thermal Conductivity	Max Skin Temperature Permitted	Adhesive	Underside Finish
1000mm cover	SL Grade Polystyrene 13.5kg/m ³	Cut to order Min. 1800mm Max. 18m	0.038 W/mK	78°C	Thermosetting Two part adhesive (CFC free)	Smooth or Elegance

Product Suitability

SolarSpan® trapezoidal insulated roof panel is suitable for covered outdoor areas, residential housing, multi dwellings, supermarkets, warehouses, factory buildings and retail outlets.

A roof slope of 2 degrees or more is required.

It is the perfect choice where BCA Part J thermal performance is required or where you need a controlled atmosphere.

Product Specification

SolarSpan® by Bondor® is an insulated composite roofing and ceiling panel and it has the following properties.

The external roof cladding skin is manufactured using 0.42mm G550 high tensile AZ150 coated steel to AS 1397. Standard colours are from the BlueScope Steel Colorbond® range. Other BlueScope Steel Colorbond® colours from their light and mid colour range may be available on special order (minimum order quantities apply).

The insulated core is available in a choice of standard thicknesses, 50mm, 75mm and 100mm and is also available in 125mm and 150mm thicknesses on special order. The core is bonded to the inside and outside skins using a two part Polyurethane glue during manufacture.

The internal ceiling cladding skin is manufactured using 0.60mm Colorbond® steel to AS 1397 formed with "Elegance" profiles or Plain finishes. Standard Colour is Surfsmist® (other available, minimum order quantity applies).

End laps for long roof runs should be formed by stepped expansion joints (requires support steel step).

Fasteners must be installed through every rib and manufactured with a minimum Class 4 anti corrosion coating. Fasteners are to be fitted with washers of either galvanized steel or aluminium.

Gutters need to be designed in accordance with AS HB39 and if larger than domestic size should be fixed to structural fascias and not directly to SolarSpan® panel.

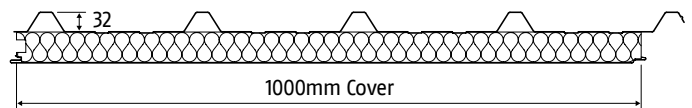
Flashings are manufactured from 0.55 G300, AZ150 BlueScope Colorbond® steel and installed to Australian Standards. Polyethelene infill strips are available to suit the sheet profile.

SolarSpan® Finishes

SolarSpan® is available in three standard thicknesses (50mm, 75mm, 100mm) and two non standard thicknesses (125mm and 150mm) and two finishes for the ceiling, plain or elegance.



Composite panels are interlocked together.



Detail illustration of SolarSpan®

Colorbond®

COLORBOND® steel colours



Note: Check against Colorbond® sample as printed colours may not be accurate.

SolarSpan® ceiling finishes



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.

Packing For Shipment

SolarSpan® 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 18.0 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).

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 > 5.0m, use of a slip-on fork spreader is recommended (refer Fig. 6). Refer to figures 7 and 8 for recommended steps to unload panels. 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.

Maintenance Recommendation

When the product is installed as per manufacturer's recommendations, 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. Please seek advice for product selection when in close proximity to breaking surf or other potentially corrosive environments.

Warranties

Bondor® provides project specific 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. SolarSpan® roofs should be installed according to Standards Australia - HB39 - Installation code for metal roof and wall cladding.



Fig. 1. Turn Up / Turn Down Tool.



Fig. 2. Specifier Sample Kit.



Fig. 3. Skylight System.



Fig. 4. Sample of Packing Arrangement for Shipping.



Fig. 9. BlueScope Technical Bulletin.

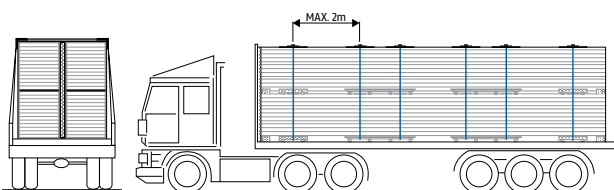


Fig. 5. Positioning of Panel Packs and Cargo Strap.

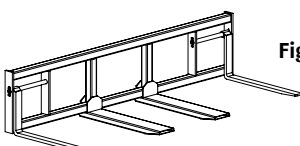


Fig. 6. Slip-On Fork Spreader.

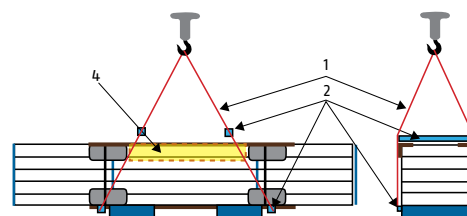


Fig. 7. Unloading of Panels of < 8.0m: 1. Lifting Sling; 2. Sling Separator (Timber/Channels).

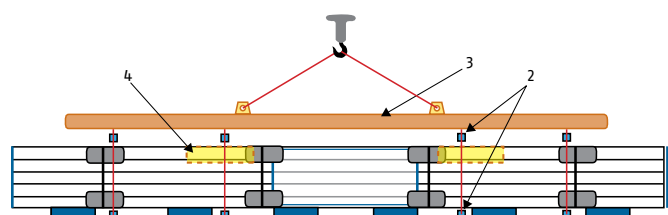
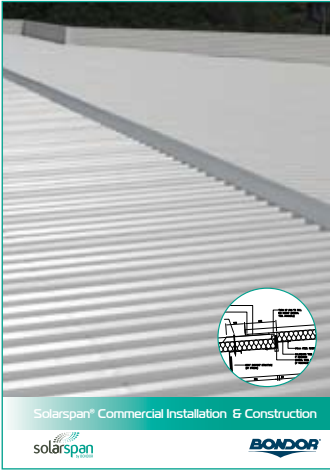
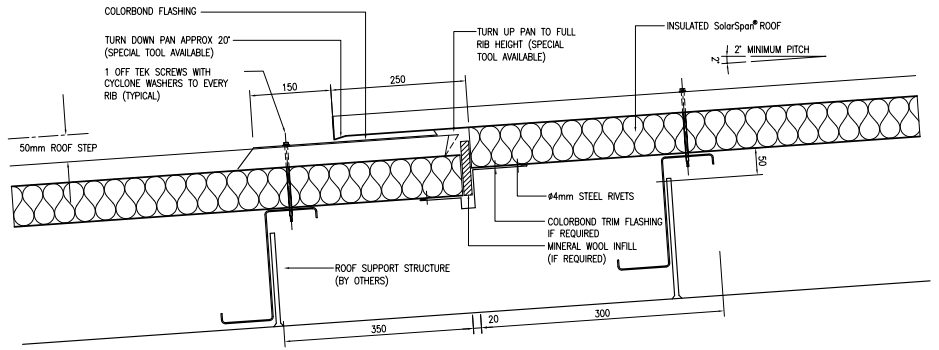


Fig. 8. Unloading of Panels of > 8.0 m: 3. Spreader Beam; 4. Strap-down Corner Angles.



Commercial Installation & Construction Brochure

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



Patio Information Guide

The SolarSpan® Information Guide provides an overview about the product, its benefits, application and finishes.



Patio 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.



Other Composite Roofing Products Available from Bondor® Include:



A cost effective, fire retardant commercial roof/ceiling/insulation system utilising a PIR core.



A low cost panel with a 0.42mm external Colorbond® skin, a R1.8 rated PUR insulating core and a white vinyl or foil underside. Purline is specified extensively for poultry and livestock buildings.



An EPS cored sandwich panel which can be manufactured in lengths up to 20 metres and capable of large spans. It is regularly specified in recreational, institutional and school halls as well as industrial buildings.

www.solarspan.com.au

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The manufacturer reserves the right to change the specification without notice. SolarSpan® is a trademark of Metecno Pty Limited. COLORBOND® and colour names are trademarks of BlueScope Steel. Check against actual COLORBOND® sample as printed colours may not be accurate.