JAS LYCORSEAM ®

Metal Roof & Wall Cladding System

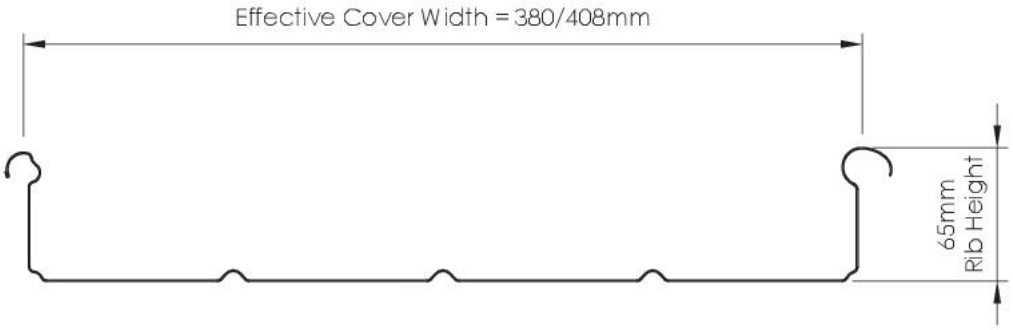
18 Tampines Industrial Cres, #07-05, Space@ Tampines, Singapore 528605, Tel: +65 6842 0606

JAS LYCORSEAM

FEATURES

JAS LYCORSEAM® standing seam roof system emanates modernity and versatility in architectural appeal, yet highly functional. Its concealed clips are specially designed to minimise heat conductivity whilst maximising thermal expansion sliding efficiency.

JAS LYCORSEAM® is an ideal choice for aesthetically pleasing standing seam roof system.

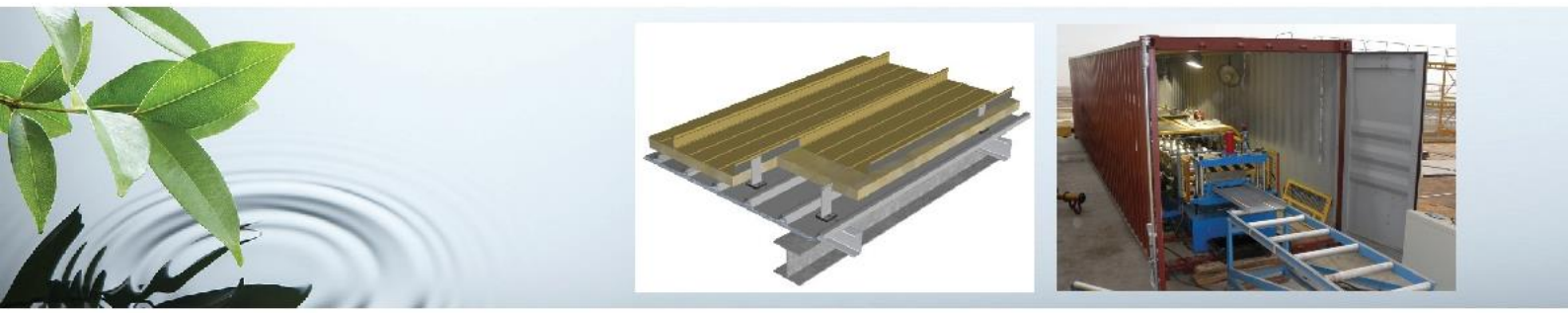


EXCELLENT PROPERTIES

- Exceptional waterproofing roof system due to its high ribs – minimum of 1° pitch is possible.
- No exposed fixing on roof, thus eliminates risk of leakage.
- **JAS LYCORLINERTM** – purpose-built liner to ensure integrity of system.
- Long spanning capability due to **JAS LYCORCLIPTM** specially designed concealed clips .
- **JAS LYCORCLIPTM** - specially designed to minimise heat transfer.

AESTHETICALLY PLEASING & COST EFFECTIVE

- Cost effective solution when used as single-skin in steel - due to its inherent strength.
- Tapered or Straight panels, Smooth or Crimped-curve capability – offers design options and with different metals, ferrous or non-ferrous .
- Quick and simple installation – resulting in cost savings.
- On-site roll-forming capability – offering further design options.



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MATERIALS

Steel

The strength and formability of steel makes it an ideal material for roof and wall panels. **JAS LYCORSEAM®** is a cold roll formed roof and wall cladding manufactured from high strength steel of G300 base material (300MPa minimum yield stress), with ZINCALUME® steel (Zinc & Aluminium alloy) coating, in accordance with AS 1397 and COLORBOND® pre-painted steel in accordance with AS 2728.

COLORBOND® pre-painted steel shall achieve CLASS '0' in accordance to BS 476 PART 6 & 7. The core material ZINCALUME® shall be non-combustible in accordance to BS 476 PART 4.

Aluminium

Available in mill finish or pre-painted, aluminium provides another choice of material for **JAS LYCORSEAM®** in demanding environmental situations as well as fulfilling your challenging roof designs. Working in close consultation with leading aluminium mills on appropriate selection of alloy, temper, hardness and paint system, **JAS LYCORSEAM®** is practically tailored to the individual needs and demands of your projects.

Other Materials

JAS LYCORSEAM® is also available in other non-ferrous materials, e.g. titanium-zinc, copper, etc. For further information, please contact **JRP & Associate Pte Ltd.**

ADVERSE CONDITIONS

If **JRP & Associates Pte. Ltd.** range of roofing, walling or rainwater products within 1km of salt marine or industrial and unusually corrosive environments, please contact our Technical Department for advice.

COLOUR COATING OPTIONS

Clean COLORBOND® pre-painted steel is resistant to dirt pick-up and staining. The various categories of Clean COLORBOND® pre-painted steel finishes offer excellent gloss and long lasting life span to the roof and wall cladding.

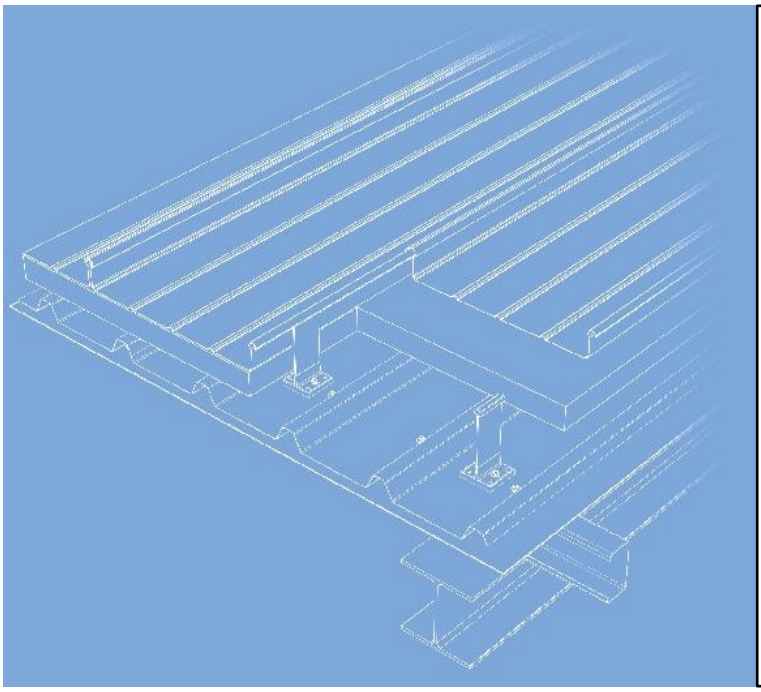
The following Clean COLORBOND® pre-painted steel finishes are available:

1. **Clean Colorbond® Ultra Steel** (Used for severe applications that require premium durability.)

2. **Clean Colorbond® XPD Steel** (Used for moderate/ severe applications that require premium durability.)

3. **Clean Colorbond® XPD Pearlescent Steel** (Used for moderate/severe applications that require premium durability and a decorative alternative.)

*For appropriate coating option or other materials such as Aluminium, Titanium Zinc, Copper, etc, please contact **JRP & Associates Pte. Ltd.***



INTERNAL LINER STEEL DECK

JAS LYCORLINERTM is the structural component that provides support and mounting surface for roof build up system. The deck will normally be a galvanised, ZINCALUME® steel (Zinc & Aluminium alloy) or Clean COLORBOND® pre-painted profile available at **JRP & Associates Pte. Ltd. JAS LYCORLINERTM** can also be a perforated product, which is used for sound absorption.

SUPPORT BATTENS

The battens are also used as support for fastening the concealed clips. These support battens can either be Z-shape or top hat section depending on the depth of the roof and application of the internal liner.

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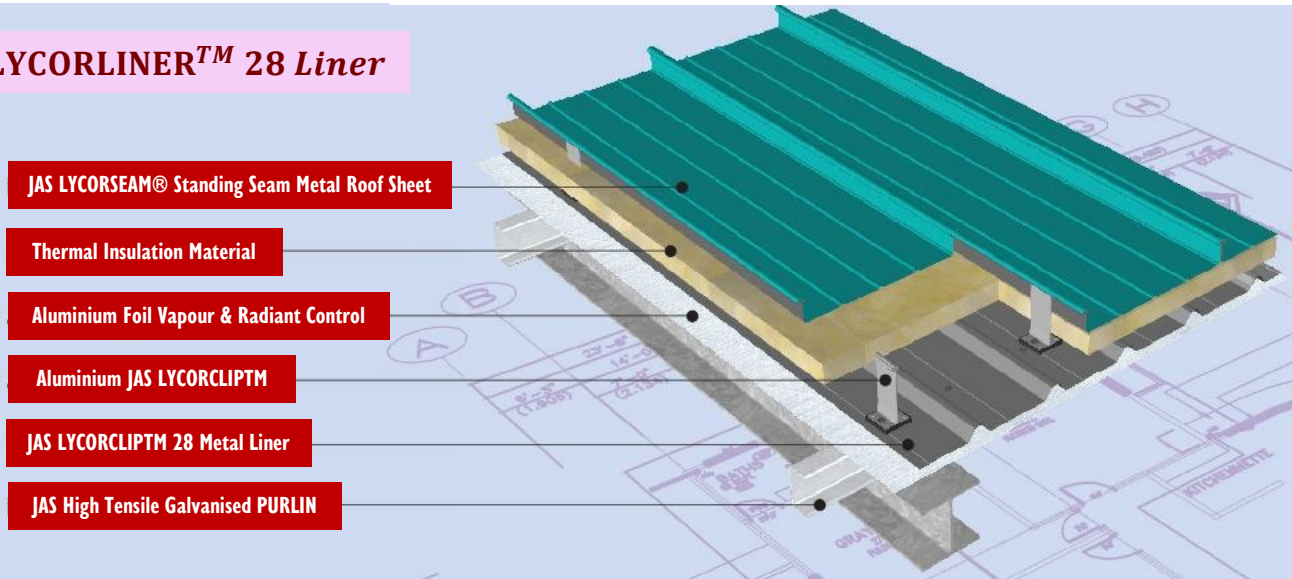
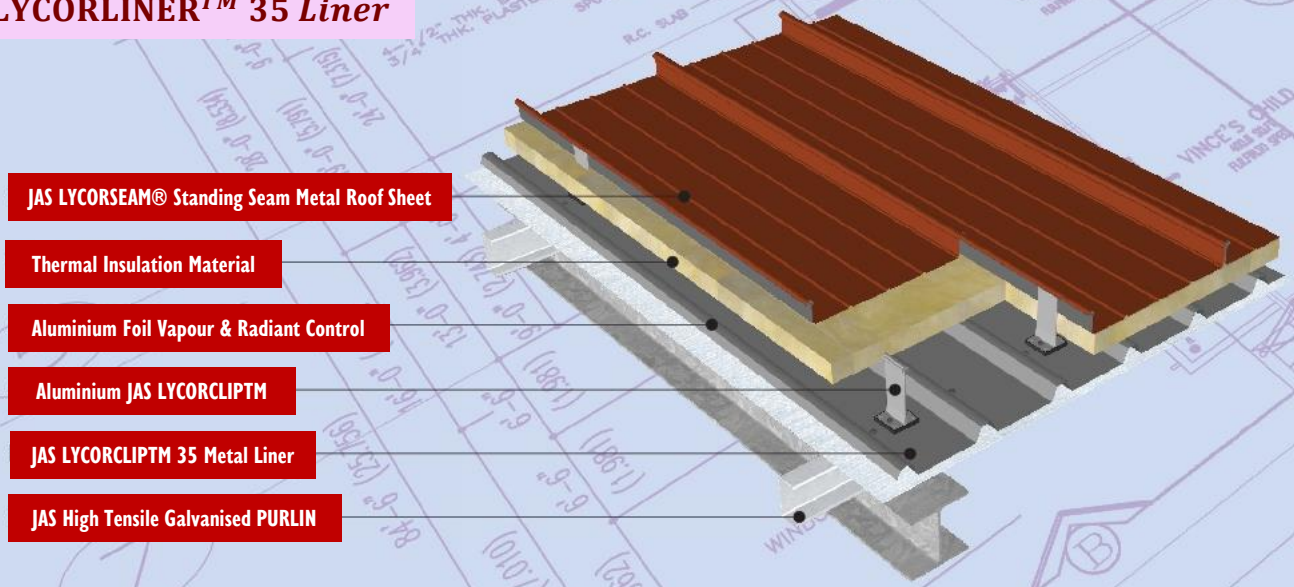
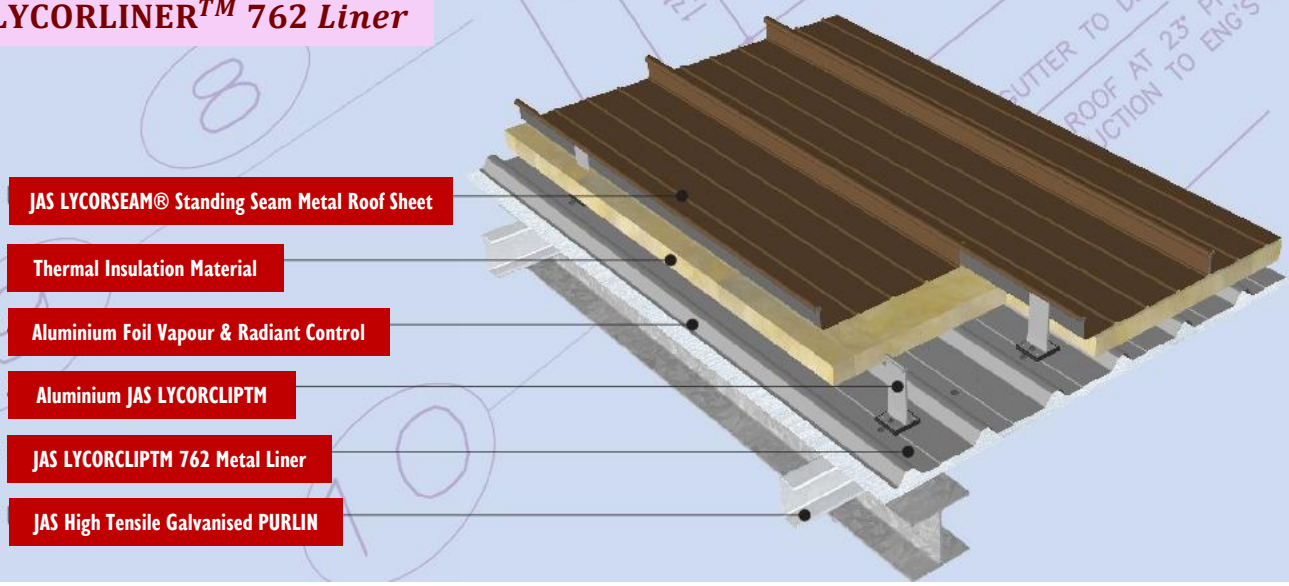
JAS LYCORLINER^{TM} 28 *Liner*



JAS LYCORLINER^{TM} 35 *Liner*



JAS LYCORLINER^{TM} 762 *Liner*



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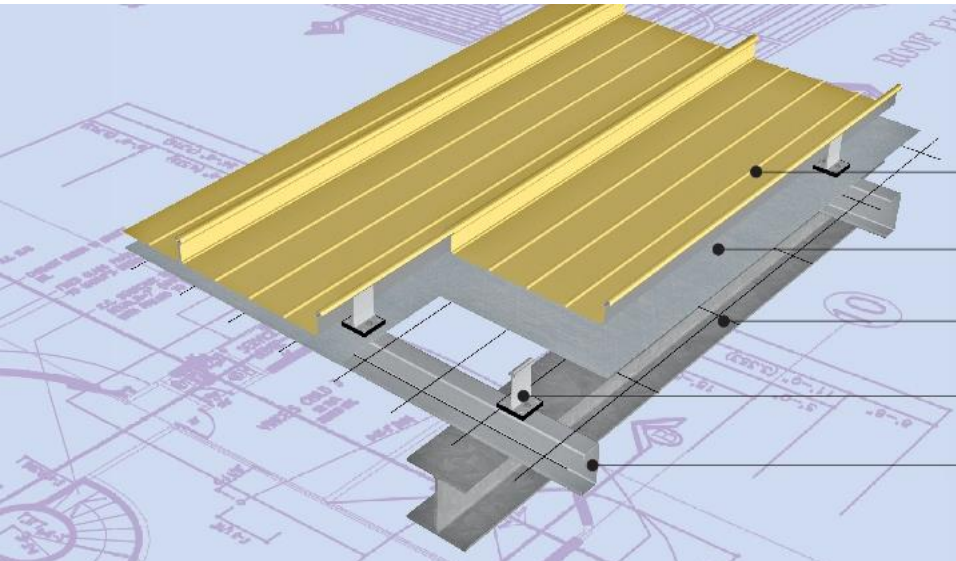
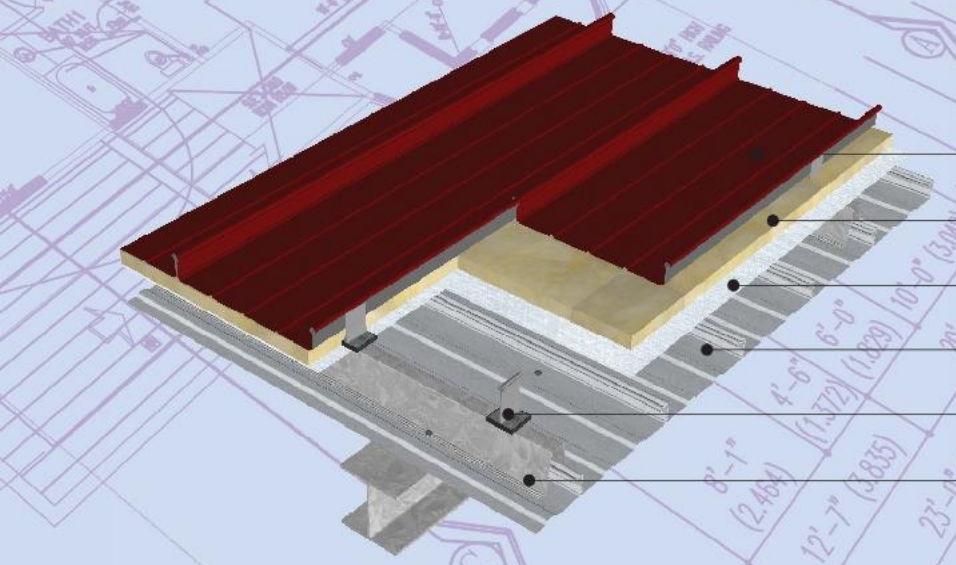
SINGLE SKIN ROOF



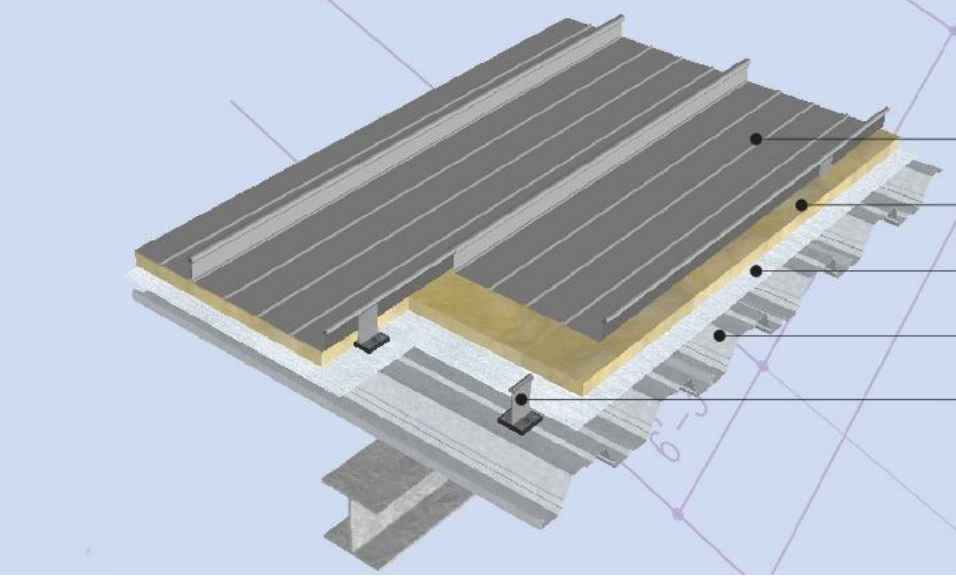
- JAS LYCORSEAM® Standing Seam Metal Roof Sheet
- Aluminium Foil Vapour & Radiant Control
- Galvanised Roof Mesh
- Aluminium JAS LYCORCLIPTM
- JAS High Tensile Galvanised PURLIN

JAS LYCORSEAM® Liner



- JAS LYCORSEAM® Standing Seam Metal Roof Sheet
- Thermal Insulation Material
- Aluminium Foil Vapour & Radiant Control
- JAS LYCORCLIPTM 28 Metal Liner
- Aluminium JAS LYCORCLIPTM
- JAS High Tensile JAS TOPHAT®

JAS FORMDEK® Liner



- JAS LYCORSEAM® Standing Seam Metal Roof Sheet
- Thermal Insulation Material
- Aluminium Foil Vapour & Radiant Control
- JAS FORMDEK® Metal Liner
- Aluminium JAS LYCORCLIPTM

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ARCHITECTURAL & TECHNICAL SPECIFICATION

The roofing and/or wall cladding metal sheets shall be 0.55 mm BMT. **JAS LYCORSEAM®** produced by **JRP & Associates Pte. Ltd.**, with 65mm rib height at 380 mm or 408 mm panel cover width. The sheets shall be installed using concealed fixing clips in accordance to manufacturer's recommendations. The fasteners used to secure the fixing clips to the supports shall conform to Australian Standard AS3566 and be compatible with the roofing material used. The clips shall be concealed and no fasteners are to penetrate the cladding. The **JAS LYCORSEAM®** ribs must be mechanically seamed to complete the installation of the roof.

The sheeting material shall be protected steel sheet in accordance to Australian Standard AS1397 with a minimum yield stress of 300MPa (Grade G300), metallic hot-dip coated with aluminium/zinc alloy comprising 55% aluminium, 43.5% zinc and 1.5% silicon. The minimum coating mass for the aluminium/zinc alloy coated steel shall be AZ200 (200 g/ m2 minimum coating mass) as determined by Australian Standard AS1397.

Wherever applicable, the installation of the metal sheets shall be in accordance to the "Installation code for metal roofing and wall cladding; Standards Australia SAA HB39-1997".

A minimum of 50mm shall be provided for projection into gutters. Flashings shall be supplied in compatible materials, as specified. Minimum cover of flashing shall be 150mm.

All sheeting shall be fixed in a workman like manner, leaving the job clean and weather-tight. All debris (nuts, screws, cuttings, filings etc.) shall be cleaned off daily.

*Note: For specification of **JAS LYCORSEAM®** in non-ferrous metals, please contact **JRP & Associates Pte Ltd.***

INSTALLATION PROCEDURE

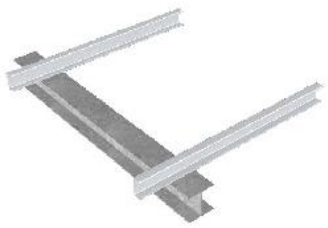
The support for the insulation will either be wire mesh, reinforced vapour barrier or JRP LYCORLINERTM secondary roof. For STC roof system, JRP LYCORLINERTM is first installed over the purlins. Thereafter, JAS LYCORCLIPTM should be fixed at alternate pans of JRP LYCORLINERTM, with 50mm thick rock-wool laid between. Following this, JAS LYCORSEAM® roof sheets are fixed on JAS LYCORCLIPTM. The final step is to mechanically seam the ribs for the entire length of the panel.

For installation procedure of single-skin in steel, please contact **JRP & Associates Pte. Ltd.**, Technical Department.

FIXING REQUIREMENT

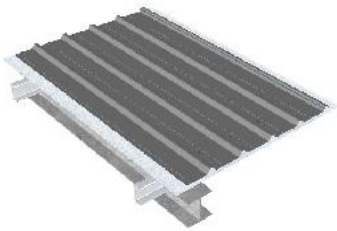
During installation, there are loads that will act on the panel parallel with any plane. This has the effect of pulling the panel down the slope of the roof. If the panel is not adequately fixed to the structure to prevent such drag loads, it will creep down the plane of the roof. Establishing the points of fixity depend on the roof type, clip type and amount of movement. Please contact **JRP & Associates Pte. Ltd.**, Technical Department, for more details.

Note: For some curve roof applications such as barrel roofs, special fixings may be required. Please consult **JRP & Associates Pte. Ltd.**, Technical Department, for further assistance.

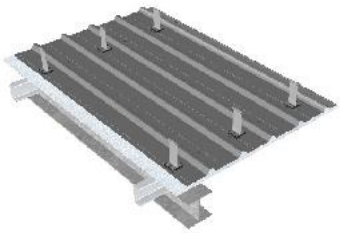


Step 1 -Installation of High Tensile Galvanised **JAS PURLINTM**.

Step 2 -Laying out Aluminium Foil for vapour and radiant control.

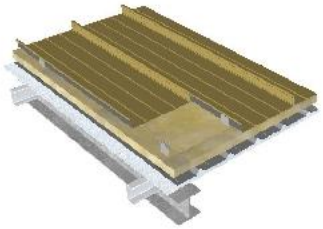


Step 3 -Install **JAS LYCORLINERTM** metal substrate.



Step 4 - Mount **JAS LYCORCLIPTM** on the metal substrate.

Step 5 - Laying out Insulation material.



Step 6 - Install **JAS LYCORSEAM®** metal roof and seam it using hand tools or power seaming machine.

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STRUCTURAL DATA

PROPERTIES

JAS LYCORSEAM® - Effective Cover Width Table

Rib Height	Effective Cover Width	Mass Per Unit Area (kg/m²)					
		Colorbond® (TCT)		Aluminium (BMT)			
		0.61 mm	0.71 mm	0.80 mm	0.90 mm	1.00 mm	1.20 mm
65mm	380mm	6.82	7.99	3.22	3.63	4.03	4.84
	408mm	6.67	7.81	3.15	3.55	3.94	4.73

The allowable tolerance shall be ± 4mm. For other cover widths availability, please contact **JRP & Associates Pte. Ltd.**, Technical Department.

PERFORMANCE

JAS LYCORSEAM® Permissible Wind Load Table

Rib Height	Effective Cover Width	Clip Spacing (mm)	Permissible Wind Load (kPa)					
			Colorbond® (TCT)		Aluminium (BMT)			
			0.61 mm	0.71 mm	0.80 mm	0.90 mm	1.00 mm	1.20 mm
65mm	380mm	1200	5.50	6.20	3.60	4.50	5.60	6.20
	408mm	1200	5.10	5.80	3.40	4.20	5.20	5.80

The allowable tolerance shall be ± 4mm. For other cover widths availability, please contact **JRP & Associates Pte. Ltd.**, Technical Department.

THERMAL MOVEMENT

JAS LYCORSEAM® Length & Thermal Movement

Rib Height	Temperature Differential	Thermal Movement for Every Metre Length of Roof	
		Colorbond®	Aluminium
65mm	30°C	0.30mm	0.69mm
	50°C	0.60mm	1.15mm
	70°C	0.80mm	2.07mm

The allowable tolerance shall be ± 4mm. For other cover widths availability, please contact **JRP & Associates Pte. Ltd.**, Technical Department.

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STRUCTURAL DATA

CURVED PANEL

Roof Pitch & Curving Characteristics

Rib Height	Minimum Pitch (Degrees)	Minimum Radius (Convex Sprung Curve)						Minimum Radius (Convex Pre-Curve)*					
		Colorbond® (TCT)		Aluminium (BMT)				Colorbond® (TCT)		Aluminium (BMT)			
		0.61 mm	0.71 mm	0.80mm	0.90mm	1.00mm	1.20mm	0.61 mm	0.71 mm	0.80mm	0.90mm	1.00mm	1.20mm
65mm	1	65.00m	65.00m	40.00m	40.00m	50.00m	55.00m	15.00m	12.00m	12.00m	10.00m	3.00m	2.50m

Rib Height	Minimum Pitch (Degrees)	Minimum Radius (Concave Pre-Curve)*						Minimum Radius (Concave Pre-Curve)*					
		Colorbond® (TCT)		Aluminium (BMT)				Colorbond® (TCT)		Aluminium (BMT)			
		0.61 mm	0.71 mm	0.80mm	0.90mm	1.00mm	1.20mm	0.61 mm	0.71 mm	0.80mm	0.90mm	1.00mm	1.20mm
65mm	1	75.00m	75.00m	45.00m	45.00m	50.00m	60.00m	*	*	25.00m	20.00m	15.00m	10.00m

JAS LYCORSEAM® can be pre-curved in the factory prior to delivery to site or sprung curved on site during installation.

***** *Please consult **JRP & Associates Pte. Ltd.**, Technical Department for smooth curve limits.*

TAPERED SHEET and WAVEFORM: For sprung and pre-curve sheet requirements, please consult **JRP & Associates Pte. Ltd.**, Technical Department.

WATER – CARRYING CAPACITY

JAS LYCORSEAM® Water Carrying Capacity Table

Roof Slope	Rainfall Intensity mm/hr								
	150	180	200	230	250	280	300	350	400
	Maximum Roof Run Length(m)								
1°	305	250	225	195	180	160	150	130	110
2°	425	355	320	295	255	225	210	180	160
3°	520	430	390	340	310	295	260	220	195
4°	595	495	445	385	355	320	295	255	220
5°	660	550	495	430	395	355	330	280	245

JAS LYCORSEAM® roofing has excellent water-carrying capacity. This and the sheeting stiffness enable roof slope to be as low as 1o for many applications. It is imperative that this minimum slope is adhere to all points of the roof to prevent ponding from occurring. Roof run lengths are the combined lengths of all roof elements contributing to a single pan drainage path. This can include the roof length upstream of a roof penetration that concentrates flow into other pans. The table above gives slope for 100 year return period rainfall intensity. For more information, please contact **JRP & Associates Pte. Ltd.**, Technical Department.

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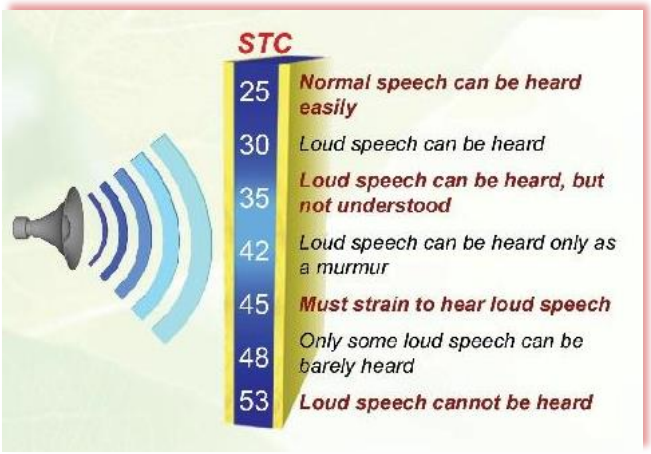
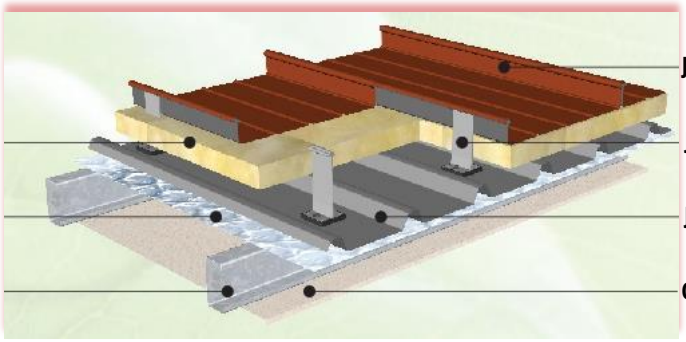
JAS LYCORSEAM® SPECIAL APPLICATION

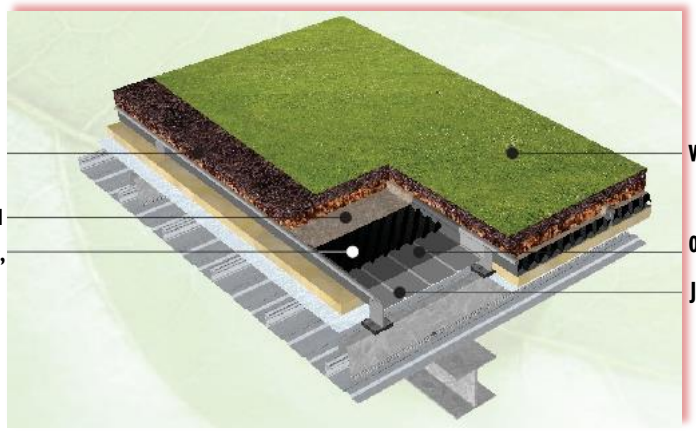
ACOUSTIC AND THERMAL REQUIREMENTS

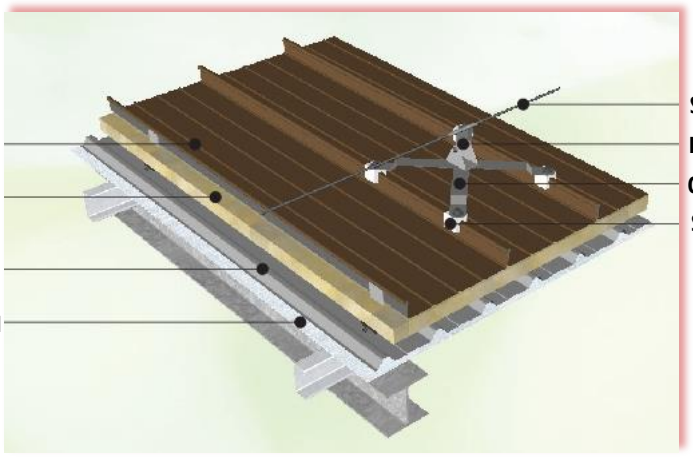
JRP & Associates Pte. Ltd. can provide standard details for various Sound Transmission Class (STC) and Impact Isolation Class (IIC), if required. The thermal resistance will vary depending on the roof design and would have to be calculated by the designer, if required. Please consult **JRP & Associates Pte. Ltd.**, Technical Department, for assistance with your roof design.



BUILD-UP FOR STC (SOUND TRANSMISSION CLASS) 56, TESTED IN ACCORDANCE WITH ASTM E90 – 97







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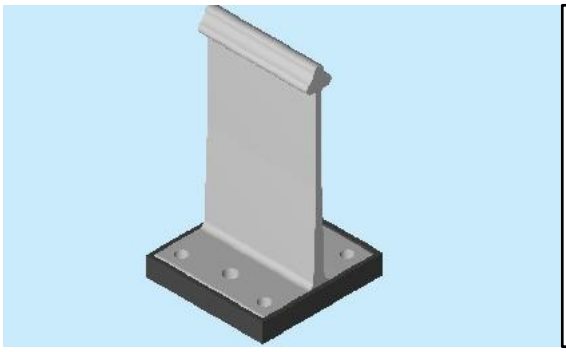
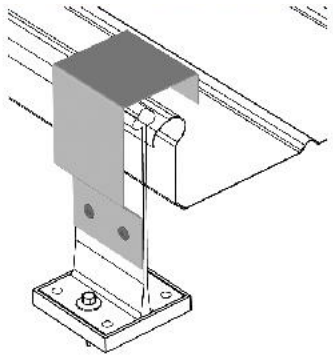
JAS LYCORSEAM® CLIP & ACCESSORIES



PANEL FIXING CLIPS

A specially designed concealed clip allows movements of sheeting arising from thermal expansion and contraction. **JAS LYCORCLIPTM** is hidden within the seam, engaging the rib. The clip spacing is coordinated with the panel size and structural characteristics to provide the necessary wind uplift resistance.

BARGE HOLD DOWN BRACKET

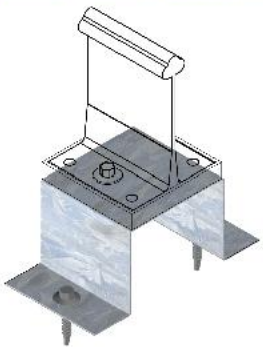


Use for holding down the starting and the end panel, also will served as a fixing bracket for barge flashing.

SEAMING MACHINE

Power Seaming Machine Tool.

JAS TOPHAT BRACKET

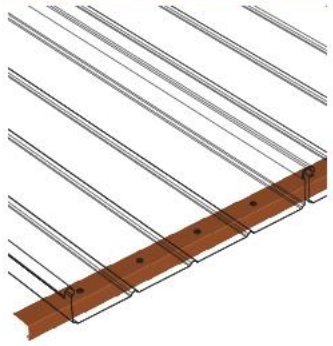


Use when thicker Roof Build- up is required for higher acoustic and thermal application.

HAND SEAMING TOOLS

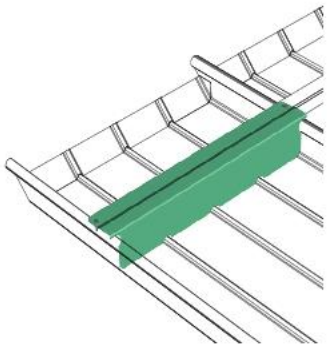
Manual Seaming Tools.

EAVES ANGLE BRACKET



This bracket serves as drip mold to the roof eaves, preventing back flow of water to the underside.

END-CLOSURE BRACKET



Serve as End-closure to control back-splash of rain water and as a fixing bracket for flashing.

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FOOT TRAFFIC

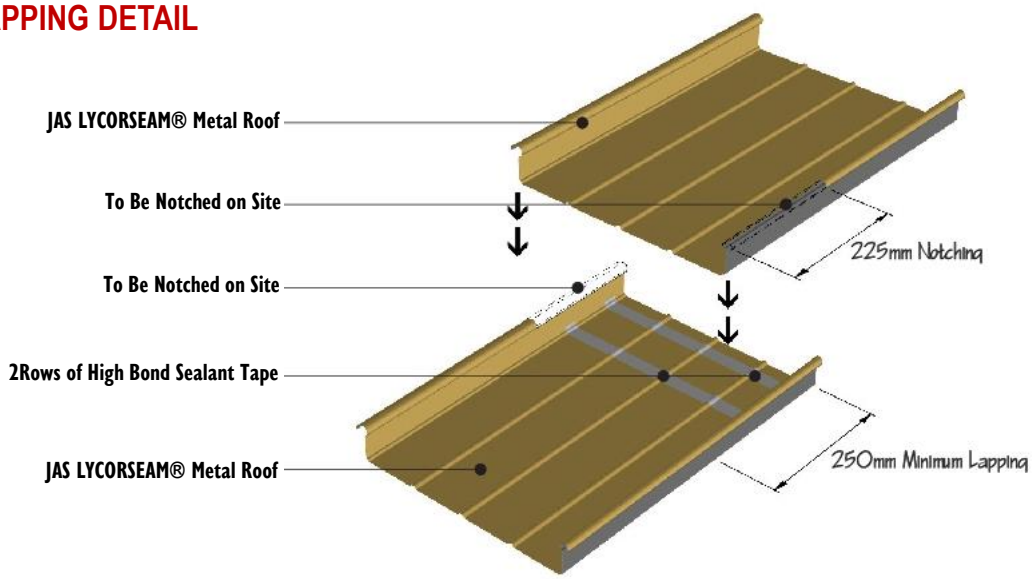
When walking on **JAS LYCORSEAM®**, always wear clean, non-marking and flat rubber soled shoes. Avoid unnecessary foot traffic and walk on the flat of the panel at or near the supporting roof structural members as much as possible. Do not use the roof panel as a working platform.

LAPPING OF SHEET

The minimum end lap should be 250mm when lapping metal to metal. It is recommended that the laps be laid in a staggered fashion on adjacent roof sheets so as to enhance aesthetics.

Note: Lapping, only possible with minimum roof pitch of 3o.

JAS LYCORSEAM® LAPPING DETAIL



COMPATIBILITY

Lead flashings should not be used in conjunction with ZINCALUME® steel or Clean COLORBOND® pre-painted steel sheeting. Drainage from ZINCALUME® or Clean COLORBOND® pre-painted steel roofing (inert materials) should not be allowed to discharge onto galvanised rainwater components. Drainage from copper roofing should not be allowed to discharge onto ZINCALUME® steel, galvanised, Clean COLORBOND® pre-painted steel or aluminium rainwater components. Each of these combinations may lead to premature corrosion.

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ORDERING

When ordering, please have the following information available to ensure a speedy processing of your requirements:

- Customer/Company name, address, phone number & fax number.
- Contact person name & phone number.
- Name of Product (e.g. **JAS LYCORSEAM®**) and material (e.g. G300 steel). Thickness of product (e.g. 0.61mm TCT). Coating or Colour (e.g. Clean COLORBOND®: Enduring White colour).
- Number/quantity and length of sheets (e.g. 10 pieces of 5 metres length per piece).
- Flashing – style, quantity and colour.
- Delivery address (e.g. No. 10 Telok Kurau Lane, Singapore).
- Delivery date & preferred time.
- Site access (please specify whether current access to delivery location would permit entry by standard 12 metres length flat-bed trailers).
- Cranage requirement (please specify whether cranage will be required at site).

LENGTH

The sheets are manufactured at **JRP & Associate Pte. Ltd.** Factory or on construction site. The length of the sheet is a function of design requirements, geometry of the roof (i.e. curving or other factors), site conditions and workability and transportation constraints.

Lengths specified must be actual site measurements and not plan dimensions. The length should be measured accurately, and allowance should be made for clearance at the ridge (unless the sheet is continuous over the ridge) of normally around 50mm. At the eaves, the overhang allowed for into the gutter which is normally not less than 50mm. Where a "step down" or expansion joint is incorporated into the roof an allowance of not less than 300mm should be added. The tolerance of the length of product supplied is +0, -15mm.

FLASHING

Standard flashing are readily available for use with **JAS LYCORSEAM®** roofing.

DELIVERY

Delivery can normally be made within 2 or 3 days, subject to the delivery location and material availability. Please assist u s to provide undamaged product by ensuring that suitable arrangements have been made for truck unloading. When lifting sheeting by crane, care should be taken to ensure that the load is spread to prevent sheeting damage. Where a crane is not available, sufficient labour must be supplied to assist in manual unloading.

HANDLING

JAS LYCORRIB® 28 should be handled with care at all times to preserve the quality of the finish. Packs should always be kept dry and stored above ground level whilst on site. If however the sheets have become wet then they should be separated, wiped and placed in the open to aid in drying.

FASTENERS

All fasteners should conform to AS 3566 and be compatible with the roofing material used. The fastener of the roof clip to support the standing seam is gauge # 10 screw. The flat shape of the screw head is very important, as a high head will puncture the flat pan of the roof sheet.

CUTTING

Sheeting can be cut, where necessary, by means of metal snips or electric nibbler. The use of cutting discs should be avoided but if it is used, the Clean COLORBOND® pre-painted steel sheeting should be placed downwards, or carefully shielded, to minimize the risk of hot filings embedding in the painted surface.

CLEAN UP

Ensure that all debris, nails, rivets, screws, rags and especially filings & particles from cutting or drilling, are carefully cleared from the surface after each day's work or premature corrosion could occur.

OIL CANNING

As in all flat pan-roofing profiles, the flat surfaces of the metal sheets may exhibit some degree of undulation known as "oil canning". The extent and degree of oil canning will generally depend on factors such as width of the flat pan, the radius of the curved roof, variations in level of the purlins or batten supports, etc. Please note the oil canning is regarded as an inherent characteristic, not a defect of flat pan roofing profiles. As such, oil canning of **JAS LYCORSEAM®**, if present, shall not form the basis of product rejection by the end-user.