



# LYSAGHT® TRIMDEK®

Roofing and Walling Solutions





STAR Automotive Centre



Punggol Community Centre



Curtin University of Technology, Sarawak Campus, Miri, Sarawak, Malaysia



EMERL Building  
(Electromagnetic Effects Research Lab),  
Nanyang Technological University



Sengkang Sports & Recreational Centre



Singapore Exposition Halls 7 to 10



Multi-Storey Carpark @ Club Street



Sejak Takraw & Silat Federation,  
Bekoh Sports Complex

## PRODUCT DESCRIPTION

LYSAGHT® TRIMDEK® steel cladding is a subtle square fluted roofing and walling profile. The fluting in the pans provides strength and long spanning capabilities, making it one of the most economical LYSAGHT® roofing profiles.

It has bold, widely spaced ribs and is available in long lengths, governed only by transportation considerations. Due to its strength, spanning ability, lightness and rigidity, wide support spacings can be used with safety.

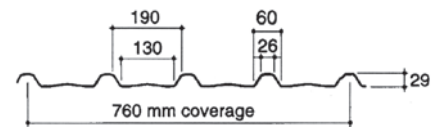
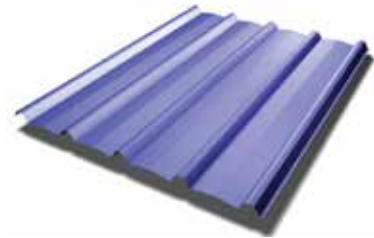
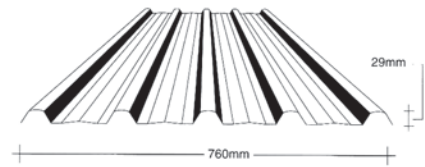
LYSAGHT® TRIMDEK® cladding can be curved by crimp curving process. It is available in both convex and concave shapes to provide versatility and creativity to building designs. The minimum radius of curvature must be at least 450mm for

convex and 550mm for concave to underside or pan of sheet.

Performance of the profile is tested and proven by NATA registered laboratory at BlueScope Lysaght Technology, Sydney, Australia and CSIRO Australia (Commonwealth Scientific and Industrial Research Organisation).

Typical Applications include:

- Roof
- Wall
- Fascia
- Feature wall
- Fencing
- Internal ceiling
- Soffit



## PHYSICAL PROPERTIES

LYSAGHT® TRIMDEK® Profile	STANDARD	NON-STANDARD <sup>#</sup>
<b>Base Metal Thickness (BMT)</b>	0.42mm	0.48mm
<b>Total Coated Thickness (TCT)*</b>	0.47mm*	0.53mm*
<b>Effective Coverage Width</b>	760mm	760mm
<b>Rib Depth</b>	29mm	29mm
<b>Roof Pitch</b> Sheet length without end lap Sheet length with end lap	3° (1 in 20 approx) 5° (1 in 12 approx)	
<b>Grade of Steel</b>	G550 ZINCALUME® steel (550N/mm <sup>2</sup> yield strength)	
<b>Tolerances</b>	LENGTH +0, -15mm. WIDTH ± 2mm	
<b>Packing</b>	In strapped bundles of 1 tonne maximum mass	
<b>Custom Cut Lengths</b>	Any measurement to a maximum transportable length	
<b>Coating class (min.)</b>	ZINCALUME® AZ150 steel (150g/m <sup>2</sup> )	

### Thickness for LYSAGHT® TRIMDEK® Profile (Standard)

Type of Finishing	BMT (mm)	Top Coat (mm)				Reverse Coat (mm)				TCT (mm)	Total Nominal Coated Thickness Including Paint (mm)
		AZ150	AZ200	Primer	Finish	AZ150	AZ200	Primer	Finish		
ZINCALUME® steel	0.42	0.025	-	-	-	0.025	-	-	-	0.47	-
COLORBOND® steel	0.42	0.025	-	0.005	0.020	0.025	-	0.005	0.005	0.47	0.505
Clean COLORBOND® XPD steel	0.42	0.025	-	0.005	0.020	0.025	-	0.005	0.005	0.47	0.505
Clean COLORBOND® XPD Pearlescent steel	0.42	0.025	-	0.005	0.020	0.025	-	0.005	0.005	0.47	0.505
Clean COLORBOND® ULTRA steel	0.42	-	0.030	0.005	0.020	-	0.030	0.005	0.010	0.48	0.520

Notes:

\*Total Coated Thickness (TCT) for Clean COLORBOND® ULTRA steel is 0.48mm (Standard), 0.54mm (Non Standard)

# For non-standard orders, a minimum order quantity and lead time is applicable. Please refer to BlueScope Lysaght Singapore for more information.

BMT: Base Metal Thickness, TCT: Total Coated Thickness

AZ150: Coating Mass of 150 grams/m on both side (55% Aluminium, 43.5 % Zinc and 1.5% Silicon)

AZ200: Coating Mass of 200 grams/m on both side (55% Aluminium, 43.5 % Zinc and 1.5% Silicon)

Finishes	Mass per Unit Area (kg/m <sup>2</sup> )		Mass per Unit Length (kg/m)		Coverage (m <sup>2</sup> /tonne)	
	Standard	Non Standard	Standard	Non Standard	Standard	Non Standard
ZINCALUME® steel (0.47mm)	4.288	4.871	3.259	3.702	223.202	205.310
COLORBOND® steel (0.505mm)	4.362	4.945	3.315	3.758	229.235	202.229
Clean COLORBOND® XPD steel (0.505mm)	4.362	4.945	3.315	3.758	229.235	202.229
Clean COLORBOND® XPD Pearlescent steel (0.505mm)	4.362	4.945	3.315	3.758	229.235	202.229
Clean COLORBOND® ULTRA steel (0.520mm)	4.424	5.007	3.362	3.805	226.031	199.731

## DESIGN CRITERIA

### SUPPORT SPACINGS NON-CYCLONIC AREAS

The maximum support spacings shown in Table 1 are based on testing in accordance with AS1562 - 1992. **“Design and Installation of Sheet Roof and Wall Cladding - Part 1: Metal”** and AS4040.1 - 1992 **“Methods of Testing Sheet Roof and Cladding Method 1: Resistance to Concentrated Loads”**.

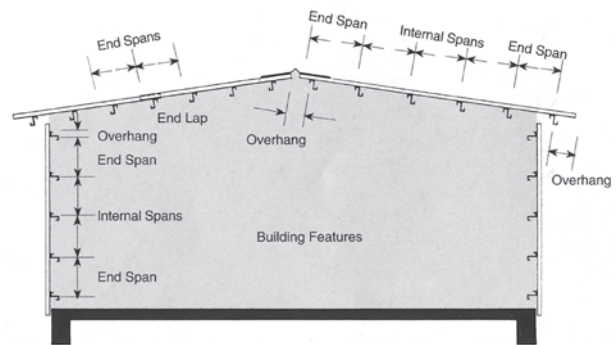
These roof support spacings are the maximum recommended for adequate performance of the roof cladding under foot traffic loading. The maximum wall spacings are based on wind pressure calculation refer to AS 1170.2:2011. The pressure considered is based on buildings up to 10m high in Region B, Terrain Category 3,

$M_s = 0.85$ ,  $M_i = 1.0$  with the assumption of  $C_{pi} = +0.20$ ,  $C_{pe} = -0.65$ ,  $K_f = 2.0$ .

These spacings may be reduced by the Serviceability and Strength Limit States for the particular project under consideration.

Table 1: Maximum Allowable Support Spacing for LYSAGHT® TRIMDEK® Profile - NON CYCLONIC AREAS

TYPE OF SPAN	STANDARD (0.47mm TCT)	NON-STANDARD (0.53mm TCT*)
<b>ROOF APPLICATION</b>		
Single Span	1100	1600
End Span	1300	1850
Internal Span	1900	2600
Overhang - Unstiffened	150	200
Overhang - Stiffened	300	350
<b>WALL APPLICATION</b>		
Single Span	2100	2100
End Span	2900	3000
Internal Span	2800	3000
Overhang	150	200



\* A minimum order quantity is required for non-standard orders, please contact BlueScope Lysaght Singapore for more information.

## PRODUCT BENEFITS

- Conforms to International Building Codes and Standards
- Manufactured under strict processes governed by ISO9001:2000 Quality Management System and ISO14001 Environmental Management System
- Excellent wind resistance
- Excellent spanning capacity
- Light weight
- Superior against severe rainfall intensity
- First class resistance against corrosion, discolouration and tropical dirt staining
- Requires no or minimal maintenance
- Genuine Material Warranty
- Genuine Product Certification
- New improved technology to BlueScope Steel's proprietary pre-painted steel enhances aesthetics and longer product lifespan.



New Town Secondary School

## LIMIT STATE WIND PRESSURES (NON-CYCLONIC AREAS)

The wind pressure capacities are based on tests conducted at NATA registered testing laboratory at BlueScope Lysaght Technology Centre in Sydney, Australia. Testing was conducted in accordance with AS1562.1 - 1992, "**Design and Installation of Sheet Roof and Wall Cladding**", and AS4040.2 - 1992, "**Resistance to Wind Pressure for Non-Cyclonic Regions**". Table 2 below shows wind pressure capacities provides pressure versus span graphs for Serviceability and Strength Limit State Design. Serviceability Limit State is based on a deflection limit of:  $(\text{span}/120) + (P/30)$ , where P is the maximum fastener pitch. The pressure capacities for Strength Limit State

have been determined by testing the cladding to failure (ultimate capacity). These pressures are applicable when the cladding is fixed to minimum material thickness of 1.0mm. To obtain the design capacity of the sheeting, a capacity

reduction factor of 0.90 should be applied. A non-cyclonic area is defined as one in which a tropical cyclone is unlikely to occur in accordance with AS1170.2 -1989, "**SAA Loading Code, Part 2: Wind Loads**".



PSB Academy, Tiong Bahru Campus

Table 2: LYSAGHT® TRIMDEK® Profile Wind Capacities (kPa) – Limit State Format (Non-Cyclonic)

Type of Span	Limit State	Span (mm)								
		600	900	1200	1500	1800	2100	2400	2700	3000
<b>[A] Standard (Base Metal Thickness = 0.42mm)</b>										
Single	Serviceability	4.98	3.91	2.83	1.87	1.16	0.75	0.53	-	-
	Strength	11.40	9.30	7.15	5.30	4.00	3.75	3.10	-	-
End	Serviceability	4.18	3.63	3.08	2.55	2.06	1.62	1.22	0.85	0.50
	Strength	7.05	6.50	5.90	5.35	4.80	4.20	3.65	3.05	2.50
Internal	Serviceability	5.05	4.18	3.42	2.83	2.36	1.94	1.56	1.23	0.97
	Strength	10.50	8.85	7.25	5.85	4.80	4.03	3.65	3.40	3.20
<b>[B] Non-Standard* (Base Metal Thickness = 0.48mm)</b>										
Single	Serviceability	7.27	5.06	3.34	2.06	1.15	0.71	0.50	0.42	-
	Strength	15.05	12.90	10.70	8.60	6.80	5.25	4.00	2.95	-
End	Serviceability	6.29	5.13	3.96	2.93	2.13	1.54	1.12	0.82	0.58
	Strength	10.40	8.90	7.30	5.90	4.80	4.10	3.60	3.25	3.05
Internal	Serviceability	7.37	5.96	4.66	3.54	2.72	2.22	1.92	1.64	1.38
	Strength	11.00	9.50	8.15	6.95	6.00	5.30	4.80	4.30	3.85

\* A minimum order quantity is required for non-standard thickness, please contact BlueScope Lysaght Singapore for more information.

\*\* Any support spacing greater than the recommended data as shown in the maximum support spacing table, no foot-traffic load is allowed.

## RAINWATER RUN-OFF FOR LYSAGHT® TRIMDEK® PROFILE

The drainage or run-off capacity of the roof sheeting is another limitation on the total length of sheet run that must be considered in roof design and construction. As a guide, Table 3 lists the maximum recommended length of roof run for LYSAGHT® TRIMDEK® Profile at the roof

slopes and rainfall intensities shown. These are based on CSIRO Australia (Commonwealth Scientific and Industrial Research Organisation) and BlueScope Lysaght Technology Centre's calculation of the behaviour of LYSAGHT® roofing profiles under peak rainfall conditions.

The roof run is the total length of roof sheeting draining rainwater in one direction including any end laps, expansion joints or steps that may be present in the roof.

Table 3: LYSAGHT® TRIMDEK® Profile Maximum Roof Run (in metres) for roof slopes and rainfall intensities

Rainfall Intensity (mm/hour)	Roof Slope			
	1 in 20 (3°)	1 in 12 (5°)	1 in 7.5 (7.5°)	1 in 6 (10°)
200	129	160	191	220
250	103	128	163	176
300	86	107	127	146
400	64	80	96	110



Outward Bound Singapore - East Coast Campus

# CRIMP CURVED LYSAGHT® TRIMDEK® PROFILE

## CRIMP CURVED ROOF

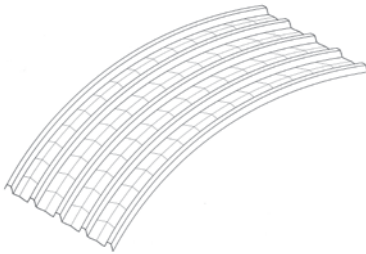
Crimp curved LYSAGHT® TRIMDEK® steel cladding is designed to provide versatility and creativity to bring new and refreshing designs to commercial, industrial, civic and domestic buildings. This design freedom has resulted in

significant cost savings in construction, mainly due to:-

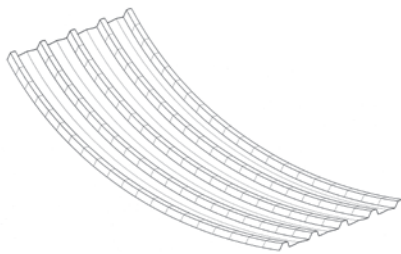
- Less supporting framework required for fascias, parapets and roofs.
- Simplified and reduced work involved

in installation of fascia cladding.

- Reduction or elimination of many flashings and cappings.
- Less cladding material required to cover a given curve.



LYSAGHT® TRIMDEK® Profile - Convex Crimp Curve



LYSAGHT® TRIMDEK® Profile - Concave Crimp Curve

Sheet Profile	Min Radius (mm)	Max Radius (mm)
<b>Concave Crimp Curve</b>		
0.47mm thk.	550	2000
0.53mm thk.	560	2000
<b>Convex Crimp Curve</b>		
0.47mm thk.	450	2000
0.53mm thk.	470	2000

## SUPPORT SPACINGS FOR CRIMP CURVED LYSAGHT® TRIMDEK® PROFILE (NON-CYCLONIC AREAS)

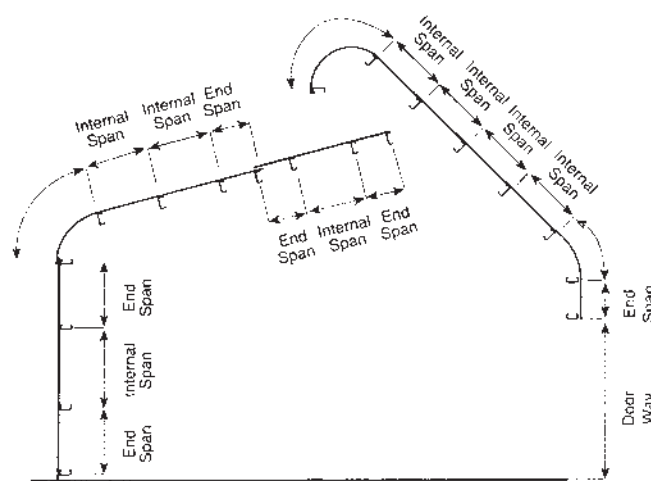
### Straight portion of crimp curved LYSAGHT® TRIMDEK® Profile:

- Maximum allowable spacings for the straight portion of crimp curved LYSAGHT® TRIMDEK® profile should follow the recommendations given in Table 1.
- End spans refer to the spacing between the first and second supports from any free end of a sheet, except where that end of the sheet is crimp curved.
- The spacing between the supports either side of an end lap should be that as recommended for end spans in Table 1.

### Crimp curved portion of crimp curved LYSAGHT® TRIMDEK® Profile:

This will depend on the radius of curvature but the following guidelines are recommended:-

- For sheets curved to a radius of curvature not more than 3000mm, supports should be placed at centres not greater than 2100mm measuring around the arc of the curve.
- Where a curve of small included angle occurs (up to approximately 15°, for example at a ridge), support spacing should not exceed 1200mm.



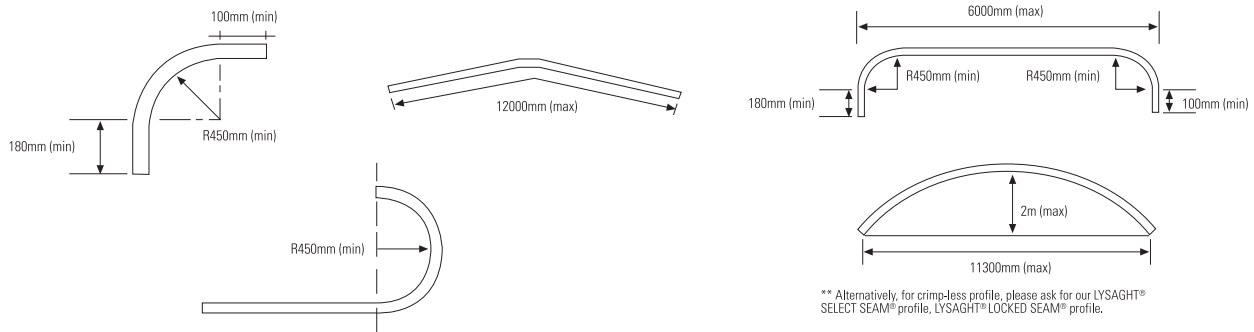
## REQUIREMENTS FOR CRIMP CURVED LYSAGHT® TRIMDEK® PROFILE

- Minimum curvature radius for convex is 450mm and 550mm for concave to underside or pan of sheet, minimum straight length of sheet at one end of a curve is 180mm.
- Maximum length of sheet that can be crimp curved for ridge application is approximately 12000mm. The curve can either be convex or concave.

- The sheet can be crimp curved to three quarters of a full circle but to facilitate side lapping, semi circle maximum is recommended.
- When both ends are crimp curved, the maximum recommended straight distance between the two curves should be 6000mm.
- For lengths exceeding 12000mm,

please consult BlueScope Lysaght Singapore for more information.

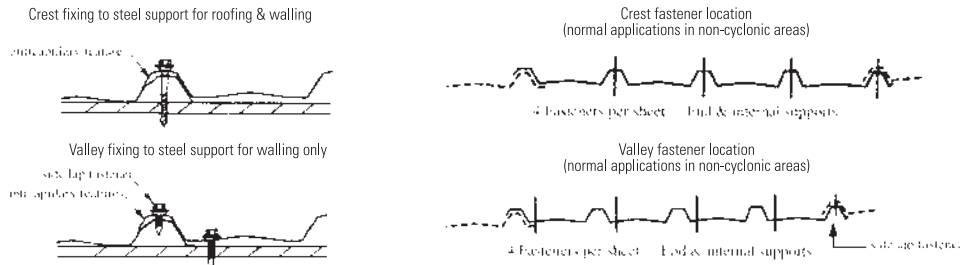
- For easy transportation and maximum protection for the crimp curved sheets, the maximum height and length of the sheeting should be 2000mm and 11300mm respectively.



## TYPES OF FASTENERS AND FASTENING METHOD

### THE PIERCE-FIXING CONCEPT

Pierce-fixing is the method of fixing sheets using fasteners which pass through the sheet. This method is different from concealed-fixing. The screws can be placed through the crests or in the valleys. LYSAGHT® TRIMDEK® steel roof cladding must be crest fixed to support. However wall cladding can be either crested or valley fixed. The selection of appropriate fasteners will ensure optimum performance of your COLORBOND® or ZINCALUME® steel roof and wall cladding. The fasteners used must have a coating system to meet either AS3566 Class 3 or AS3566 Class 4 standards.



### RECOMMENDED FASTENERS

Non-Cyclonic Region		
Steel Support	Directly to support	With Insulation Blanket
<b>Thickness</b> Up to 4.5 mm	No. 12-14 x 55 mm Hex head self drilling and tapping screw with bonded washer	Increase to min. 65 mm long screw
Exceed 4.5 mm	Tek 5 No. 12-24 x 68 mm Hex head self drilling and tapping screw with bonded washer	Tek 5 No. 12-24 x 68 mm Hex head self drilling and tapping screw with bonded washer
Timber Support		
<b>Grade</b> Hardwood	No. 12-11 x 65 mm Hex head Type 17 self drilling screw with bonded washer	No. 14-10 x 75 mm Hex head Type 17 self drilling screw with bonded washer
Softwood	No. 14-10 x 75 mm Hex head Type 17 self drilling screw with bonded washer	No Change

#### For Roof Applications

**Identification of Fastener**  
The format of the number code is:

**12 - 14 x 55**

Screw gauge (Thread outside diameter)    Thread pitch (Thread per inch)    Overall length of the screw measured from under the head (mm)

#### For Wall Applications

**Identification of Fastener**  
The format of the number code is:

**12 - 14 x 20**

Screw gauge (Thread outside diameter)    Thread pitch (Thread per inch)    Overall length of the screw measured from under the head (mm)

# NOISE & HEAT CONTROL

## REDUCTION OF RAIN NOISE

To reduce rain noise on metal roof sheeting, a self-adhesive bitumen felt is placed underneath the roof sheeting to dampen the rain induced vibration at point of impact. This is followed by installation of a solid roof substrate such as LYSAGHT® SPANDEK® substrate or LYSAGHT® TRIMDEK® substrate. An insulation mineral wool blanket will then be placed in between the metal roof substrate

and a layer of double-sided aluminium foil. Noise will be further reduced by the transmission loss through the mineral wool blanket to achieve a significant marked noise reduction.

Note : When using an insulation mineral wool blanket, care should be taken to ensure that it is fully protected from moisture.

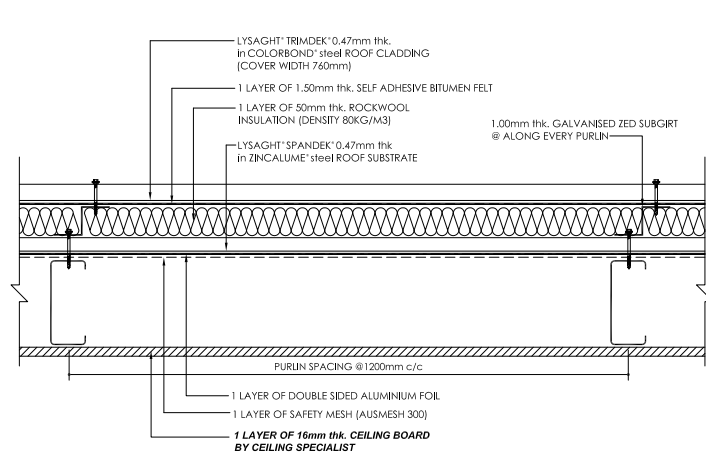
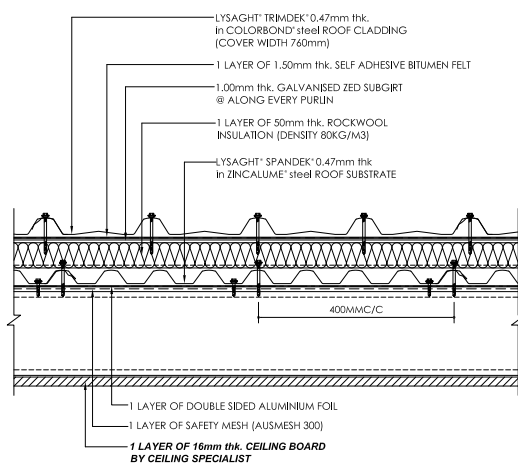
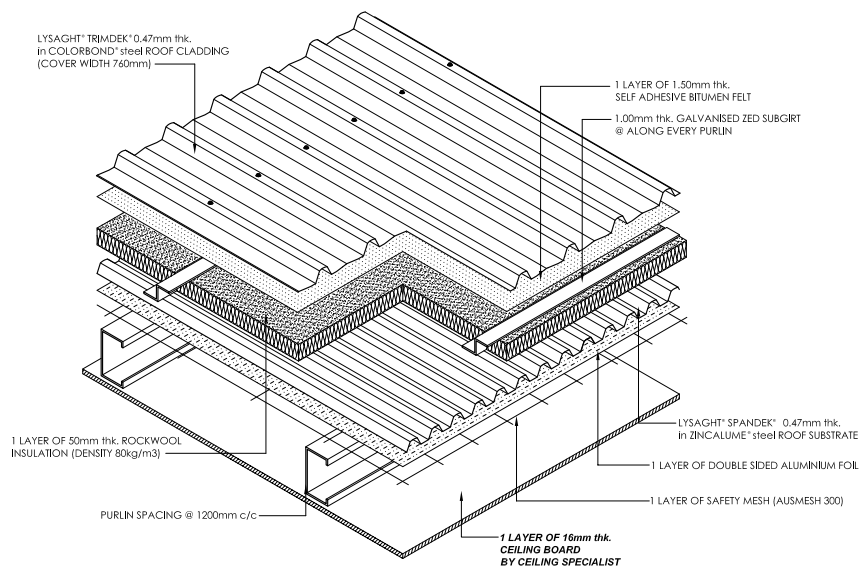
## HEAT CONTROL

The effective method to control heat is to lay the reflective foil laminate over the supports before laying the sheeting or insulation blanket. The insulation blanket over the foil laminate in conjunction with vapour barrier allows condensation control. An insulation blanket is often provided to improve heat insulation to the overall roof system.

## ACOUSTIC ROOF SYSTEM

As a result of a laboratory measurement of airborne sound transmission loss of BlueScope Lysaght Acoustic Roof System, PSB Corporation (Testing Group) has rated the roof system tested on October 10, 2002 as having a Sound Transmission Class 51 (STC 51). The test was conducted in accordance with ASTM E90 – 97.

Roof Build-up System with Sound Transmission Class (STC) 51: Testing was carried out with the ceiling boards





# SUGGESTED SPECIFICATIONS FOR EXTREME ENVIRONMENTS

## [A] MODERATE MARINE ENVIRONMENT

Suggested Specifications for LYSAGHT® TRIMDEK® Profile	
Total Coated Thickness (TCT)	0.47mm TCT
BlueScope Steel Proprietary Pre-painted Steel System	COLORBOND® steel or Clean COLORBOND® XPD steel* or Clean COLORBOND® XPD Pearlescent steel*
Steel Grade	G550 (Minimum yield strength of 550 mPa)
Minimum Coating Mass of ZINCALUME® steel	AZ150 (150g/m <sup>2</sup> )

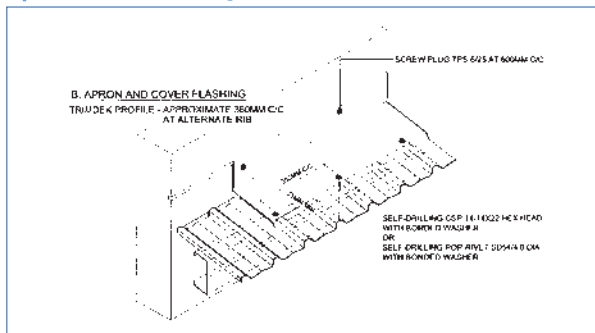
## [B] SEVERE MARINE ENVIRONMENT

Suggested Specifications for LYSAGHT® TRIMDEK® Profile	
Total Coated Thickness (TCT)	0.48mm TCT
BlueScope Steel Proprietary Pre-painted Steel System	Clean COLORBOND® ULTRA steel*
Steel Grade	G550 (Minimum yield strength of 550 mPa)
Minimum Coating Mass of ZINCALUME® steel	AZ200 (200g/m <sup>2</sup> )

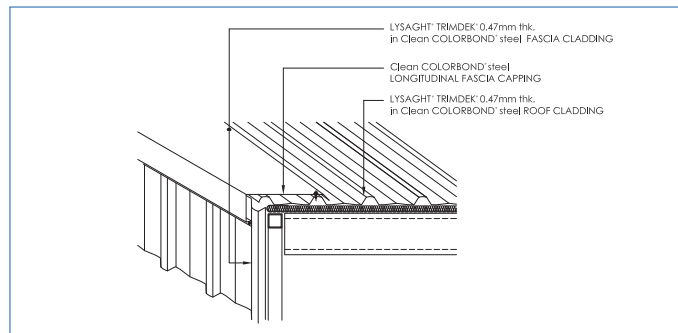
\* Minimum order quantity is required. Please contact BlueScope Lysaght Singapore for more information.

## SOME STANDARD FLASHINGS/CAPPINGS

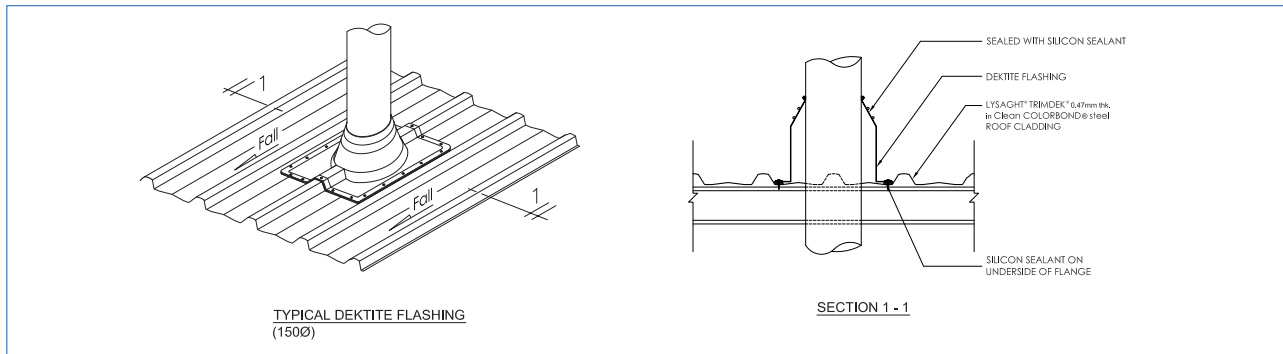
### Apron & Cover Flashings



### Longitudinal Fascia Capping



### Roof Penetration



# SIMPLE INSTALLATION INSTRUCTIONS FOR LYSAGHT® TRIMDEK® CLADDING

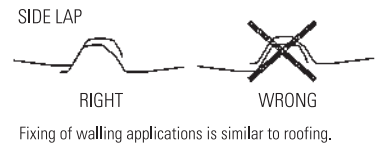
- 1 When lifting roofing sheets onto roof frames for installation, make sure all male and/or female ribs face the same direction. If not, sheets will have to be turned end-for-end during fixing.
- 2 When the first sheet is fastened into position, a string line can be stretched across the lower end of the roof alignment. The line will then be used as a guide for the subsequent roof panel for installation.
- 3 Position and fasten the next roofing sheet to each support on the male rib of the installed sheet. Place the second sheet over

the second run of the roofing sheets and fasten the sheets together before proceeding to the next sheet.

- 4 Make sure the side lapping is installed correctly. The side rib with the longitudinal anti-capillary flute (male rib) is supposed to be covered by the side rib without a longitudinal flute (female rib).
- 5 Each sheet should be fully fastened before proceeding to the next sheet. The side lap

with preceding sheet should be fastened last.

- 6 In the case that two or more shorter sheets are installed to provide full-length coverage due to handling or transport considerations, lay each complete line of sheets in turn from gutter/ eaves to ridge as shown.



\* Please refer to "Guidelines for Specification and Installation of LYSAGHT® Roofing and Walling Solutions" for detailed information on installation method, tips for inspection and compatibility notes.



## REMINDER!

If you are working at height 2 metres and above, you must wear a safety harness with a shock absorbing twin tail lanyard attached to either a life line or an anchorage point.

In addition, the use of Ausmesh 300 is recommended to assist in the prevention of falls during roof sheet laying. Contact BlueScope Lysaght Singapore for more information on Ausmesh 300.





Jurong West Hawker Centre Upgrading Programme



Serangoon Garden South School



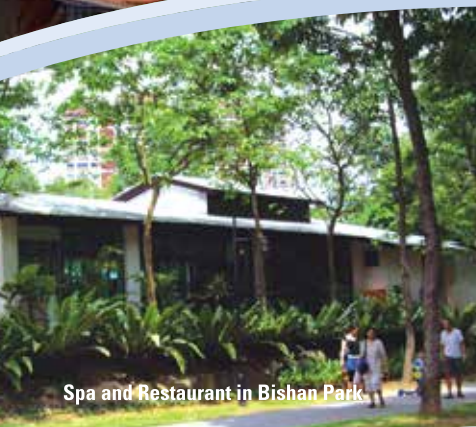
Ang Mo Kio Market & Food Centre (A&A Works)



Terrace Industrial Development at Changi North Street 1



Cambridge Industrial Trust at Tuas Ave 3



Spa and Restaurant in Bishan Park



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Fernvale Garden School

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