

The Lysaght logo is positioned in the top right corner. It features the word "LYSAGHT" in a bold, white, sans-serif font. A white swoosh underline is positioned beneath the letters "AGHT". The background of the entire page is a dark blue to black gradient, overlaid with a complex, light blue architectural blueprint pattern consisting of various lines, circles, and geometric shapes.

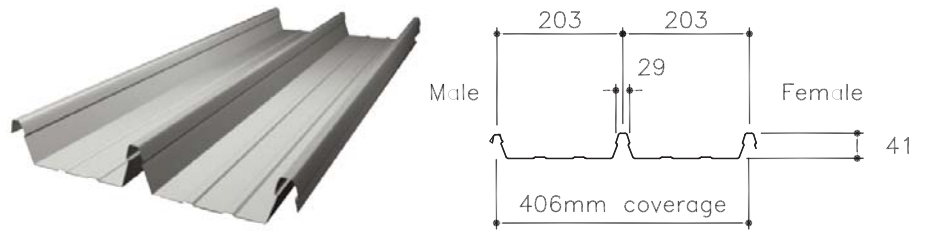
LYSAGHT

A large, close-up photograph of the Lysaght Klip Lok 406 cladding system. The image shows several parallel, metallic-looking panels with a ribbed profile, arranged diagonally from the top left towards the bottom right. The lighting creates strong highlights and shadows, emphasizing the texture and depth of the cladding. A white diagonal line separates this image from the blue architectural background on the right side of the page.

LYSAGHT® KLIP LOK® 406

Durable and Versatile
Long-Length Concealed-
Fixed Cladding System

LYSAGHT® KLIP LOK® 406



LYSAGHT KLIP-LOK 406 is a strong, durable, versatile and, long-spanning concealed-fix roof and wall cladding with exceptional waterproofing characteristics. Smart fluted pans and a lock-action rib design enables its usage as a low-pitched roof. It is also suitable for walling, both horizontal and vertical installation.

LYSAGHT® KLIP-LOK® 406 profile has an effective cover width of 406mm and a rib height of 41mm. Its relatively high rib makes it a compatible solar-ready roof. It is roll-formed from genuine High Tensile ZINCALUME® G550 steel and is available in a range of COLORBOND® steel proprietary paint systems and colours.

The profile can be used for any roof and wall cladding, fascia, and soffit. It is designed to perform at a minimum recommended roof pitch of 2° (1 in 29), vertical and horizontal ribbed walling.

PHYSICAL PROPERTIES

	STANDARD	NON-STANDARD
Base Metal Thickness (BMT)	0.48mm	0.60mm
Total Coated Thickness (TCT)	0.54mm	0.66mm
Mass per Unit Area – ZINCALUME® Steel (kg/m ²)	5.68	7.02
Mass per Unit Area – COLORBOND® Ultra Steel (kg/m ²)	5.77	7.12
Effective Cover Width	406mm	406mm
Rib Depth	41mm	41mm
Minimum Recommended Roof Pitch / Slope:		
Sheet length without end lap		2°
Sheet length with end lap		3°
Grade of Steel (MPa)	G550 (550N/mm ² yield strength)	
Tolerances	Length +0, -15mm / Width ± 2mm	
Packing	In strapped bundles of 1 tonne maximum mass	
Custom Cut Lengths	Any measurement to a maximum transportable length	
Coating Class	AZ200	
Finishes	ZINCALUME® steel	
	COLORBOND® ULTRA steel	

Note: For Non-Standard orders, a minimum order quantity and delivery lead time is applicable. Please refer to our sales representative or customer service officers for more information



Scan for online resources

TABLE 1: MAXIMUM ALLOWABLE SUPPORT SPACING – NON-CYCLONIC AREAS

TYPE OF SPAN	STANDARD (0.48mm BMT / 0.54mm TCT)	NON-STANDARD # (0.60mm BMT / 0.66mm TCT)
Roofs		
	(mm)	
Single Span	1800	2300
End Span	2400	2700*
Internal Span	3000	3600*
Unstiffened Overhang +	200	300
Walls		
Single Span	2400	2700
End Span	2400	3000
Internal Span	2400	3000
Unstiffened Overhang +	400	600

Note: When thick insulation material is not carried over the purlin or where material is used with an independent top hat, the spanning capabilities may be stretched. Advice may be given on a case-by-case basis. Please refer to BlueScope Lysaght Singapore’s sales representative.

* When used in conjunction with heat insulation materials such as fibreglass blankets, the maximum support spacing should not exceed 2300mm.

+ Overhang is not meant for human traffic.

Non-standard orders are subject to minimum order quantity and delivery lead time.

PERFORMANCE

SUPPORT SPACING FOR 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 calculations with reference to AS1170.2:2011. 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 $C_{pi} = +0.20$, $C_{pe} = -0.65$, $K_1 = 2.0$.

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

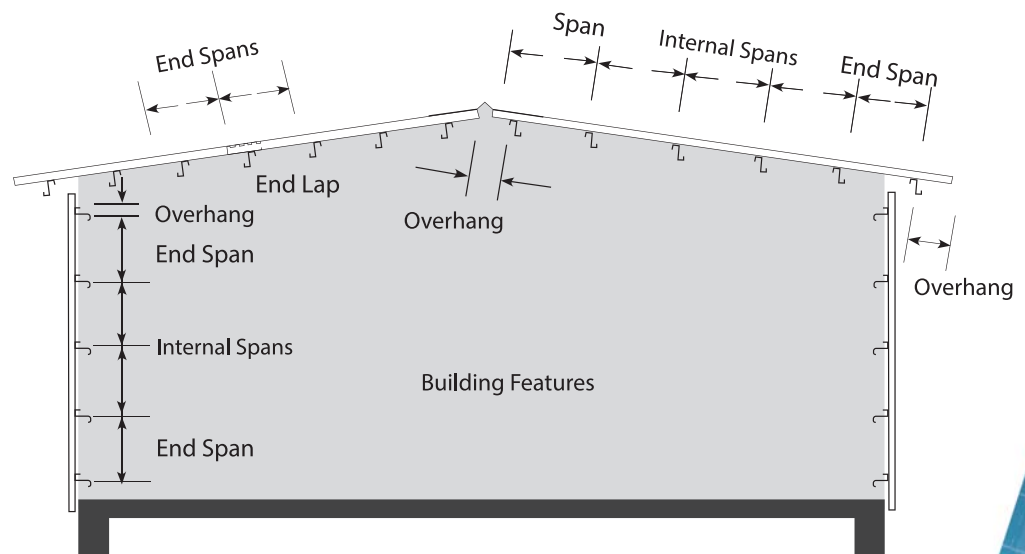


TABLE 2: WIND CAPACITIES (kPa) – LIMIT STATE FORMAT (NON-CYCLONIC)

[A] STANDARD (0.48mm BMT / 0.54mm TCT)											
TYPE OF SPAN	LIMIT STATE	SPAN (mm)									
		900	1200	1500	1800	2100	2400	2700	3000	3300	3600
Single	Serviceability	2.69	2.38	2.07	1.78	1.49	1.20	0.92	0.64	-	-
	Strength	4.90	4.80	4.55	4.20	3.65	3.05	2.35	1.70	-	-
End	Serviceability	2.41	2.17	1.96	1.77	1.61	1.46	1.32	1.18	1.02	0.84
	Strength	4.00	3.85	3.70	3.40	3.00	2.60	2.20	1.85	1.60	1.40
Internal	Serviceability	2.82	2.76	2.66	2.53	2.37	2.19	1.98	1.75	1.51	1.27
	Strength	4.60	3.95	3.40	2.95	2.60	2.30	2.05	1.85	1.65	1.50

[B] NON-STANDARD* (0.60mm BMT / 0.66mm TCT)											
TYPE OF SPAN	LIMIT STATE	SPAN (mm)									
		900	1200	1500	1800	2100	2400	2700	3000	3300	3600
Single	Serviceability	4.82	4.12	3.47	2.88	2.34	1.83	1.34	0.87	-	-
	Strength	8.80	7.60	6.55	5.60	4.75	4.00	3.25	2.60	-	-
End	Serviceability	4.57	4.27	3.94	3.54	3.11	2.66	2.21	1.80	1.44	1.14
	Strength	6.50	5.20	4.10	3.30	2.85	2.60	2.40	2.25	2.00	1.65
Internal	Serviceability	5.05	4.71	4.36	4.00	3.62	3.25	2.86	2.47	2.07	1.67
	Strength	7.40	6.40	5.50	4.75	4.15	3.60	3.10	2.90	2.30	1.85

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

LIMIT STATE WIND PRESSURES FOR NON-CYCLONIC AREAS

The wind pressure capacities are based on tests conducted at NATA registered testing laboratory at Lysaght Technology in Chester Hill, 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**”.

The table for wind pressure capacities below provides pressure versus span graphs for Serviceability and Strength Limit State Design. Serviceability Limit State is based on a deflection limit of: $(span/120) + (P/30)$. 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**”.

TABLE 3: MAXIMUM ROOF RUN (IN METRES) FOR ROOF SLOPES AND RAINFALL INTENSITIES

RAINFALL INTENSITY (mm/hour)	PITCH OF ROOF/SLOPE				
	2°	3°	5°	7.5°	10°
250	187	219	273	325	374
300	156	183	227	271	311
400	117	137	170	203	234
500	93	110	136	163	187

RAINWATER RUN-OFF FOR LYSAGHT® KLIP-LOK® 406

The drainage or run-off capacity of 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® KLIP-LOK® 406 profile at the roof slopes and rainfall intensities. These are based on CSIRO Australia (Commonwealth Scientific and Industrial Research Organisation) and BlueScope Lysaght'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 on the roof.

// PRODUCT FEATURES & BENEFITS

1. CONCEALED FIXING

Fixing clips effectively secure KLIP-LOK® 406 to steel or timber supports without puncturing the sheets. With no exposed fasteners, clean and smooth architectural lines can be achieved.

2. RAINWATER DRAINAGE AND WATERPROOF SYSTEM

LYSAGHT® KLIP-LOK® 406 profile provides a lightweight but extremely strong waterproof cladding system. Its wide fluted pans and high ribbed design disperses rainwater quickly and efficiently to the outer perimeters of the roof. Thus, LYSAGHT® KLIP-LOK® 406 steel cladding is an excellent choice for severe rainfall intensity areas in Asia.

3. ALL WEATHER PERFORMANCE

LYSAGHT® KLIP-LOK® 406 profile has exceptional strength even though it is light weight. It has excellent wind resistance too. Its first-class resistance against corrosion, discolouration, and tropical dirt staining, while requiring no or minimal maintenance, makes it the best all-weather performer.

4. SIMPLE & LOW-COST FIXING

Long, straight lengths of LYSAGHT® KLIP-LOK® 406 profile can be laid in place and easily aligned. Fixing with our clips is simpler and faster than ever before. The smaller number of clips for a given area provides extra economy. LYSAGHT® KLIP-LOK® 406 profile is available in long lengths, therefore in most jobs, you can have one sheet from ridge to gutter without end laps.

5. PROVEN BY TEST RESULTS

The steel profile is tested and proven by NATA registered laboratory at Lysaght Technology Centre and CSIRO (Commonwealth Scientific and Industrial Research Organisation) in Australia.

6. OTHER BENEFITS

- a) Conforms to International Building Codes and Standards.
- b) Manufactured under strict processes governed by ISO9001 Quality Management System and ISO14001 Environmental Management System.
- c) Genuine material warranty (terms & conditions apply).
- d) Genuine Product Certification.

REDUCTION OF RAIN NOISE

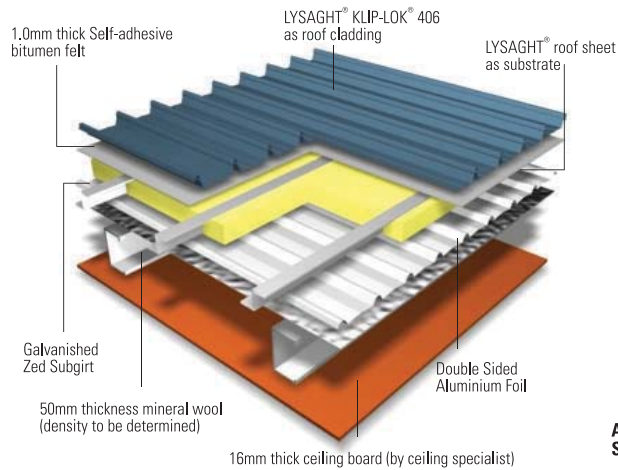
To further reduce noise created by rainfall on metal roofs, an insulation mineral wool blanket can be placed in between two metal roof cladding in Lysaght's Acoustic Roof System. As long as the insulation blanket is held tightly against the underside of the roof sheeting, this will dampen the rain induced vibration at the point of impact and a marked noise reduction would be achieved.

Otherwise, noise will only be reduced by transmission loss through the mineral wool blanket in a standard roof system.

Lysaght's Acoustic Roof System has been rated and approved by PSB Corporation (testing group). The system was tested and proven to meet requirements of Sound Transmission Class 51 (STC 51). The test was conducted in accordance with ASTM E90 – 97.

HEAT CONTROL

The effective method to control heat is to lay 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 system.



Acoustic Roof System (STC51)

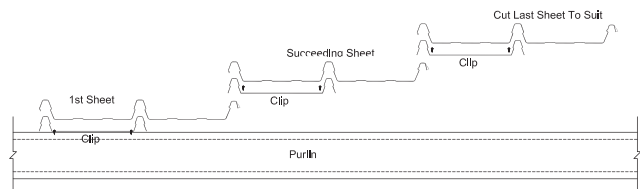
FASTENING METHOD & TYPE OF FASTENERS

THE CONCEALED FIXING CONCEPT

Identification of Fastener
The format of the number code is:

10 - 24 x 16

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



* Note: Two fasteners required per clip.

RECOMMENDED FASTENERS

	STEEL SUPPORTS		TIMBER SUPPORTS	
	THICKNESS		GRADE	
	UP TO 4.5mm	EXCEEDS 4.5mm	HARDWOOD	SOFTWOOD
Directly to support	No. 10 – 24 x 16mm wafer-head self drilling and tapping screw	Teks 5 No. 12 – 24 x 32mm wafer-head self drilling and tapping screw	No. 10 – 12 x 25mm wafer-head type 17 self drilling wood screw; 3.75mm x 50mm flat-head spiral threaded nail (on special orders)	No. 10 – 12 x 46mm wafer-head type self drilling wood screw
Over Insulation Blanket	Increase to 22mm or longer screw if required	Same as above	Increase to > 25mm or longer screw if required; 3.75mm x 50mm flat-head spiral threaded nail (on special orders)	Same as above

Note: Recommended fasteners should conform to Class 3 AS3566 Standard.

1. PREPARATION FOR INSTALLATION

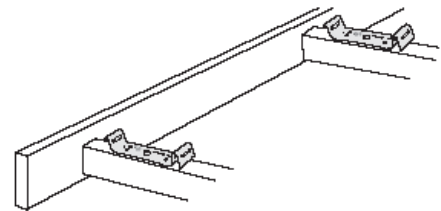
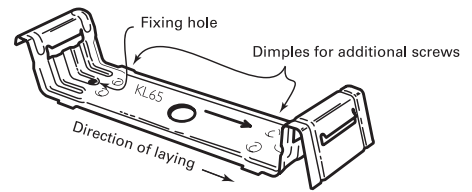
When lifting roofing sheets onto roof frames to prepare for installation, ensure all sheets have overlapping female rib facing the side where fastening is to commence.

2. FIX THE FIRST ROW OF KL 65 CLIPS

The first run of KL 65 clips have to be positioned and fastened, one onto each purlin, so that they will correctly engage in the female and centre ribs of the first sheeting when the sheeting is placed over them.

Fasten clips to the purlin at each sheet, having positioned them so that the first run of clips will be in correct relation with the building elements.

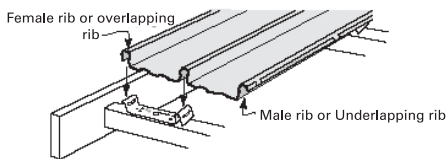
Align and fasten the remainder of the first run of clips using a string as a straight edge.



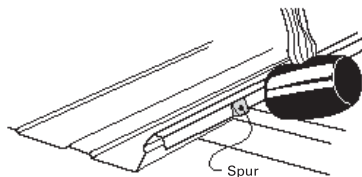
Fix the first row of clips (KL65 clips shown)

3. PLACE THE FIRST SHEET

Position the first roof sheet over the fastened run of clips, having fastened the clips longitudinally in relation to the eaves overhang, and then fully engage on clips by applying foot pressure to the centre and female ribs over each clip. If the clips foul up one of the spurs spaced along the outer free edge of the male rib, the spur can be flattened with a blow from a rubber mallet to allow the clip to sit down over the rib.



Placing the first sheet

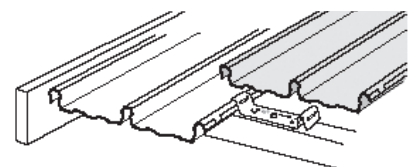


Flatten spurs in way of clips

4. FIX THE NEXT (AND SUBSEQUENT) CLIPS & SHEETS

Position the next run of clips, one to each purlin, engage over the male ribs of the installed sheet and fasten each clip with the recommended wafer-head fasteners.

Place the second sheet over the second run of clips with the female rib overlapping the male rib of the first preceding sheet, and the centre rib over the centre rib's up-stand of the clips.



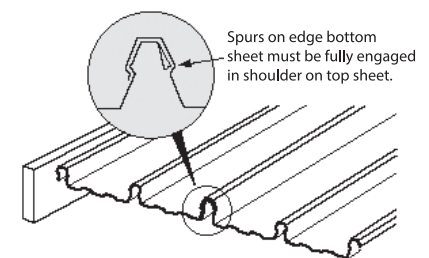
Placing next sheet (s)

5. ENSURE ROOFING SHEETS INTERLOCK COMPLETELY

The interlocking ribs and centre rib should be fully engaged over each clip.

The full engagement can be done by walking along the full length of the roof sheeting being installed, with one foot in the tray next to the overlapping female rib and the other foot applying pressure to the top of the interlocking rib at regular intervals.

A distinct 'click' will be heard as the spurs along the edge of the male rib snap into the shoulder along the female rib.



Spurs must engage fully

6. CHECK ALIGNMENT PERIODICALLY

Occasionally check the roofing sheets to ensure they are still parallel to the first sheet. This can be checked by taking two measurements across the width of the fixed sheet.

The string line can be used to ensure that the ends of the roofing sheets are in line.

7. POSITIONING THE FINAL SHEET

If the space left between the last fixed sheet and the fascia or parapet is more than half the width of a LYSAGHT® KLIP-LOK® 406 sheet, cut the final sheet along its length leaving the centre rib complete.

Place the cut sheet onto a row of clips, the same way as it would be done for a full sheet.

Where the space left between the last fixed sheet and the fascia or parapet cannot fit half the width of a LYSAGHT® KLIP-LOK® 406 sheet, fix the edge of the final sheet at each purlin with a clip that has been cut into half.

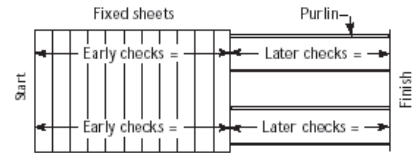
8. FLASHINGS / CAPPINGS

Upon completion of the roofing sheets installation, the flashing will be suited to the requirements on site to complement and improve the total waterproof / watertight roof system.

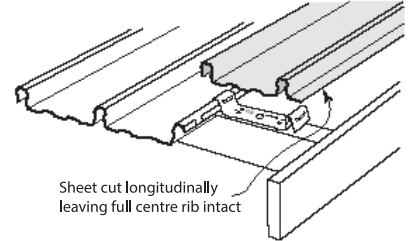
To prevent LYSAGHT® KLIP-LOK® 406 sheets from sliding downwards in the fixing clips on very steep roof pitches or slopes, each sheet under the flashing or capping should be pierced-fix along the top of the sheets.

Note:

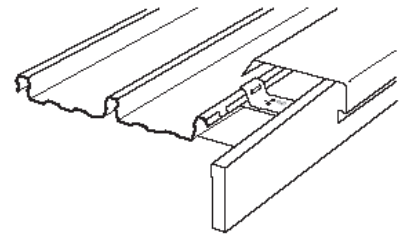
- The installation procedure for walls is similar to that described for roofs. To prevent LYSAGHT® KLIP-LOK® 406 sheets from sliding downwards in the fixing clips, you should pierce-fix through each sheet under the flashing or capping, along the top of the sheets.



Check alignment periodically



Placing last sheet where half a sheet will fit



Placing last sheet where half a sheet won't fit



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.

STRONG BRANDS, QUALITY MATERIALS

LYSAGHT® products are made of highest quality material, namely COLORBOND® steel and ZINCALUME® steel which are the leading materials for external cladding application. COLORBOND® steel and ZINCALUME® steel have been used on countless buildings to portray modern architecture works of art, ranges from the classic roofing to advance façade for industrial, commercial and residential buildings.

Colorbond®

COLORBOND® steel is a pre-painted finished product with ZINCALUME® steel substrate to deliver both superior corrosion resistance and excellent colour performance.

It comes with the THERMATECH® solar reflectance technology and Clean technology to minimize tropical dirt staining while lowering urban heat island effect, delivering longevity and minimal maintenance to your external cladding.

COLORBOND® steel is backed by a BlueScope's material warranty*
Singapore: Up to 10* Years of warranty

Product Attributes

- Pre-painted finish on top of ZINCALUME® steel substrate to deliver superior corrosion resistance.
- Superior primer technology which prevents paint delamination.
- Proprietary super polyester paint system proven to provide excellent colour performance.
- Clean technology incorporated to resist against tropical dirt staining.
- THERMATECH® solar reflectance technology to allow for lower temperature cladding.
- Wide varieties of colours and finishes to cater for your building design needs.

Zincalume®

ZINCALUME® steel is a metallic coated steel product composed of 55% aluminium, 43.5% zinc and 1.5% silicon (aluminium-zinc alloy coating) that can provide superior corrosion resistance for your external cladding, with expected lifespan that's four times the life of generic alternatives (GI).

ZINCALUME® steel is backed by BlueScope's material warranty*
Singapore: Up to 10* Years of warranty

Product Attributes

- Superior corrosion resistance due to the minimum coating class of AZ150.
- Initial resistance to surface marking and wet storage corrosion due to the proprietary clear resin coating.
- Better aesthetics compared to generic alternatives (Al-Zn) due to less surface darkening, afforded by the proprietary clear resin coating.
- Lightweight and thermally efficient compared to conventional roofing materials (e.g. concrete and clay tiles)
- Excellent flexibility in design as steel can be bent and curved to form truly unique designs.

**Warranty terms and conditions apply*

This material warranty may vary to buildings nearer to marine or industrial environment and is subjected to prior agreement by BlueScope. For full terms and conditions and to determine the eligibility of your project for the warranty, please contact your Key Account Manager.

There are different internal and external environments affecting the longevity of COLORBOND® steel and ZINCALUME® steel, hence feel free to consult our material experts for more specialized recommendations.

Examples of recommendations:

- Direct contact between COLORBOND® steel or ZINCALUME® steel with copper, lead and stainless steel should be avoided.

If condensation on the reverse side of roofing sheet is likely, vapour barrier should be installed to shield COLORBOND® steel or ZINCALUME® steel from prolonged exposure to the condensation (moisture).

REFERENCES



Treelodge@Punggol



The Promenade Shopping Complex in Brunei



Jurong East MRT










REFERENCES



The New Kota Kinabalu High Court Complex in Sabah



Residential Project in Sarawak

-  COATING
-  COLOUR CHOICES
-  DESIGN FLEXIBILITY
-  DURABILITY / SECURITY
-  HI-TECH PRODUCTION
-  RECYCLING
-  TERMITE PROOF
-  THERMAL EFFICIENCY
-  WARRANTY



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Dec 2022