LYSAGHT KLIP-LOK 406

Concealed-fixed cladding

LYSAGHT KLIP-LOK 406 is a strong, durable, versatile, long length roof and wall cladding. KLIP-LOK 406 combines the strength of steel, smart fluted pans and a lock-action rib design which, together with concealed fastening, enables its use on applications from low pitched roofs to vertical or as horizontal ribbed walling.

Latest Technology

State of the art testing methods have been used to determine the performance of KLIP-LOK 406. The direct pressure testing rig at our NATA registered testing laboratory has been used to develop the limit state performance of KLIP-LOK 406.

This results in a much better modelling of wind loads, compared to traditional air bag testing methods.

Simple, low-cost fixing

Long, straight lengths of KLIP-LOK 406 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.

KLIP-LOK 406 is available in long lengths, therefore on most jobs you can have one sheet from ridge to gutter without end laps.

Concealed-fixing

Fixing clips effectively secure KLIP-LOK 406 to steel or timber supports without puncturing the sheet. With no exposed fasteners, the straight lines of your roof remain clean and smooth.

Colours

KLIP-LOK 406 is available in an attractive range of COLORBOND® steel colours and plain ZINCALUME® (zinc/aluminium alloy coated steel). COLORBOND® METALLIC steel, COLORBOND® stainless steel and COLORBOND® ULTRA steel are also available in a more limited range of colours subject to enquiry.

Roofing & Walling Products
Structural Products
Rainwater Products
Fencing Products
House Framing Products
Customer Support
Home Improvements

Lysaght Klip-lok 406

Masses

BMT	kg/m	kg/m²	m²/t
0.42 ZINCALUME®	2.01	4.95	202
0.42 COLORBOND®	2.04	5.03	199
0.48 ZINCALUME®	2.28	5.62	178
0.48 COLORBOND®	2.32	5.71	175
0.60 ZINCALUME®	2.82	6.95	144
0.60 COLORBOND®	2.86	7.04	142

Material specifications

KLIP-LOK 406 is made from:

- ZINCALUME® aluminium/zinc alloy-coated steel complying with AS 1397—2001 G550, AZ150 (550 MPa minimum yield stress, 150 g/m2 minimum coating mass);

The base metal thickness is 0.42, 0.48 and 0.60 mm. or

Stainless steel standard grade designation is AISI/ASTM Type 430; UNS No. S43000 available in 0.42 BMT only and is available subject to enquiry.

The COLORBOND® prepainted steel complies with AS/NZS 2728 -1997.

Lengths

Sheets are available custom cut.

Tolerances

Length: + 0 mm, – 15 mm

Width: + 4 mm, – 4 mm

Walking on roofs

Generally, keep your weight evenly distributed over the soles of both feet

to avoid concentrating your weight on either heels or toes. Always wear smooth soft-soled shoes; avoid ribbed soles that pick up and hold small stones, swarf and other objects.

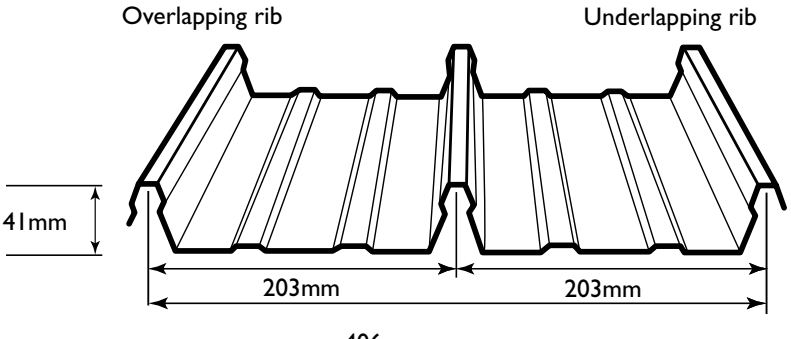
Minimum roof pitch

You can use KLIP-LOK 406 on roof pitches from as low as 1 degree (1 in 50) for 0.48 and 0.60 mm BMT, and 2 degrees (1 in 30) for 0.42 BMT. It can also be used on walls.

Maximum roof lengths for drainage measured from ridge to gutter (m)

Penetrations will alter the flow of water on a roof. For assistance in design of roofs with penetrations, please seek advice from our information line.

Peak rainfall	Roof slope					
intensity mm/hr	1°	2°	3°	5°	75°	10°
100	375	467	548	682	813	934
150	250	311	365	454	542	623
200	188	234	274	341	406	467
250	150	187	219	273	325	374
300	125	156	183	227	271	311
400	94	117	137	170	203	234
500	75	93	110	136	163	187



Maximum support spacings (mm)

	BMT (mm)		
Type of span	0.42	0.48	0.60
Roofs			
Single span	1500	1800	2300
End span	1700	2400	2700
Internal span	2100	3000	3600
Unstiffened eaves overhang	200	200	300
Stiffened eaves overhang	600	600	900
Walls			
Single span	1800	2400	2700
End span	1800	2400	3000
Internal span	1800	2400	3000
Overhang	300	400	600

- For roofs: the data are based on foot-traffic loading.
- For walls: the data are based on pressures (see wind pressures table).
- Table data are based on supports of 1mm BMT.

Maximum support spacings

The maximum recommended support spacings are based on testing in accordance with AS1562.1-1992, AS4040.0-1992 and AS4040.1-1992.

Roof spans consider both resistance to wind pressure and light roof traffic (traffic arising from incidental maintenance).

Wall spans consider resistance to wind pressure only.

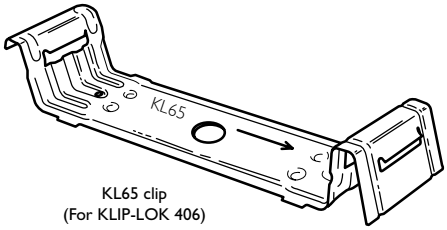
The pressure considered is based on buildings up to 10 m high in Region B, Terrain Category 3, Ms=0.85, Mi=1.0, Mt=1.0 with the following assumptions made:

Roofs:

Cpi=+0.20, Cpe=-0.90, Kl=2.0 for single and end spans, Kl=1.5 for internal spans.

Walls:

Cpi=+0.20, Cpe=-0.65, Kl=2.0 for single and end spans, Kl=1.5 for internal spans



KL65 clip
(For KLIP-LOK 406)

These spacings may vary by serviceability and strength limit states for particular projects.

Fasteners

Where insulation is to be installed, you may need to increase the length of the screws given below, depending on the density and thickness of the insulation. When the screw is properly tightened:

- into metal: there should be at least three threads protruding past the support you are fixing to, but the Shankguard must not reach that support;
- into timber: the screw must penetrate the timber by the same amount that the recommended screw would do if there were no insulation.

Klip-lok 406 Concealed Fastening

Fixing to steel Up to 0.75mm BMT	
10 - 12 x 25mm	
Fixing to steel >0.75 to 3mm BMT	**Fixing to timber**
10 - 16 x 16mm OR USE 10 - 16 x 22mm over insulation	HARDWOOD: 10 - 12 x 25mm SOFTWOOD: 10 - 12 x 35mm over insulation. HARDWOOD: Spiral Nail 3.75mm dia x 40 Spiral Nail 3.75mm dia x 60 over insulation SOFTWOOD: 10 - 12 x 25mm Spiral Nail 3.75mm dia x 60

KLIP-LOK 406: Limit state wind pressure capacities (kPa)

Span type	Limit state	Span (mm) 900	1200	1500	1800	2100	2400	2700	3000	3300	3600
Base metal thickness 0.42 mm											
SINGLE	Serviceability	2.05	1.80	1.57	1.35	1.14	0.94	0.74	0.55		
	Strength*	3.15	3.05	2.90	2.70	2.35	1.95	1.55	1.30		
END	Serviceability	1.93	1.84	1.74	1.61	1.46	1.31	1.14	0.99	0.84	0.70
	Strength*	3.42	3.30	3.15	2.85	2.55	2.20	1.85	1.50	1.25	1.05
INTERNAL	Serviceability	1.89	1.83	1.77	1.70	1.59	1.40	1.20	1.10	1.05	0.92
	Strength*	2.75	2.55	2.30	2.07	1.70	1.40	1.20	1.10	1.05	0.95
Base metal thickness 0.48 mm											
SINGLE	Serviceability	2.69	2.38	2.07	1.78	1.49	1.20	0.92	0.64		
	Strength*	4.41	4.30	4.10	3.75	3.25	2.70	2.10	1.53		
END	Serviceability	2.41	2.17	1.96	1.77	1.61	1.46	1.32	1.18	1.02	0.84
	Strength*	3.60	3.45	3.30	3.05	2.70	2.35	2.00	1.70	1.45	1.30
INTERNAL	Serviceability	2.82	2.76	2.66	2.53	2.35	2.05	1.80	1.65	1.50	1.27
	Strength*	4.10	3.55	3.05	2.65	2.35	2.05	1.80	1.65	1.50	1.35
Base metal thickness 0.60 mm											
SINGLE	Serviceability	4.82	4.12	3.47	2.88	2.34	1.83	1.34	0.87		
	Strength*	7.90	6.85	5.90	5.00	4.30	3.60	2.95	2.30		
END	Serviceability	4.57	4.27	3.65	3.00	2.55	2.30	2.15	1.80	1.44	1.14
	Strength*	5.85	4.65	3.65	3.00	2.55	2.30	2.15	2.00	1.80	1.50
INTERNAL	Serviceability	5.05	4.71	4.36	4.00	3.62	3.20	2.80	2.40	2.05	1.67
	Strength*	6.65	5.75	4.95	4.30	3.70	3.20	2.80	2.40	2.05	1.75

* A capacity reduction factor of $\phi = 0.9$ has been applied to strength capacities.
Table values are based on supports of 1 mm BMT.

Limit states wind pressures

KLIP-LOK 406 offers the full benefits of the latest methods for modelling wind pressures. The wind pressure capacity table is determined by full scale tests conducted at BlueScope Lysaght's NATA-registered testing laboratory, using the direct pressure-testing rig.

Testing was conducted in accordance with AS 1562.1—1992 Design and Installation of Sheet Roof and Wall Cladding—Metal, and AS 4040.2—1992 Resistance to Wind Pressure for Non-cyclonic Regions.

The pressure capacities for serviceability are based on a deflection limit of (span/120) + (maximum fastener pitch/30).

The pressure capacities for strength have been determined by testing the cladding to failure (ultimate capacity). These pressures are applicable when the cladding is fixed to a minimum of 1.0 mm, G550 steel.

For material less than 1.0 mm thick, seek advice from our information line.

Adverse conditions

If this product is to be used in marine, severe industrial, or unusually corrosive environments, ask for advice from our information line.

Metal & timber compatibility

Lead, copper, free carbon, bare steel and green or some chemically-treated timber are not compatible with this product. Don't allow any contact of the product with those materials, nor discharge of rainwater from them onto the product. Supporting members should be coated to avoid problems with underside condensation. If there are doubts about the compatibility of other products being used, ask for advice from our information line.

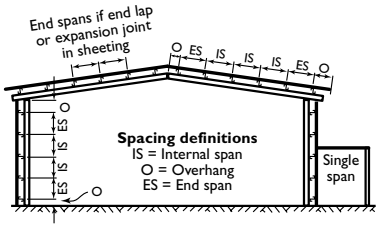
Maintenance

Optimum product life will be achieved if all external walls are washed regularly. Areas not cleaned by natural rainfall (such as the tops of walls sheltered by eaves) should be washed down every six months.

Storage and handling

Keep the product dry and clear of the ground. If stacked or bundled product becomes wet, separate it, wipe it with a clean cloth to dry thoroughly.

Handle materials carefully to avoid damage: don't drag materials over rough surfaces or each other; don't drag tools over material; protect from swarf.



Turn up-down tools

On all roofs of pitches less than 15 degrees, the high end of all sheets must be turned up to stop water from being driven under the flashing and into the building.

Similarly, the pans at the gutter end must be turned down to stop water running back along the underside of the sheets.

Tools are available for both applications.

Notching tool

A tool is available for on-site notching of transverse flashings and cappings.

Cutting

For cutting thin metal on site, we recommend a circular saw with a metal-cutting blade because it produces fewer damaging hot metal particles and leaves less resultant burr than does a carborundum disc.

Cut materials over the ground and not over other materials.

Sweep all metallic swarf and other debris from roof areas and gutters at the end of each day and at the completion of the installation. Failure to do so can lead to surface staining when the metal particles rust.

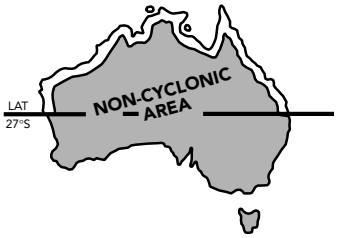
Sealed joints

For sealed joints use screws or rivets and neutral-cure silicone sealant branded as suitable for use with galvanised or ZINCALUME® steel.

Non-cyclonic areas

The information in this brochure is suitable for use only in areas where a tropical cyclone is unlikely to occur as defined in AS 1170.2—2002.

For information on the use of LYSAGHT products in cyclonic conditions, refer to the Design Capacities for Cyclonic Areas brochure (formerly Cyclonic Area Design Manual) which is available by ringing Steel Direct on 1800 641 417 or on our website: www.lysaght.com.



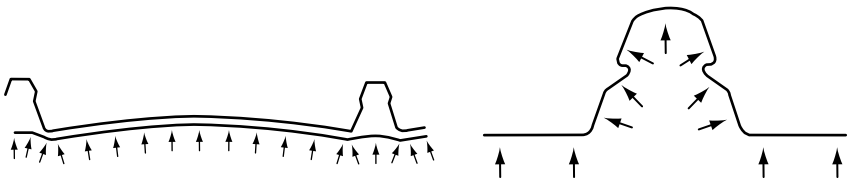
Accurate testing

Our LYSAGHT brand has held the lead in Australian building products for over 150 years. This position has been maintained through meticulous research and development.

When we say LYSAGHT KLIP-LOK 406 HI-STRENGTH is stronger, we back the statement up with full-scale testing in our NATA-registered laboratory.

The data in this publication are obtained from our direct-pressure test rig which accurately reproduces the wind conditions experienced in the field.

Older air bag methods used by others distribute pressure unevenly, so that air bags can produce misleading results and inflated strengths (see diagram).



The rigid shape of an inflated airbag does not apply pressure to the ribs of secret-fixed cladding or adjacent to supports

BlueScope Lysaght's direct pressure rig uses no air bags and applies pressure uniformly over the entire profile – including the ribs.

Uniform pressure distribution of our direct pressure rig which accurately reproduces the wind conditions experienced in the field.

Installation

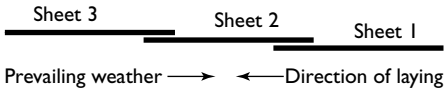


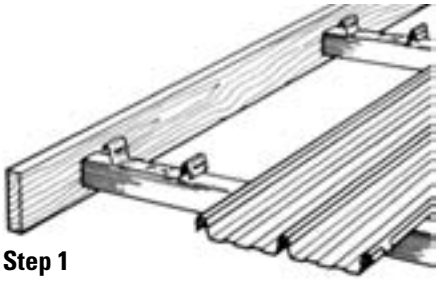
Figure 1
Lay sheets towards prevailing weather

General Installation Notes

1. Check that the top faces of all purlins or battens are lying in one plane, adjusting as necessary by packing or easing between these members and their supporting structure. Under no circumstances should packing be used directly under the fastening clips to adjust fall or alignment of roof.

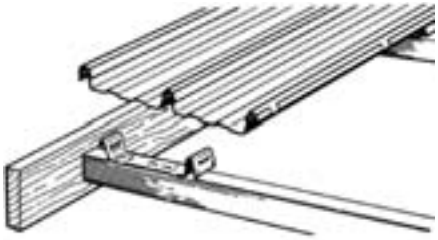
   Accurate alignment ensures efficient locking of sheets and clips. Conversely, misalignment can interfere with the locking action, particularly on close support centres.
2. To maintain maximum holding power the first and last supports and clips should be at least 75 mm from each end of the sheet.
3. Make spot checks for the alignment of sheets during laying to control fanning or creep (5 sheets = 2030 mm coverage). To rectify alignment, sheets may be adjusted 2 mm by pulling the clip away or pushing towards the sheet while fastening the clip.
4. For very steep roof or vertical wall applications, a positive fastener (screw or bolt) is required in each sheet length to prevent movement down the fastening clips. This is best positioned under or through the flashing or capping at the top end.
5. KLIP-LOK 406 can be fastened over insulation wool blankets up to 50 mm thick when the blanket is draped over supports before installation of clips.
6. Sheets should project a minimum 50mm into the gutter line.

Installation Procedure



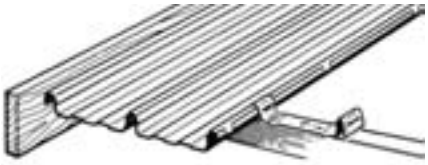
Step 1

When lifting sheet lengths onto the roof frame ready for installation, make sure all sheets have the overlapping ribs facing towards the side where fastening is to commence. The first run of clips must be located and fastened, one to each support, so that they will correctly engage in the overlapping and centre ribs of the first sheet when it is located and locked over them. To do this, fasten clips to the purlins at each end of the sheet, having positioned them so that the first sheet will be in correct relation to other building elements. Align and fasten the remainder of the first run of clips using a string line or the first sheet as a straight edge.



Step 2

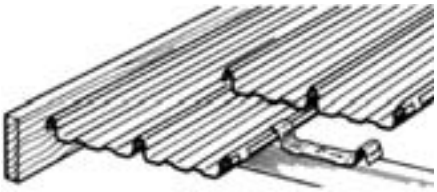
Position the first sheet longitudinally in relation to gutter overhang and locate it over the fastened run of clips, positioning the centre rib first, and engage the centre and overlapping ribs onto all clips by foot pressure.



Step 3

Position and fasten the next run of clips, one to each support, with the short return leg of the clip over the underlapping rib of the installed sheet.

If the clip fouls one of the spurs spaced along the outer free edge of the underlapping rib, the spur can be flattened with a blow from a rubber mallet to allow the clip to seat down over the rib.



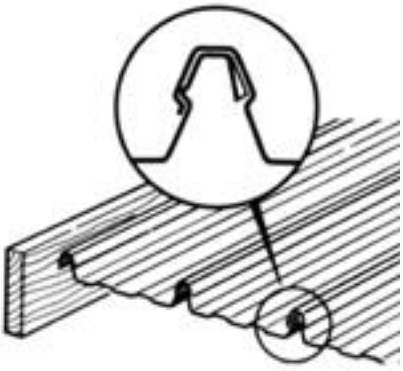
Step 4

Place the second sheet over the second run of clips, again positioning the centre rib first. A string line stretched across the bottom alignment of the sheets can be used to check that the ends of the sheets are in line.

Fully engage the interlocking ribs and the centre rib over each clip.

This can be achieved by walking along the full length of the sheet being installed with one foot in the tray next to the overlapping rib and the other foot applying pressure to the top of the interlocking ribs at regular intervals.

Also apply foot pressure to the top of the centre rib over each clip. For complete interlocking, which is essential, the spurs of KLIP-LOK 406 along the underlapping rib must be fully engaged in the shoulder of the overlapping rib.



Step 4b

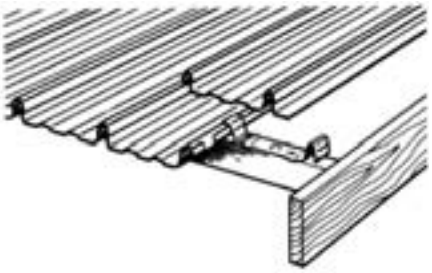
See illustration 'Step 4b'.

A distinct "click" will be heard as the interlocking ribs fully engage.

When engaging KLIP-LOK 406 interlocking ribs, stand only on the sheet being installed, that is the overlapping sheet, and not on the preceding sheet.

Install subsequent sheets by following Steps 3 and 4 and make periodic checks that the installed sheets are aligned with the roof perimeter.

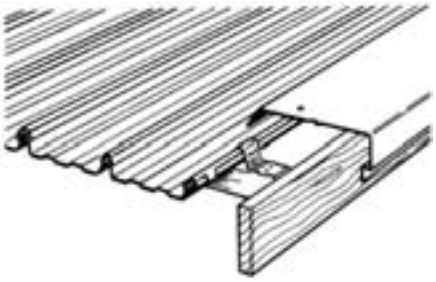
On walling applications a rubber mallet must be used to fully engage the interlocking ribs and engage the centre ribs over the clips.



5a (Part sheet cut longitudinally leaving full centre rib.)

Step 5

If the space left between the last full sheet and the fascia or parapet is more than a half sheet width, a sheet can be cut longitudinally, leaving the centre rib complete. This partial sheet can be fully clipped onto a row of clips as for a full sheet, before installing the capping or flashing. If the space left between the last full sheet and the fascia or parapet is less than a half sheet width, it can be covered by the capping or flashing. In this case, the last sheet should be secured by cutting clips in halves and fastening the underlapping rib at each purlin with a half clip.



5b (Last rib fastened with half clip and covered by capping or flashing.)

Rainwater solutions

LYSAGHT® rainwater goods

Whether you're searching for a distinctive look for a new home or looking for an economic solution for a large commercial project BlueScope Lysaght offer an extensive range of rainwater solutions.

Our domestic rainwater goods are manufactured from ZINCALUME® steel with COLORBOND® steel colours available, so they'll stand up to years of the harshest Australian climate.

The choice of colours and styles is extensive, covering everything you could need from gutters and downpipes, to fascia, flashings and cappings, as well as fasteners and fixing clips.

Domestic gutters and downpipes

We manufacture the perfect guttering system for your home, whatever the style. You can choose from Quad, TRIMLINE®, SHEERLINE® or a number of other designs. Speak with your local BlueScope Lysaght branch for availability.

All designs can be complemented with our complete range of square and round downpipes and rainwater accessories.

To ensure quick and easy installation there is also a full range of matching fixing clips.

Fascia

The NOVALINE® fascia is attractive and easy to install. It is strong, lightweight and can be used as a complete system. Special clips are also available to fix Quad ,TRIMLINE® and OGEE® gutters to the fascia.

Commercial/industrial drainage systems

There is a standard procedure for designing the drainage of a roof using an eaves & gutter system. It is assumed that the gutters will have a gradient steeper than 1:500. Box gutter systems can be more complex and are thoroughly treated in AS/NZS 3500.3.2:1998.

We manufacture the perfect guttering system for your structure, whichever type is appropriate.

All designs can be complemented with our complete range of square and round downpipes and rainwater accessories. To ensure quick and easy installation there is also a full range of matching fixing clips.

A total solution

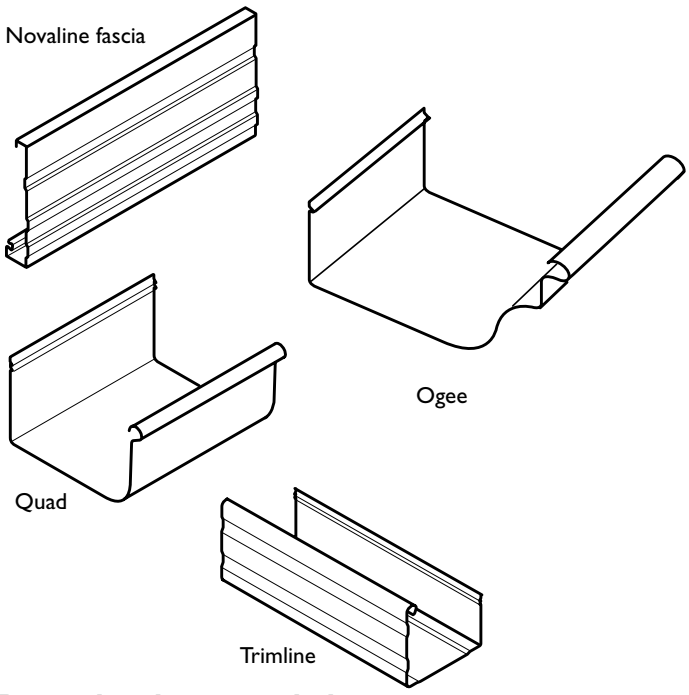
BlueScope Lysaght provides a broad range of roofing and rainwater products for industrial building solutions which complement KL-406. Our guttering systems can be tailor-made for your project.

Why you should always insist on BlueScope Lysaght

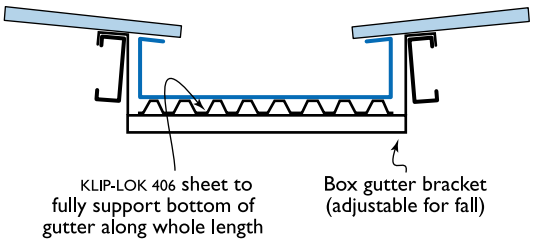
When you specify LYSAGHT products you have the added advantage of dealing with a company whose expertise and experience with steel stretches back for well over a century. A company with a reputation for consistently producing top quality products at competitive prices.

Our products are backed by a performance warranty for up to 25 years. When a BlueScope Lysaght warranty is granted, it guarantees in writing that your products will perform exactly to specifications when installed and maintained in accordance with our recommendations.

Terms and conditions apply - see www.lysaght.com.



Domestic rainwater solutions

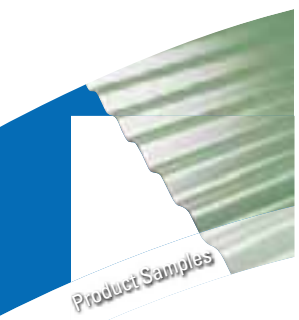


Box gutter

Commercial rainwater solutions

KLIP-LOK 406 design advantages.

- KLIP-LOK 406 is a concealed fixed cladding for roofing or walls
- Strong visual appeal
- Longer spans for economical construction
- Strong, lightweight and economical
- It can be fixed quickly and easily - no special tools required



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Information, brochures and your local distributor **1800 641 417**

Please check the latest information which is always available at **www.lysaght.com**

BLUESCOPE LYSAGHT