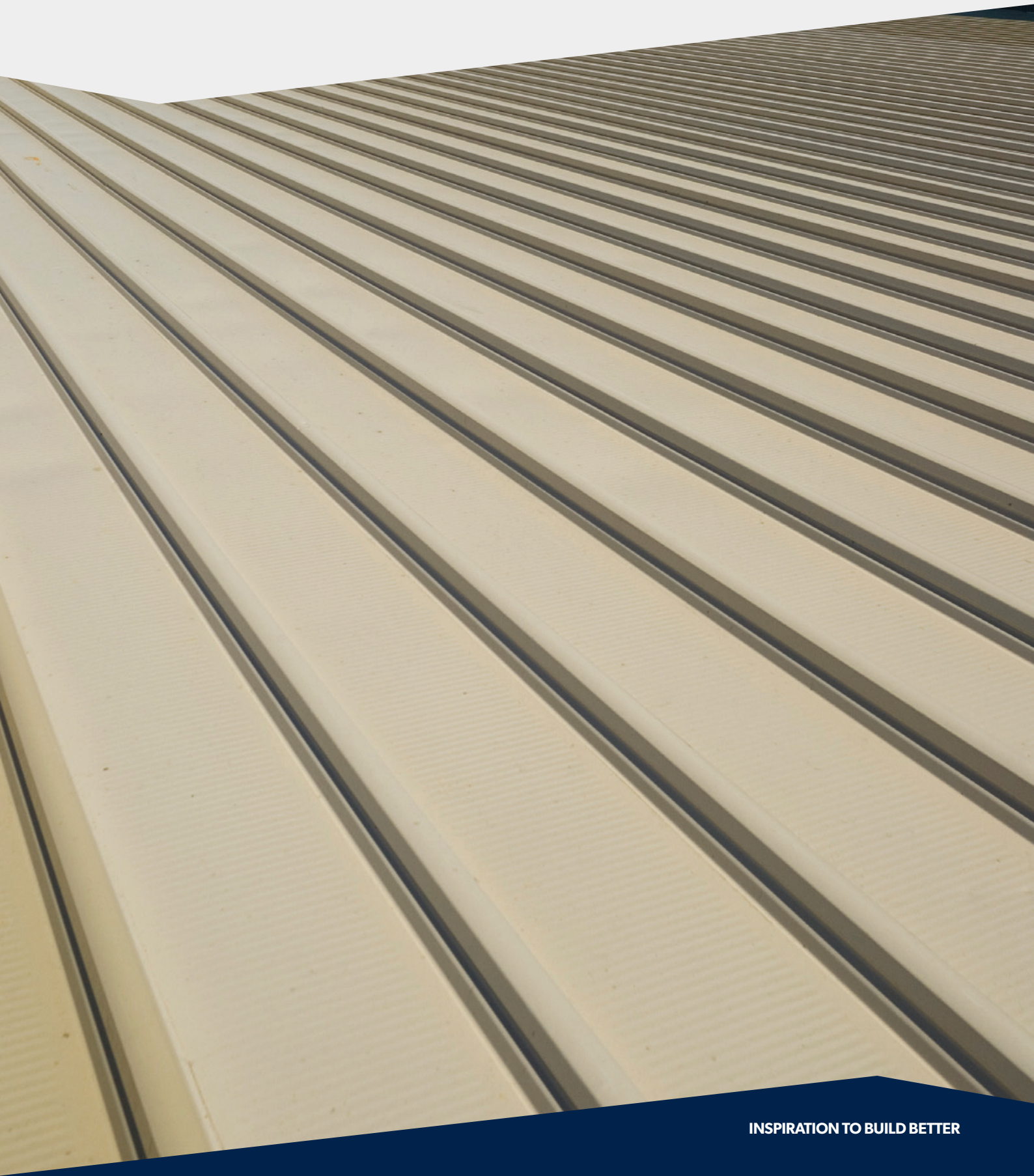
KLIP-LOK 700 HI-STRENGTH®

DESIGN AND INSTALLATION GUIDE



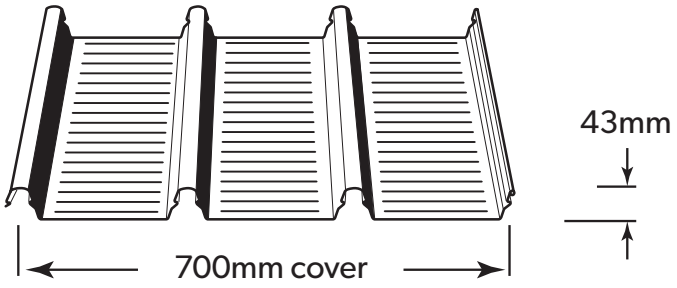
INSPIRATION TO BUILD BETTER

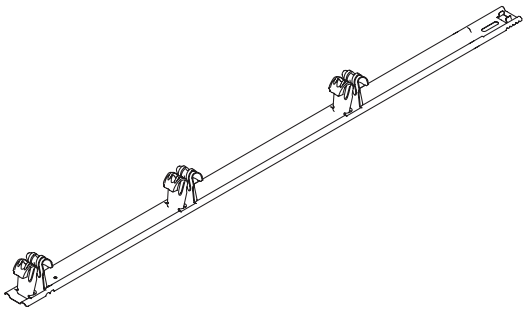
LYSAGHT KLIP-LOK 700 HI-STRENGTH®

Visually, a bold rib makes a strong statement rising from the flat pans. Thermal expansion of long, straight runs are achievable, and with no exposed fasteners, the long, straight lines of KLIP-LOK 700 HI-STRENGTH® (KL-700HS) remain clean and smooth.

At the heart of our system is our fixing clip, which can be laid in place and fixed simpler and faster than ever before. This is because the KLIP-LOK 700 HI-STRENGTH® clip is fixed with hex. Head screws, which are easier to drive. The clip also gives roofers the ability to accommodate up to 100mm of insulation.

KLIP-LOK 700 HI-STRENGTH® is available in rolled-on-site lengths. Our mobile on-site rollformer means extra long lengths of KLIP-LOK 700 HI-STRENGTH® can be made on-site and looks fantastic and also eliminates expansion joints. Longitudinal fluting manufactured from the mobile rollformer. Its availability is subject to enquiry.





MATERIAL SPECIFICATIONS

Next generation ZINCALUME® aluminium/zinc/magnesium alloy coated steel complies with AS 1397 G550, AM125 (550 MPa minimum yield stress, 125g/m^2 minimum coating mass).

COLORBOND® steel is pre-painted steel for exterior roofing and walling. It is the most widely used. The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397. Minimum yield strengths is G550 (550 MPa). Minimum coating mass is AM100 (100g/m^2).

COLORBOND® Metallic steel is pre-painted steel for superior aesthetic qualities displaying a metallic sheen.

COLORBOND® Ultra steel is pre-painted steel for severe coastal or industrial environments (generally within about 100-200 metres of the source). The painting complies with AS/NZS 2728 and the steel base is an aluminium/zinc alloy-coated steel complying with AS 1397. Minimum coating mass is AM150 (150g/m^2).

SUPERDURA® Stainless steel is a pre-painted stainless steel and is used for severe and coastal environments. The painting complies with AS/NZS 2728 and the steel base is a stainless steel complying with AISI/ASTM Type 430; UNS No. S43000.

MATERIAL AND COLOUR AVAILABILITY

For local availability of KLIP-LOK 700 HI-STRENGTH® in the base metal thicknesses or the large range of available finishes (from unpainted ZINCALUME® steel to COLORBOND® pre-painted steel), contact your nearest Lysaght service centre.

For the local availability of colours for KLIP-LOK 700 HI-STRENGTH® please enquire at your nearest Lysaght service centre.

COLORBOND® STEEL WITH THERMATECH® TECHNOLOGY

COLORBOND® steel's core colour range in the Classic and Matt finish features our specially designed Thermatech® solar reflectance technology. Thermatech® reflects more of the sun's heat on hot, sunny days which may help increase your comfort while reducing your dependence on air conditioning*. Thermatech® is available in all core colours except Night Sky®.

LENGTHS

Mobile rollformed sheets are custom cut on-site. Factory sheets cut to order.

MASSES

	BMT (mm)	kg/m	kg/m^2	m^2/t
ZINCALUME® steel	0.42	3.23	4.61	217
COLORBOND® steel	0.42	3.26	4.65	215
ZINCALUME® steel	0.48	3.67	5.24	191
COLORBOND® steel	0.48	3.70	5.28	189

TOLERANCES

Length: + 0mm, – 15mm; Width: + 4mm, – 4mm

Make allowance for thermal expansion or contraction for long length roofs at sheeting ends.

The equation $\Delta L = \alpha \times \Delta T \times L$ gives an indication of the sheeting extent or contraction (ΔL).

$\alpha = 12 \times 10^{-6}$ (coefficient of linear expansion for steel)

ΔT = temperature change in °C

L = sheet length in mm

MAXIMUM SUPPORT SPACINGS

The maximum recommended support spacings are based on testing in accordance with AS 1562.1, AS 4040.0 and AS 4040.1.

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 10m high in Region B, Terrain Category 3, M_s=0.85, M_l=1.0, M_t=1.0 with the following assumptions made:

ROOFS:

C_{pi}=+0.20, C_{pe}=-0.90, K_l=2.0 for single and end spans, K_l=1.5 for internal spans.

WALLS:

C_{pi}=0.20, C_{pe}=-0.65, K_l=2.0 for single and end spans, K_l=1.5 for internal spans.

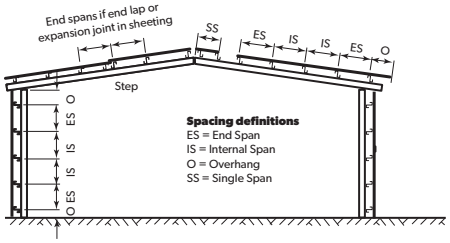
These spacings may vary by serviceability and strength limit states for particular projects.

MAXIMUM SUPPORT SPACINGS (MM)

	BMT	
Type of Span	**0.42mm**	**0.48mm**
Roofs		
Single span	1650	2050
End span	1750	2350
Internal span	2200	2800
Unstiffened eaves overhang	150	200
Stiffened eaves overhang	450	500
Walls		
Single span	2600	3000
End span	3000#	3000#
Internal span	3000#	3000#
Overhang	150	200

For roofs: the data are based on foot-traffic loading.
For walls: the data are based on pressures for transverse fluted material.
Table data are based on supports of 1mm BMT. Refer to the TOPSPAN® Design and Installation Guide and Selection Tables for support thickness less than 1.0 mm BMT, or seek advice from our information line.
Spans in excess of 3000mm may be available subject to enquiry. Wall applications or long spans require particular attention to installation practice.

SPAN TYPES - ROOFING AND WALLING PROFILE



MAXIMUM ROOF LENGTHS FOR DRAINAGE MEASURED FROM RIDGE TO GUTTER

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.

LIMIT STATES WIND PRESSURES

KLIP-LOK 700 HI-STRENGTH® 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 Lysaght's NATA-registered testing laboratory, using the direct-pressure testing rig.

Testing was conducted in accordance with AS 1562.1 and AS 4040.2.

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 1.0mm, G550 steel. For material less than 1.0mm thick, refer to the TOPSPAN® Design and Installation Guide and Selection Tables, or 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.

MAXIMUM ROOF LENGTHS FOR DRAINABLE MEASURED FROM RIDGE TO GUTTER (M)

Peak Rainfall Intensity (mm/hr)	Roof Slopes (degrees)					
	1	**2**	**3**	**5**	**7.5**	**10**
100	344	428	502	624	745	856
150	229	285	334	416	496	571
200	172	214	251	312	372	428
250	137	171	201	250	298	342
300	115	143	167	208	248	285
400	86	107	125	156	186	214
500	69	86	100	125	149	171

MINIMUM ROOF PITCH

Our unique anti-capillary side-lap allows you to use KLIP-LOK 700 HI-STRENGTH® on roof pitches from as low as 1° (1 in 50) for 0.48 and 2° for 0.42 BMT.

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/NZS 1170.2.



For information on the use of LYSAGHT® products in cyclonic conditions, refer to the Cyclonic Area Design Manual which is available on our website: www.lysaght.com.

KLIP-LOK 700 HI-STRENGTH® (TRANSVERSE FLUTES) LIMIT STATE WIND PRESSURE CAPACITIES (KPA) 0.42 BMT

Span Type	Limit State	Span (mm)							
		900	1200	1500	1800	2100	2400	2700	3000
Single	Serviceability	3.08	2.53	2.00	1.53	1.15	0.86	0.65	0.49
	Strength*	4.95	4.15	3.50	2.85	2.30	1.85	1.55	1.30
End	Serviceability	3.05	2.73	2.40	2.02	1.64	1.32	1.07	0.91
	Strength*	5.55	4.30	3.35	2.75	2.55	2.40	2.20	1.85
Internal	Serviceability	2.90	2.64	2.39	2.16	1.94	1.74	1.55	1.38
	Strength*	5.40	4.60	3.90	3.25	2.75	2.40	2.20	2.00

KLIP-LOK 700 HI-STRENGTH® (TRANSVERSE FLUTES) LIMIT STATE WIND PRESSURE CAPACITIES (KPA) 0.48 BMT

Span Type	Limit State	Span (mm)							
		900	1200	1500	1800	2100	2400	2700	3000
Single	Serviceability	4.22	3.35	2.54	1.83	1.28	0.90	0.69	0.57
	Strength*	6.30	5.20	4.25	3.35	2.70	2.15	1.80	1.60
End	Serviceability	3.81	3.34	2.88	2.43	2.02	1.67	1.38	1.15
	Strength*	6.30	5.10	4.15	3.55	3.15	2.85	2.50	2.20
Internal	Serviceability	3.76	3.32	2.91	2.54	2.24	2.01	1.84	1.68
	Strength*	6.35	5.55	4.80	4.10	3.60	3.20	2.85	2.60

KLIP-LOK 700 HI-STRENGTH® (LONGITUDINAL FLUTES) LIMIT STATE WIND PRESSURE CAPACITIES (KPA) 0.42 BMT

Span Type	Limit State	Span (mm)							
		900	1200	1500	1800	2100	2400	2700	3000
Single	Serviceability	2.52	2.05	1.60	1.22	0.91	0.69	0.56	0.48
	Strength*	4.85	4.10	3.40	2.75	2.20	1.80	1.45	1.20
End	Serviceability	2.65	2.48	2.26	1.92	1.53	1.19	0.94	0.79
	Strength*	3.40	2.95	2.60	2.30	2.15	2.00	1.80	1.55
Internal	Serviceability	2.63	2.40	2.17	1.96	1.76	1.57	1.41	1.25
	Strength*	3.85	3.40	3.00	2.65	2.35	2.15	2.00	1.95

KLIP-LOK 700 HI-STRENGTH® (LONGITUDINAL FLUTES) LIMIT STATE WIND PRESSURE CAPACITIES (KPA) 0.48 BMT

Span Type	Limit State	Span (mm)							
		900	1200	1500	1800	2100	2400	2700	3000
Single	Serviceability	2.80	2.27	1.77	1.33	0.98	0.74	0.59	0.50
	Strength*	5.80	4.75	3.80	2.95	2.30	1.80	1.50	1.30
End	Serviceability	3.11	2.51	2.01	1.64	1.40	1.23	1.07	0.93
	Strength*	5.10	4.05	3.20	2.65	2.30	2.10	1.85	1.60
Internal	Serviceability	2.68	2.47	2.27	2.09	1.94	1.81	1.70	1.60
	Strength*	5.00	4.30	3.65	3.10	2.70	2.45	2.35	2.30

* Above tables are based on supports of 1mm BMT.

For clip-fixed cladding, the spacing of the supports should be maximised. This is particularly important for high performance of the clip-fixed cladding, with preference for the support spacing to be 1500mm or greater. When clip-fixed cladding is fixed to closely spaced supports, additional attention should be given during installation to minimise alignment issues. Alignment issues can lead to other matters to address such as marking or potential of thermally induced noise.

INSTALLATION

PREPARATION

Before starting work ensure that:

- check flatness, slope and overhang;
- orient the sheets before lifting. Note the overlapping rib is towards the end of the building where you start;
- check that the overhang of the sheets from the clips, at both eaves and ridge, is not less than the minimum permitted.
- the first and the last supports and clips should be at least 75mm from each end of the sheet to keep maximum holding power.

Make any necessary adjustments before you start laying sheets, because they will be difficult to rectify later.

ORIENT SHEETS BEFORE LIFTING

Consider which end of the building is best to start from. For maximum weather-tightness, start laying sheets from the end of the building that will be downwind of the worst-anticipated or prevailing weather (Figure 1).

It is much easier and safer to turn sheets on the ground than up on the roof. Before lifting sheets on to the roof, check that they are the correct way up and the overlapping side is towards the edge of the roof from which installation will start.

Place bundles of sheets over or near firm supports, not at mid span of roof members.

Starting method 1. Cut the 1st clip 25mm from the centre of the second tower (as shown). The first tower on the cut clip locates in the 1st rib of the first sheet (Figure 2) but you must fix two clips at the start.

Starting method 2. The first tower on the first clip locates in the first rib of the first sheet (Figure 2). The clip fixes the edge of the first sheet.

KLIP-LOK 700 HI-STRENGTH® INSTALLATION

1. Lay and fix wire mesh to the supports and glass wool insulation in accordance with the appropriate building requirements.
2. Position the first clips on each support by placing onto the support nearest the roof edge (Figure 3).
3. Fix the first clip on the support so they point in the direction of laying. Ensure the clip is 90 degrees to the edge of the sheet.
4. Align the clips using a string line (or the first sheet as a straight edge) to align the clips as you fix a clip to each support working towards the high end of the roof.
5. Drive hex-head screws through the top of the clip, into the support.
6. Work along the edge of the roof ensuring it aligns correctly at its ends in relation to the gutter and ridge (or parapet or transverse wall).
7. Position the first sheet so that it overhangs the desired amount (usually 50mm) to the gutter. It is important to ensure this first sheet is placed square to adjacent edges (Figure 4).
8. Engage the sheet with clips using vertical foot pressure on all the ribs over each clip.
9. Fix the next row of clips, one to each support with the slots and tabs engaged. Be sure the clip is 90 degrees to the edge of the sheet. It is good practice to bend down the tabs once engaged. This can be done with the bit of a screw gun.

Figure 1

Lay sheets towards prevailing weather.

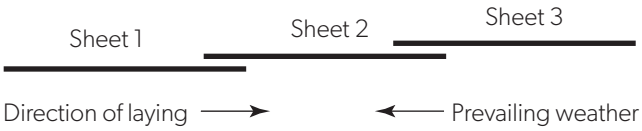
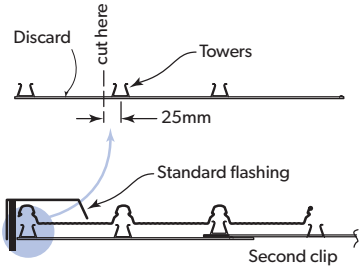


Figure 2

Alternative methods for first clips.

KLIP-LOK 700 HIGH-STRENGTH®: Starting method 1



KLIP-LOK 700 HIGH-STRENGTH®: Starting method 2

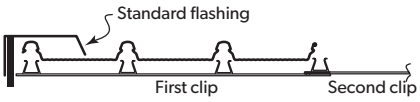


Figure 3

Fix the first row of clips. Fix the next (and subsequent) clips and sheets.

KLIP-LOK 700 HI-STRENGTH®

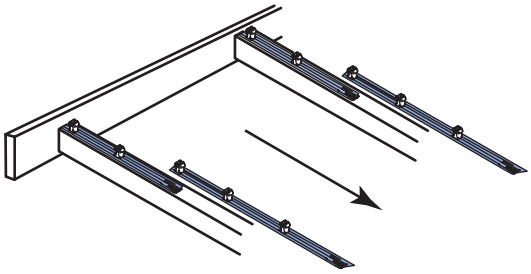
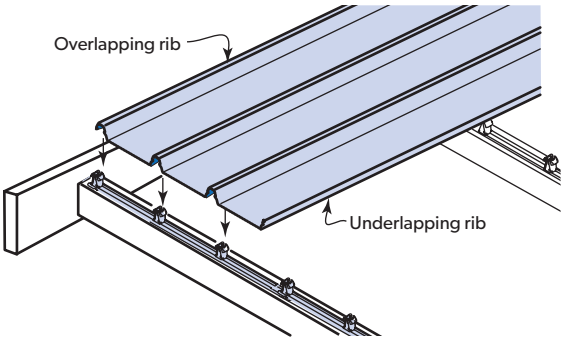


Figure 4

Placing the first sheet.



10. As before, place the next sheet over its clips ensuring you also engage the edge of the preceding sheet.
11. Accurately position the sheet so that it overhangs the desired amount into the gutter. It is important that you keep the gutter-end of all sheets in a straight line.
12. Fully engage the two sheets along the overlapping rib. You can do this by walking along the full length of the sheet with one foot in the centre pan of the previous sheet and the other foot applying vertical pressure to the top of the interlocking ribs at regular intervals. It is important that you don't walk in the unsupported pan beside the overlap (Figure 5).
13. With long spans, additional care may be required to ensure the overlapping rib adequately engages onto the underlapping leg. Care should be exercised due to the potential instability of the side-lap when it is not adequately engaged (interlocked).
14. Similarly, engage all the clips by applying vertical foot pressure to the top of the other two ribs over each clip.

It is essential that the sheets interlock completely. It is important that your weight is fully on the sheet you are installing.

CHECK ALIGNMENT OCCASIONALLY

Occasionally check that the sheets are still parallel with the first sheet, by taking two measurements across the width of the fixed sheeting.

At about half way through the job, perform a similar check but take the measurements from the finishing line to aim for the final sheet to be parallel with the end of the roof. If the measurements are not close enough, lay subsequent sheets very slightly out of parallel to gradually correct the error (Figure 6). Therefore, to allow this to happen, flatten the tabs on the base of subsequent clips—the slot in the clip will allow the clips to be fixed out of standard pitch.

FIX THE LAST SHEET

If the final space is less than the full width of a sheet, you can cut a sheet along its length and shorten the clips as appropriate.

INSTALLING KLIP-LOK 700 HI-STRENGTH® WALLS

In walling applications, horizontal pressure will need to be applied locally to the sheets to engage the ribs. Use body pressure (torso, hand or foot) or use a rubber mallet if required. Care should be exercised due to the potential instability of the temporary worker access equipment.

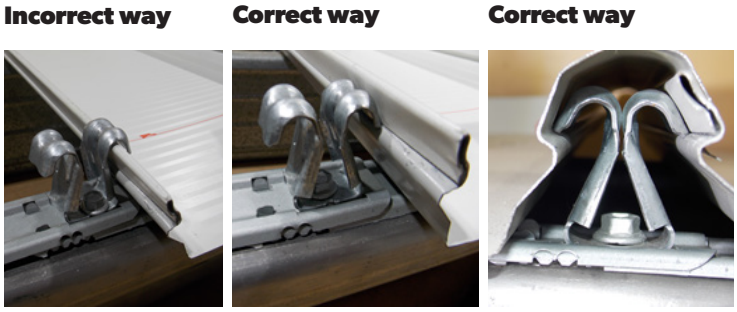
To prevent KLIP-LOK 700 HI-STRENGTH® from sliding downward in the fixing clips, you should pierce-fix through each sheet under the flashing or capping, along the top of the sheets.

LOK-KLIP® AND KLIP-LOK 700 HI-STRENGTH®

The LOK-KLIP® end and expansion joint system provides installers with quick and easy end joint/expansion joint solution. For more details refer to the LOK-KLIP® brochure available on our website (Figure 7).

INSTALLING TRANSLUCENT SHEETS WITH KLIP-LOK 700 HI-STRENGTH®

Because of its greater thermal expansion, translucent cladding should be fixed using oversized holes and sealing washers recommended by the cladding manufacturer. When used with concealed fixed claddings, ensure the fasteners do not penetrate the steel cladding. There are translucent products available that easily accommodate this.



Note: Don't exceed the maximum support spacing specified by the translucent cladding manufacturer. Use of translucent sheeting may result in lower limit state capacities.

For installation of translucent sheets with LOK-KLIP®, refer to the Ampelite Clearslide® installation guidelines on LOK-KLIP®.

Figure 5

Engaging the lapping ribs.

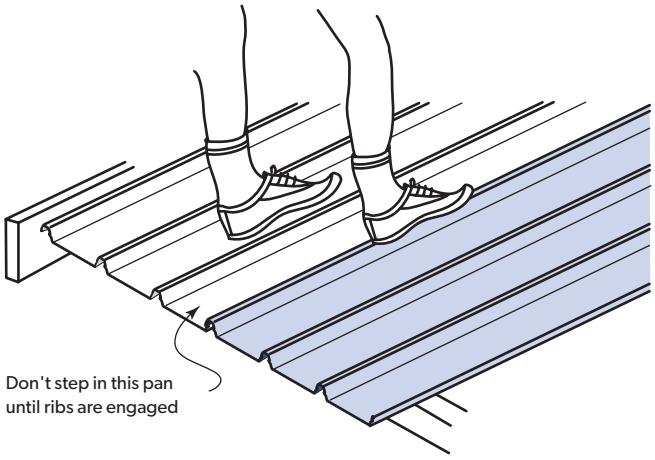


Figure 6

Check alignment occasionally.

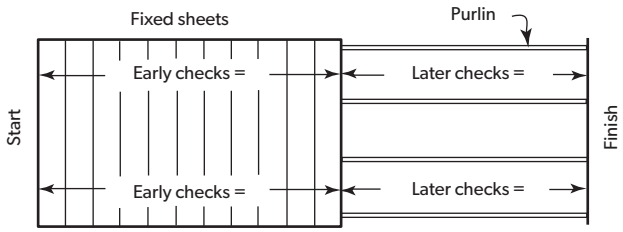
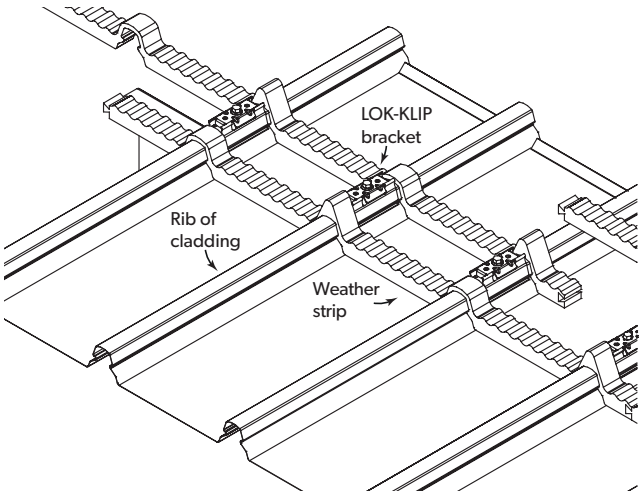


Figure 7

LOK-KLIP® and KLIP-LOK 700 HI-STRENGTH®



FASTENERS WITHOUT INSULATION

	Fix to Steel Single & lapped steel thickness ≥0.55 up to 1.0mm BMT	Fix to Steel Single steel thickness ≥1.0mm BMT up to 3.0mm BMT	Fix to Steel Total lapped thickness ≥1.00 BMT up to 3.8mm BMT	Fix to Timber Hardwood J1-J3	Fix to Timber Softwood J4
Clip Fixed	RoofZips M6-11x25	12-14x20*, Metal Teks, HH	12-14x20*, Metal Teks, HH	12-11x25, Type 17, HH	12-11x45, Type 17, HH or RoofZips M6-11x25

Notes:
1. For other steel thicknesses not specified please seek advice from screw manufacturer.
2. HH = Hex. Head.
3. Use 3 screws per clip.
4. As above or equivalent fastener.

* Longer screws may be easier to install (e.g. 12-14x30).

WALKING ON ROOFS

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.

Be careful when moving between supports. Do not walk in the pan immediately adjacent to flashings or translucent sheeting. Walk at least one pan away.

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.

METAL & TIMBER COMPATIBILITY

Lead, copper, free carbon, bare steel and green or some other chemically-treated timbers 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.

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.

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.

END LAPS/EXPANSION JOINTS

KLIP-LOK 700 HI-STRENGTH® cannot be end lapped however LOK-KLIP® provides an acceptable solution as an 'end joint'. (Or use long length sheets from a mobile rollformer.)

FASTENERS

Where insulation is to be installed, you may need to increase the length of the screws given, 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.

SEALED JOINTS

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

SWARF

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.

EXTRA VERSATILITY OF MOBILE ROLLFORMING

The mobile rollformer delivers on-site rolling for extra long lengths. In some cases the mobile rollformer has the unique ability to 'roll-to-roof' saving you time and money for transport and craneage.

PRODUCT DESCRIPTIONS

- All descriptions, specifications, illustrations, drawings, data, dimensions, and weights contained in this publication and websites containing information from Lysaght are approximations only. They are intended by Lysaght to be a general description for information and identification purposes and do not create a sale by description. Lysaght reserves the right at any time to:

  a) Supply goods with such minor modifications from its drawings and specifications as it sees fit, and

  b) Alter specifications shown in its publications and websites to reflect changes made after the date of publication.

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AUSTRALIAN STANDARDS

Australian Standard	Definition
AS 1397:2021	Continuous hot-dip metallic coated steel sheet and strip — Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2728:2013	Prefinished/pre-painted sheet metal products for interior/exterior building applications — Performance requirements
AS 1562.1:2018	Design and installation of metal roof and wall cladding, Part 1: Metal
AS 4040.0 -1992	Methods of testing sheet roof and wall cladding
AS 4040.1-1992 (Reconfirmed 2016)	Methods of testing sheet roof and wall cladding - Method 1: Resistance to concentrated loads
AS 4040.2-1992 (Reconfirmed 2016, Amendment 1:2018)	Methods of testing sheet roof and wall cladding, Part 2: Resistance to wind pressures for non-cyclone regions
AS/NZS 1170.2:2021	Structural design actions, Part 2: Wind actions

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