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Curved, bent & tapered cladding

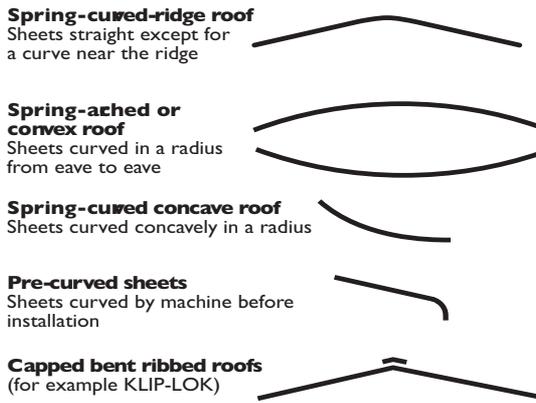


Figure 4.1
Typical curved and bent applications

Curved sheets can be used for both roofing and walling applications. Sheeting can be curved into either concave or convex shapes as required.

An excellent method of cladding low-slope gable roofs is to run continuous lengths of roofing from eave to eave, across the full width of the roof. This gives a particularly neat and attractive roof. It is also possible to spring-curve sheets into a concave shape.

With the exception of KLIP-LOK, the ridge capping is eliminated in these roofs, thus avoiding any possibility of leakage along the ridge. KLIP-LOK can be used similarly, but the ribs are cut at the ridge and a metal cap is fitted over the cut.

4.1 Spring-curved-ridge roof

Sheets in a spring-curved-ridge roof remain straight except for a curve near the ridge.

The pans of KLIP-LOK, INTEGRITY, LONGLINE 305 and TRIMDEK tend to oilcan (minor waviness in the pan) when spring curved. Apart from not looking good, an oilcanned pan may retain water which could lead to discolouration and/or deterioration of the sheet coating and also contributes to thermally induced roof noise. If some oilcanning in the pans is acceptable, these profiles can be spring-curved up to a maximum slope of 1 in 30 (2°); with the spacing between the purlins at the ridge being slightly less than the internal span recommended for the profile in Table 2.12.1.

Over the supports at the ridge, very slight crease marks may appear in the pans or valleys when subjected to foot traffic. They don't affect strength and will usually not be seen from the ground.

Only the sheet profiles recommended for spring-curving are shown in Table 4.1.1.

Each sheet is first fixed to one side of the roof, and then pulled down to be fixed to the other side. To minimise small laying errors, lay alternate sheets from opposite sides of the roof.

Side laps should be sealed with silicone sealant for the length of the curve.

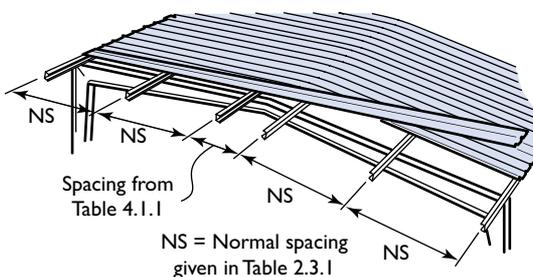


Figure 4.1.1
Spring-curved-ridge roof

Table 4.1.1
Minimum spacing of purlins at ridge for spring-curved-ridge roof (mm)

	1 in 20 (3°)	1 in 15 (4°)	1 in 12 (5°)	1 in 10 (6°)	1 in 8 (7°)
SPANDEK 0.42 BMT	1400	1500			
SPANDEK 0.48 BMT	1500	1600	1700		
CUSTOM ORB 0.42 BMT			1200		
CUSTOM ORB 0.48 BMT			1300	1400	
CUSTOM BLUE ORB 0.6 BMT			1200	1300	1400

Blank spaces are combinations not recommended

4.2 Spring-arched roof

Sheets in a spring-arched (convex) roof are curved in a radius from eave to eave. SPANDEK, LONGLINE 305, CUSTOM ORB and CUSTOM BLUE ORB can be spring-curved for an arched roof. Table 4.2.1 shows the acceptable radii.

The top face of all purlins must accurately follow and be tangential to the radius of the arch. The radius of curvature can be calculated from the formula in Figure 4.2.1.

Table 4.2.1
Recommended radii for convex spring-curving

	Minimum radius (m)	Purlin spacing at minimum radius (mm)	Maximum radius ¹ (m)
SPANDEK 0.42 BMT	20	1200	60
SPANDEK 0.48 BMT	20	1400	60
CUSTOM ORB 0.42 BMT	12	800	35
CUSTOM ORB 0.48 BMT	10	1000	35
CUSTOM BLUE ORB 0.6 BMT	9	900	35
LONGLINE 305 0.7 BMT	26	1600	180
LONGLINE 300 0.7 BMT (Fluted)	20	1200	180
LONGLINE 0.7 BMT (Tapered)	20	1200	180

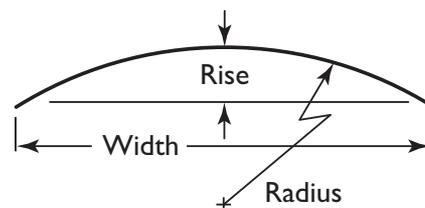
¹ Maximum radius is to provide sufficient drainage near crest of arch.

At the crest of an arch the roof is flat, which is obviously below the specified minimum roof pitch. Therefore side laps of shallow roof profile as such as CUSTOM ORB, CUSTOM BLUE ORB and SPANDEK should be sealed over the crest of the arch until there is sufficient pitch to give adequate drainage (see Table 2.3.1). The length of seal is shown in Figure 4.2.2. Refer to Section 8.5 for side-lap fixing and Section 7.9 for sealant application.

Over the supports very slight crease marks may appear in the pans or valleys when subjected to foot traffic. They don't affect strength and will usually not be seen from the ground.

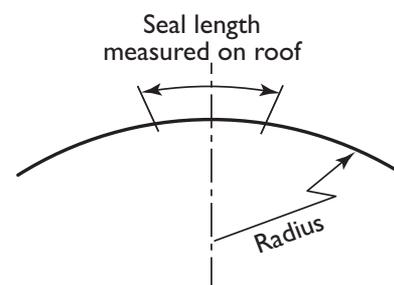
If end laps are necessary they should not be located at or near the crest of the arch and each sheet length must span at least three purlin spacings.

Profiles with wide pans manufactured from high tensile steel (such as KLIP-LOK, SPANRIB and INTEGRITY 820) are susceptible to local buckling of the pans and are therefore not recommended for spring-arched roofs.



$$\text{Radius} = \frac{\text{Width}^2 + 4(\text{Rise})^2}{8 \times \text{Rise}}$$

Figure 4.2.1
Calculation of radius



$$\text{Seal length} = 0.035 \times \text{Radius} \times \text{specified minimum roof pitch}$$

CUSTOM ORB and CUSTOM BLUE ORB
(min. roof pitch 5): Seal length = 0.18 x radius

SPANDEK
(min. roof pitch 3): Seal length = 0.11 x radius

Figure 4.2.2
Seal length for side laps on spring-arched roof

These products may be made specially from soft steel (G300) to minimise the problem.

Each sheet is first fixed to one side of the roof, and then pulled down to be fixed to the other side. Alternate sheets are laid from opposite sides of the roof.

4.3 Spring-curved concave roofs

Roofing can be spring-curved into concave shapes.

Table 4.3.1 shows the acceptable radii.

Table 4.3.1
Radii for spring curved concave roofs

	Minimum radius (m)	Purlin spacing (mm)
KLIP-LOK 406 BMT 0.48	26	1400
SPANDEK BMT 0.42	18	1200
SPANDEK BMT 0.48	20	1400
TRIMDEK BMT 0.42	20	1000
TRIMDEK BMT 0.48	22	1200
CUSTOM ORB BMT 0.42	10	800
CUSTOM ORB BMT 0.48	10	1000
CUSTOM BLUE ORB BMT 0.60	8	800
LONGLINE 305 BMT 0.70	26	1600

The purlin spacing may be increased for radii greater than the minimum radii shown, provided the spacing does not exceed that shown in Table 2.3.1

For fluted and tapered LONGLINE please contact your local Service Centre for advice.

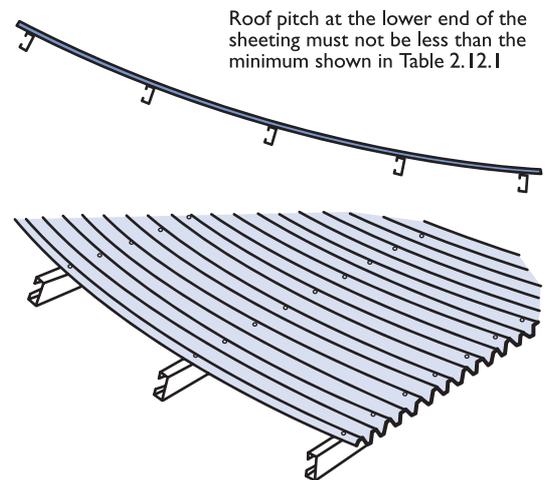


Figure 4.3.1
Spring-curved concave roof

4.4 Pre-curved sheets

Pre-curving of CUSTOM BLUE ORB and MINI ORB is available for various applications - we don't recommend pre-curving for other profiles.

Pre-curved corrugated roofing is popular for aesthetics (such as a bullnosed verandah roof), or for function (such as a gutterless eave design). CUSTOM BLUE ORB can be curved to a small radius (300 to 400mm - local variations apply).

MINI ORB can be curved to a radius to as small as 150mm, though it isn't recommended for roofing.

Because of the spacing of curving rolls, there is usually a straight portion at the end of the sheet beyond the curve (often 50 to 110mm for CUSTOM BLUE ORB, and about 50mm for MINI ORB). Allow for this in your design. It can be trimmed off if necessary.

If a pre-curved section of cladding is to be joined to a straight section, it is recommended that you order the curved and straight sheets at the same time, asking for them to be matched in production to ensure a quality end-lap. End-lap the sheets as described in Section 10.4 (End-lapping).

Our CUSTOM BLUE ORB and the MINI ORB pages of the LYSAGHT Walling Products brochure gives more details on curving.

4.5 Capped bent ribbed roofs

Tray cladding can be used in continuous lengths from eave to eave by cutting the ribs and bending the pans at the ridgeline. The same process is used on Mansard roofs. Caps are fitted over the cut ribs, which open up when the pans are bent. Fitting the rib caps can be time-consuming and care must be taken with sealing to avoid any possibility of leakage.

The ribs must be cut squarely, with a metal cutting blade in a power saw, set to the depth of the rib minus 2mm.

In some states pressed steel caps may be available to suit KLIP-LOK ribs, though the range of angles is limited. Caps can be handmade to suit any angle from flat sheet.

KLIP-LOK is most frequently used for capped bent ribbed roofs, but LONGLINE 305, TRIMDEK or even SPANDEK can be used. For these four profiles the rib caps can be made from pieces of rib profile cut from a short length of cladding. A neutral-cure silicon sealant should be used.

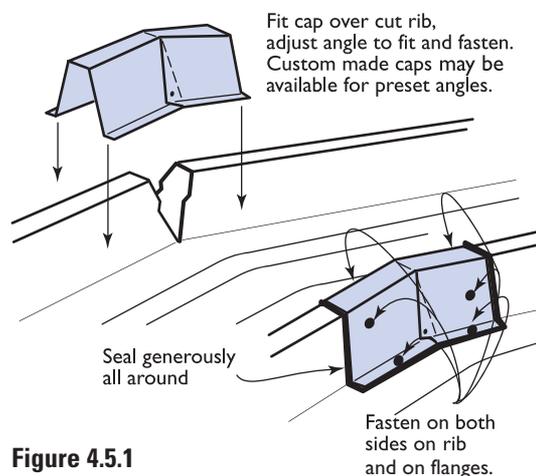


Figure 4.5.1
Capped bent ribbed roof

4.6 Tapered roofing

LONGLINE products

The LONGLINE cladding product is available in cover widths of:

- LONGLINE 305 - Wide flat pans, with a uniform cover width of 305mm.
- Fluted LONGLINE – Flat panned profile with subtle “concertina” type with longitudinal pan stiffeners with a uniform cover width of 300mm.
- Tapered LONGLINE - “Concertina” type stiffeners running longitudinally in the pans varying from a subtle definition to a bold definition. Cover width varying from a wide end of 305mm, down to a narrow end of as low as 145mm.

With combinations of fluted and tapered sheets, and/or with spring curving, striking or special architectural effects can be achieved.

The tapered LONGLINE results in a fan effect on roofs. Alternating the arrangement of tapered sheets or the combination of tapers/ fluted or standard LONGLINE 305 sheets will result in various patterns and textures being achieved.

All tapers are linear tapers. The tapers are manufactured in the standard mode (termed on the production line as FORWARD taper) or in the non-standard mode (termed on the production line as REVERSE taper).

The normal manufacture is “FORWARD” and unless specified the FORWARD taper will be produced.

The orientation of installation of the sheets will govern as to which end of the roof that laying can commence. On some projects the choice of laying direction is important and thus the selection of the correct direction of taper (Forward or Reverse) is vital.

For product range and availability and assistance on tapers, please contact your nearest service centre.

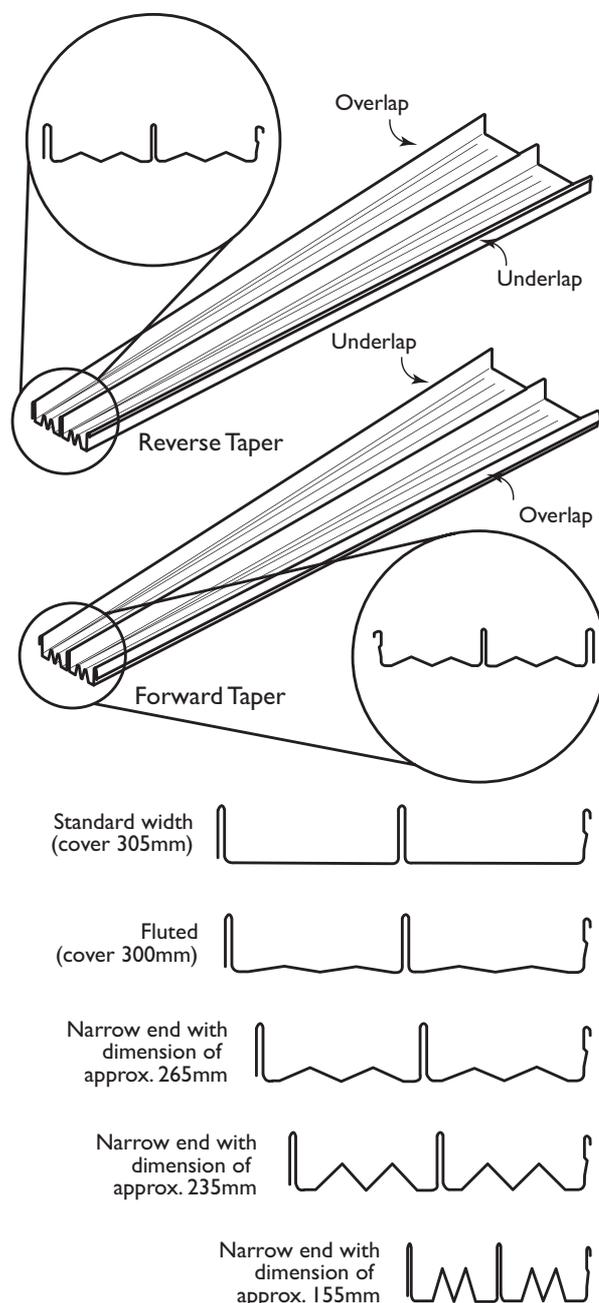


Figure 4.6.1
Tapered LONGLINE 305

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