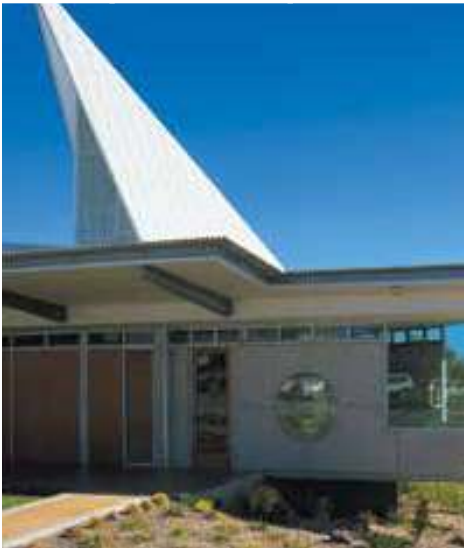


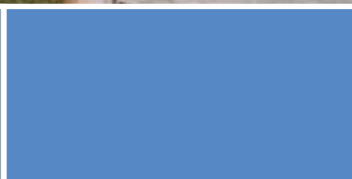
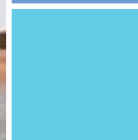
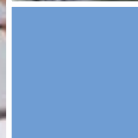


Global Excellence since 1857



# SPANDEK® 935

Design and Installation Guide



LYSAGHT SPANDEK® 935 is a contemporary looking, trapezoidal profile which is ideal for applications where a stronger, bolder, more modern appearance is required.

SPANDEK® 935 was originally designed as a strong attractive roofing material for industrial and commercial construction, however SPANDEK® 935 has proved equally popular for residential and public buildings, underlining its versatility and pleasing appearance.

SPANDEK® 935 combines strength with lightness, rigidity and economy.

## Profile

SPANDEK® is a 935 mm wide coverage profile with nominal 24 mm deep ribs at nominal 93.5 mm center to center distance. The end ribs are designed with anti-capillary action to avoid any seepage of water through the lateral overlap. (Please refer Fig. 1)

## Material Specifications:

ZINCALUME® steel resin coated, minimum metallic coating mass is AZ150 (150g/m<sup>2</sup>), minimum yield strengths of G550 (550MPa) complies with AS1397 or IS15961.

COLORBOND® XRW is pre-painted steel for exterior roofing and walling. Its minimum metallic coating mass of AZ150 (150g/m<sup>2</sup>), minimum yield strengths G550 (550 MPa) with Super Durable Polyester exterior paint system, total 25um DFT on topside and 10um DFT on reverse side complying with AS/NZS 2728- type 4 or IS15965- class 3.

COLORBOND® Ultra is pre-painted steel for severe coastal or industrial environments, minimum metallic coating mass is AZ200 (200g/m<sup>2</sup>), minimum yield strengths is G550 (550MPa), Super Durable Polyester exterior paint system, total 25um DFT on topside and 15um DFT on reverse side complying with AS/NZS 2728- type 4 or IS15965- class 3.

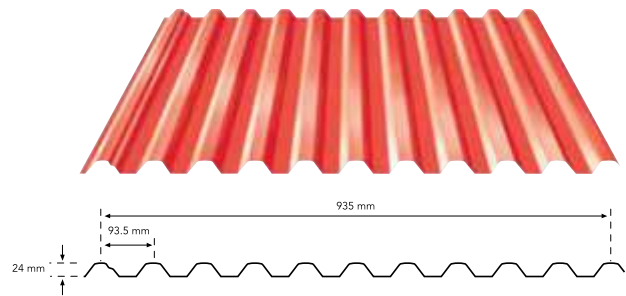
(Please contact Tata BlueScope Steel office for COLORBOND® spectrum series (metallic finish) and COLORBOND® XPD (PVDF) specification)

## COLORBOND® steel with THERMATECH™ Technology

COLORBOND® steel with THERMATECH™ technology reflects more of the sun's heat, allowing both roofs and buildings stay cooler in summer. In moderate to hot climates, compared to roofing materials of similar colour with low solar reflectance, COLORBOND® steel with THERMATECH™ can reduce annual cooling and energy consumption by up to 15%\*and also reduces peak roof temperature by up to 6°C\*\*.

## Lengths

Sheets are supplied custom cut.



(Fig. 1)

## Tolerances

Length: + 0 mm, - 15 mm

Width: + 4 mm, - 4 mm

## Masses

BMT*	TCT*	Product	kg/m	kg/m <sup>2</sup>
0.42	0.47	ZINCALUME® steel	4.21	4.51
0.42	0.47	COLORBOND® steel	4.31	4.61
0.45	0.50	ZINCALUME® steel	4.51	4.81
0.45	0.50	COLORBOND® steel	4.59	4.91

\*All dimensions are in 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.

## Maximum support spacings

The maximum recommended support spacings are based on testing in accordance with AS1562.1-1992, AS4040.1-1992 and AS4040.2-1992.

Roof spans consider both resistance to wind pressure and light roof traffic (traffic arising from incidental maintenance). Wall Spans considers resistance to wind pressure only. The pressure considered (in accordance with IS 875.3) is based on buildings up to 10m high, Zone 3 (Basic wind speed  $V_b = 47\text{m/s}$ ), Class A, Terrain category 3,  $K_1 = 1.0$ ,  $K_2 = 0.91$ ,  $K_3 = 1.0$ , with the following assumptions made;

Maximum Support Spacings (mm)		
Total Coated Thickness (mm)		
Type of span	0.47	0.50
<b>Roofs</b>		
Single Span	800	900
End Span	1200	1500
Internal Span	1700	2000
Unstiffened eaves overhang		
	250	300
Stiffened eaves overhang		
	500	600
<b>Walls</b>		
Single Span	1500	1700
End Span	1300	2000
Internal Span	1900	2500
Overhang	300	350
* For roofs, the data are based on foot-traffic loading.		
* For walls, the data are based on pressure (see pressure table)		
* Tables are based on supports on 1 mm BMT.		
* Please contact Tata BlueScope Steel Office before adopting for design.		

### Roofs:

$C_{pe} = - 1.20$  (internal cladding spans)

$C_{pe} = - 2.0$  (single and end cladding spans)

$C_{pi} = + 0.2$

### Walls:

$C_{pe} = - 0.80$  (internal cladding spans)

$C_{pe} = - 1.20$  (single and end cladding spans)

$C_{pi} = + 0.2$

These spacings may vary for particular projects, depending on specific structure characteristics.

### 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 your nearest Tata BlueScope Steel office.

Maximum Roof Run (m) as based on CSIRO Formula							
Profile	Rainfall intensity mm/hr	Roof Slope					
		1°	2°	3°	5°	7.5°	10°
SPANDEK® 935 Flow Area =178 m <sup>2</sup>	100	-	-	122	147	170	191
	150	-	-	82	98	113	127
	200	-	-	61	73	85	95
	250	-	-	49	59	68	76
	300	-	-	41	49	57	64
	400	-	-	31	37	43	48
	500	-	-	24	29	34	38

### Limit states wind pressures

SPANDEK® 935 offers the full benefits of the latest methods for modeling wind pressures. The wind pressure capacity table is determined by full-scale

test's conducted at BlueScope Steel'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 Pressures for Noncyclonic Regions.

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

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.

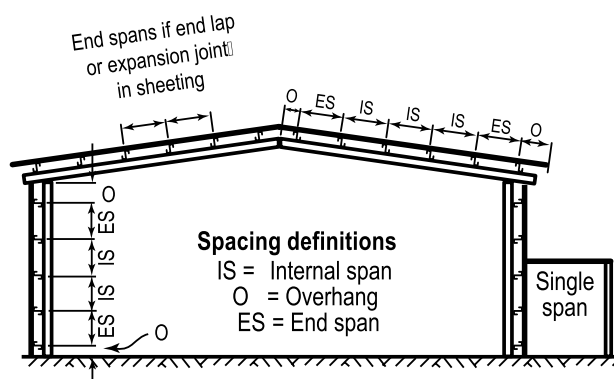
For material less than 1.0 mm thick, seek advice from your nearest Tata BlueScope Steel office.

### Metal & timber compatibility

Lead, copper, bare steel and green or some chemically treated timbers are not compatible with this product; thus don't allow any contact of the product with those materials, nor discharge of rainwater from them onto the product. If there are doubts about the compatibility of products being used, ask for advice from your nearest Tata BlueScope Steel office.

### Maintenance

Optimum product life will be achieved if all external surfaces 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 and stack it to dry thoroughly. Handle materials carefully to avoid damage: don't drag materials over rough surfaces or each other; carry tools, don't drag them; protect from swarf.

SPANDEK® 935: Limit state wind pressure capacities (kPa)											
Span Type	Fasteners per sheet per support		Span (mm)								
			900	1200	1500	1800	2100	2400	2700	3000	3300
SPANDEK® 935 - 0.40 mm Base Metal Thickness (0.45 mm Total Coated Thickness)											
SINGLE	4	Serviceability	2.20	1.75	1.35	1.01	0.76	0.59	0.47	0.38	-
		Strength*	10.20	7.90	5.85	4.20	3.10	2.55	2.30	2.20	-
	5	Serviceability	3.99	2.98	2.07	1.34	0.86	0.59	0.47	0.41	-
		Strength*	11.00	8.80	6.80	5.15	4.05	3.35	2.95	2.65	-
DOUBLE	4	Serviceability	1.89	1.60	1.33	1.10	0.92	0.79	0.69	0.61	-
		Strength*	5.95	4.60	3.35	2.40	1.75	1.45	1.25	1.25	-
	5	Serviceability	4.04	3.17	2.38	1.74	1.29	1.03	0.88	0.78	-
		Strength*	7.35	5.70	4.25	3.05	2.30	1.95	1.75	1.75	-
INTERNAL	4	Serviceability	1.84	1.55	1.29	1.05	0.87	0.74	0.66	0.62	0.59
		Strength*	7.65	6.30	5.10	4.00	3.10	2.50	2.10	1.90	1.70
	5	Serviceability	3.70	3.08	2.50	1.98	1.56	1.24	1.03	0.88	0.77
		Strength*	7.95	6.55	5.30	4.15	3.25	2.65	2.30	2.15	2.00
SPANDEK® 935 - 0.45 mm Base Metal Thickness (0.50 mm Total Coated Thickness)											
SINGLE	4	Serviceability	2.93	2.28	1.70	1.22	0.88	0.66	0.53	0.44	-
		Strength*	11.15	8.65	6.40	4.65	3.50	2.95	2.70	2.70	-
	5	Serviceability	4.41	3.34	2.38	1.60	1.07	0.75	0.58	0.48	-
		Strength*	11.80	9.85	8.00	6.45	5.30	4.40	3.75	3.20	-
DOUBLE	4	Serviceability	2.40	2.00	1.64	1.34	1.12	0.97	0.87	0.79	-
		Strength*	7.25	5.55	4.00	2.80	2.00	1.65	1.50	1.50	-
	5	Serviceability	5.10	3.94	2.89	2.05	1.48	1.16	0.99	0.90	-
		Strength*	8.75	6.80	5.10	3.70	2.85	2.40	2.20	2.20	-
INTERNAL	4	Serviceability	2.27	1.93	1.61	1.32	1.10	0.93	0.82	0.75	0.70
		Strength*	7.65	6.15	4.75	3.55	2.65	2.05	1.75	1.65	1.65
	5	Serviceability	4.33	3.64	2.98	2.39	1.91	1.54	1.27	1.07	0.91
		Strength*	9.85	8.15	6.60	5.20	4.10	3.35	2.85	2.60	2.40

\* A capacity reduction factor of  $\phi=0.9$  has been applied to strength capacities. Supports must be not less than 1 mm BMT.

\* Please contact Tata BlueScope Steel office before adopting for design.

\* Non standard colours and sizes are also available on special request.

The above data has been derived from tests conducted at our research centre and reproduction of the same in any form is strictly prohibited.

(Table 3)

## 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 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.

## Non-cyclonic areas

The information in this brochure is suitable for use only in areas where a tropical cyclone is unlikely to occur. Ask for advice from your nearest Tata BlueScope Steel office on designs to be used in cyclonic areas.



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# Installation

## Fastening sheets to supports

SPANDEK® 935 is pierce-fixed to steel or timber supports. This means that fastener screws pass through the sheeting.

You can place screws for SPANDEK® 935 through the crests or in the valleys. To maximize water tightness, always place roof screws through the crests. For walling, you may use either crest- or valley fixing.

Always drive the screws perpendicular to the sheeting, and in the centre of the corrugation or rib. Don't place fasteners less than 25 mm from the ends of sheets.

All the fasteners shall conform to Australian Standard AS 3566 Class 3-4 (min) for external application.

## Side-laps

The edge of SPANDEK® 935 with the anti-capillary groove is always the underlap. It is generally considered good practice to use fasteners along side-laps however, when cladding is supported as indicated in Maximum support spacings, side-lap fasteners are not usually needed for strength.

## End lapping

End-laps are not usually necessary because SPANDEK® 935 is available in long lengths. If you want end-laps, seek advice from your nearest Tata BlueScope Steel

office on the sequence of laying and the amount of overlap.

## Ends of sheets

It is usual to allow roof sheets to overlap into gutters by about 50 mm. If the roof pitch is less than 250 or extreme weather is expected, the valleys of sheets should be turned down at lower ends, and turned-up at upper ends by about 80°.

## Laying procedure

For maximum weather-tightness, start laying sheets from the end of the building that will be in the lee of the worst anticipated or prevailing weather.

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.

## Sheet-ends on low slopes

When SPANDEK® 935 is laid on slopes of 5 degrees or less, cut back the corner of the under-sheet, at the downhill end of the sheet, to block capillary action. (Please refer fig. 2)

## SPANDEK® 935: Fastening sheet to support

### Roof - Screw fix through rib

Crest - 5 fixing



Crest - 4 fixing

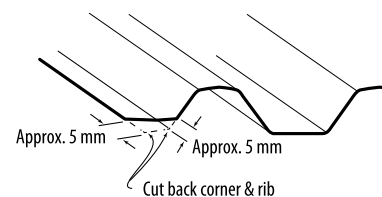


### Wall - Screw fix through pan

Valley - 5 fixing



Valley - 4 fixing



(Fig. 2)

### Fasteners without insulation

Support Details	Number of Fasteners		Crest Fixing Roof & Wall Application	Valley Fixing Wall Application only
	Per Sheet/support	Per m <sup>2</sup>		
Steel up to 0.75 mm BMT	4 or 5	5*	13 -13 x 55, Batten Tekes HG, Hex Head	10-16 x16 Metal Tekes, Hex Head
Steel > 0.75 mm BMT up to 3 mm BMT			12 -14 x 45, Metal Tekes HG, Hex Head	10-16 x16 Metal Tekes, Hex Head
Timber - Softwood			12 -11 x 65, Type 17 HG, Hex Head	10-12 x 30, Type 17 HG, Hex Head
Timber - Hardwood			12 -11 x 50, Type 17 HG, Hex Head	10-12 x 20, Type 17 HG, Hex Head

Note:

- All screws are self drilling self tapping with EPDM sealing washer unless otherwise noted.
- The number of screws per support are per m<sup>2</sup> are only for guidance, based on support spaced at 1 m and wall 0.6m.
- HG refers to Hi-Grips.
- \* - the screw quantity is based on an average number of screws.
- Please refer the above data for guidance purpose only, and may contact Tata BlueScope Steel office for further information.



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## Benefits

- Bolder contemporary corrugated profile
- Excellent for withstanding high wind load, snow load or impact load i.e. foot traffic
- Shorter roof runs, steeper roof slopes ( 5° )
- Suitable for curved roofs – larger spring curved roofs ( 30- 60 m with 1.2 m purlin spacing )
- Good rainfall capacity
- Longer Spanning capability in comparison to any conventional system in the market

## Product Descriptions

- All descriptions, specifications, illustrations, drawings, data, dimensions and weights contained in this catalogue, all technical literature 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:
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