

## ARKbar bracket and rail spacer system:-

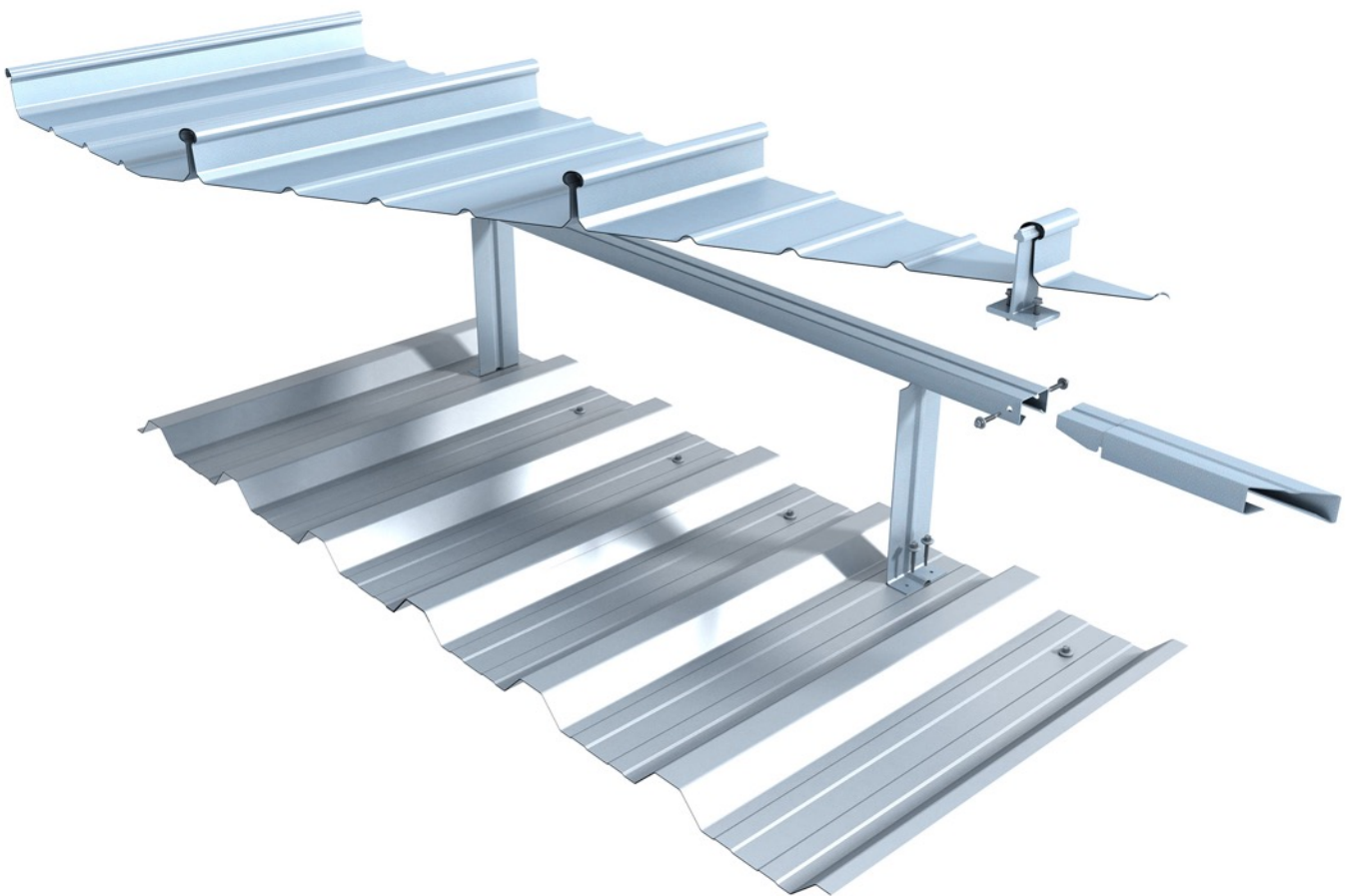
A spacer system for twin skin steel 32/1000 roof systems

A spacer system for twin skin steel 32/1000 wall systems

A spacer system for standing seam roof systems

- Thorough testing by Oxford Brookes University to BSEN 1993-1-3.
- U values to BSEN 10211
- Intuitive and simple method of installation.
- S450 grade steel
- Bracket depths from 80mm to 400mm
- $U_{\min} 0.10W/m^2K$  \*
- Stability bridge feature
- Anti-sway brackets for  $\geq 260mm$  systems

\* ( $\lambda=0.040W/mK$  insulation, 400mm bracket, 1.6m spans)





Rail depth	25mm	Rail width	43mm
Rail length	3000mm and 3600mm (cover length, spigot 50mm)	Rail thickness	1.20mm
Rail Weight	1.1kg/m	Bracket thickness	1.60mm
Bracket width	70mm	Bracket depths	80mm-400mm (other depths on enquiry)
Material	1.20mm and 1.60mm S450GD+Z275: BSEN 10346:15		

Rail section properties	Gravity		Uplift			
	I mm <sup>4</sup>	M <sub>Rd</sub> kNm	I mm <sup>4</sup>	M <sub>Rd</sub> kNm		
	9770	0.498	9000	0.45		
Bracket properties	Compression at 100mm depth	Compression at 200mm depth	Compression at 250mm depth	Compression at 280mm depth	Compression at 300mm depth	Compression at 400mm depth
	F <sub>c,Rd</sub> (kN)	F <sub>c,Rd</sub> (kN)	F <sub>c,Rd</sub> (kN)	F <sub>c,Rd</sub> (kN)	F <sub>c,Rd</sub> (kN)	F <sub>c,Rd</sub> (kN)
	8.54	5.24	3.41	3.05	2.81	1.6

## Maximum loads kN/m<sup>2</sup> at spans in m

Bracket spacing 1200mm	Span m	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00
	Wind kN/m <sup>2</sup>	1.94	1.77	1.62	1.49	1.39	1.30	1.21	1.14	1.08	1.02	0.97
	Imposed kN/m <sup>2</sup>	1.29	1.17	1.08	0.99	0.92	0.86	0.81	0.76	0.72	0.68	0.65
	Cantilever mm	330	330	330	330	330	330	330	330	330	330	330
Bracket spacing 1000mm	Span m	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00
	Wind kN/m <sup>2</sup>	2.33	2.12	1.94	1.79	1.67	1.55	1.46	1.37	1.30	1.23	1.17
	Imposed kN/m <sup>2</sup>	2.07	1.88	1.72	1.59	1.48	1.38	1.29	1.22	1.15	1.09	1.03
	Cantilever mm	330	330	330	330	330	330	330	330	330	330	330
Bracket spacing 800mm	Span m	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00
	Wind kN/m <sup>2</sup>	2.92	2.65	2.43	2.24	2.08	1.94	1.82	1.71	1.62	1.53	1.46
	Imposed kN/m <sup>2</sup>	2.58	2.35	2.15	1.99	1.85	1.72	1.62	1.52	1.44	1.36	1.29
	Cantilever mm	330	330	330	330	330	330	330	330	330	330	330
Bracket spacing 600mm	Span m	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00
	Wind kN/m <sup>2</sup>	3.89	3.53	3.24	2.99	2.78	2.59	2.43	2.29	2.16	2.05	1.94
	Imposed kN/m <sup>2</sup>	3.45	3.13	2.87	2.65	2.46	2.30	2.15	2.03	1.91	1.81	1.72
	Cantilever mm	330	330	330	330	330	330	330	330	330	330	330

Table shows maximum loads kN/m<sup>2</sup> at spans in m and at bracket spacings noted.

Bracket depth is 250mm and the purlin thickness 1.5mm (S450).

For other combinations enquire with ARK Profiles.

Wind = Max permissible wind uplift load kN/m<sup>2</sup>

Imposed = Max permissible imposed load kN/m<sup>2</sup>

Cantilever = Max permissible cantilever mm at max wind and imposed loads

The loads are permissible and include a load factor of 1.5

Bracket spacing mm

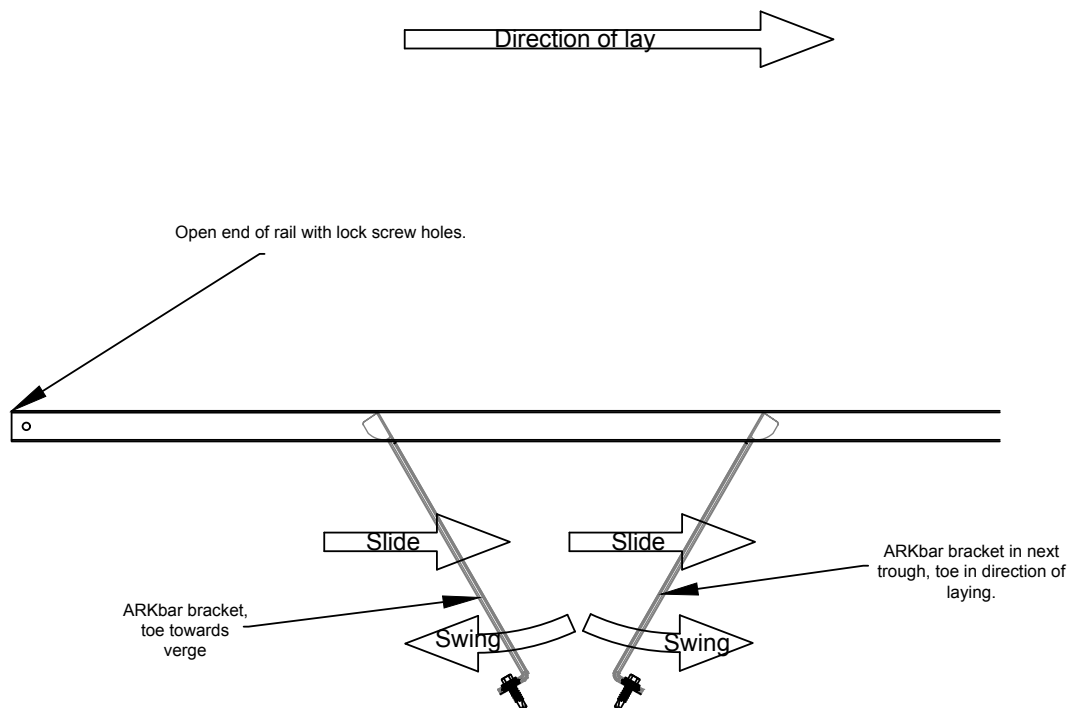
At brackets > 250mm use anti-sway brackets at nominal max centres of 20m

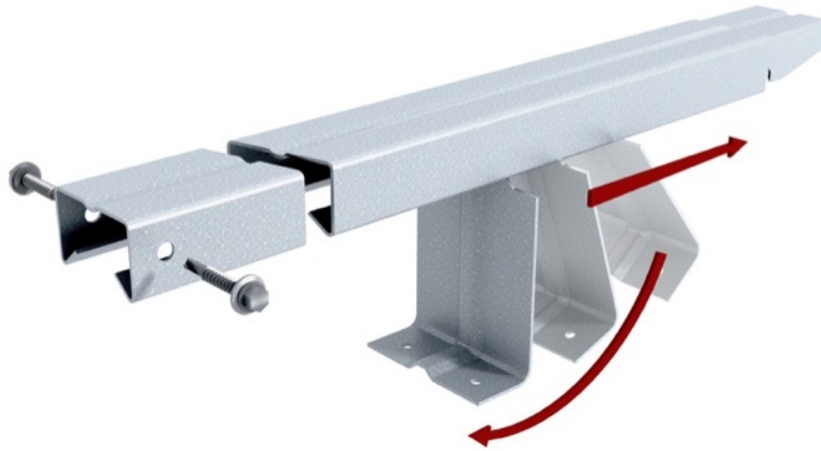
U Values	<p>U values, W/m<sup>2</sup>K, at spans and bracket depths shown.                  Roof and wall systems are 32/1000/200 inner and outer profiles.                  Insulation is lambda <math>\lambda=0.040</math>W/mK and <math>\lambda=0.040</math>W/mK glass or rock quilt under 10% compression.                  The nett insulation depth = bracket depth                  Gross insulation thickness (roll thickness) must be 10% over the bracket depth to allow for compression.                  Bracket centres are 1m                  Spans are average purlin centres in m.                  Contact ARK Profiles for other lambda values/bracket spacings etc</p>					
U values W/m <sup>2</sup> K <b>Roof systems</b> Lambda $\lambda=0.040$ W/mK insulation	Bracket depth mm	Sheeting span				
	Nett insulation mm	1.0m	1.2m	1.4m	1.6m	1.8m
	180	0.27	0.27	0.26	0.26	0.26
	190	0.26	0.25	0.25	0.24	0.24
	200	0.25	0.24	0.24	0.23	0.23
	210	0.23	0.23	0.22	0.22	0.22
	220	0.22	0.22	0.21	0.21	0.21
	230	0.21	0.21	0.20	0.20	0.20
	240	0.20	0.20	0.20	0.19	0.19
	250	0.20	0.19	0.19	0.18	0.18
	260	0.19	0.18	0.18	0.18	0.18
	270	0.18	0.18	0.17	0.17	0.17
	280	0.17	0.17	0.17	0.16	0.16
	290	0.17	0.16	0.16	0.16	0.16
300	0.16	0.16	0.16	0.15	0.15	
310	0.16	0.15	0.15	0.15	0.15	
U values W/m <sup>2</sup> K <b>Roof systems</b> Lambda $\lambda=0.037$ W/mK insulation	Bracket depth mm	Sheeting span				
	Nett insulation mm	1.0m	1.2m	1.4m	1.6m	1.8m
	180	0.26	0.25	0.25	0.24	0.24
	190	0.24	0.24	0.23	0.23	0.23
	200	0.23	0.23	0.22	0.22	0.21
	210	0.22	0.21	0.21	0.21	0.20
	220	0.21	0.20	0.20	0.20	0.19
	230	0.20	0.19	0.19	0.19	0.19
	240	0.19	0.19	0.18	0.18	0.18
	250	0.18	0.18	0.18	0.17	0.17
	260	0.18	0.17	0.17	0.17	0.16
	270	0.17	0.17	0.16	0.16	0.16
	280	0.16	0.16	0.16	0.15	0.15
	290	0.16	0.15	0.15	0.15	0.15
300	0.15	0.15	0.15	0.14	0.14	
310	0.15	0.14	0.14	0.14	0.14	

U values W/m <sup>2</sup> K <b>Wall systems</b> Lambda λ=0.040W/mK insulation	Bracket depth mm	Sheeting span				
	Nett insulation mm	1.0m	1.2m	1.4m	1.6m	1.8m
	180	0.27	0.26	0.26	0.25	0.25
	190	0.25	0.25	0.24	0.24	0.24
	200	0.24	0.24	0.23	0.23	0.23
	210	0.23	0.22	0.22	0.22	0.21
	220	0.22	0.21	0.21	0.21	0.20
	230	0.21	0.20	0.21	0.20	0.20
	240	0.20	0.20	0.19	0.19	0.19
	250	0.19	0.19	0.18	0.18	0.18
	260	0.19	0.18	0.18	0.17	0.17
	270	0.18	0.17	0.17	0.17	0.17
	280	0.17	0.17	0.16	0.16	0.16
	290	0.17	0.16	0.16	0.16	0.15
	300	0.16	0.16	0.15	0.15	0.15
310	0.16	0.15	0.15	0.15	0.14	
U values W/m <sup>2</sup> K <b>Wall systems</b> Lambda λ=0.037W/mK insulation	Bracket depth mm	Sheeting span				
	Nett insulation mm	1.0m	1.2m	1.4m	1.6m	1.8m
	180	0.25	0.25	0.24	0.24	0.23
	190	0.24	0.23	0.23	0.22	0.22
	200	0.23	0.22	0.22	0.21	0.21
	210	0.22	0.21	0.21	0.20	0.20
	220	0.21	0.20	0.20	0.19	0.19
	230	0.20	0.19	0.19	0.19	0.18
	240	0.19	0.18	0.18	0.18	0.18
	250	0.18	0.18	0.17	0.17	0.17
	260	0.17	0.17	0.17	0.16	0.16
	270	0.17	0.16	0.16	0.16	0.16
	280	0.16	0.16	0.15	0.15	0.15
	290	0.16	0.15	0.15	0.15	0.14
	300	0.15	0.15	0.14	0.14	0.14
310	0.15	0.14	0.14	0.14	0.14	
Fastener types	Bracket: Carbon steel (or A2 stainless steel) 5.5mm Ø fasteners, 15mm Ø washers. Rail locks: Carbon steel (or A2 stainless steel) 5.5mm Ø fasteners, 15mm Ø washers. Anti-sway brackets: carbon steel (or A2 stainless steel) 5.5mm Ø fasteners, 15mm Ø washers.					
Fastener frequency	Brackets: 2No per bracket Rail lock: 2No, 1 each side through pre-punched holes, at the spigot location. Anti-sway brackets, 4No per bracket, 2No at each end.					
Installation: key requirements	<ol style="list-style-type: none"> <li>Slide brackets into the rail from open end (with the two fastener holes, the non-spigot end). Swing brackets to vertical and screw fix to the structure using 2No fasteners with washers.</li> <li>Install all brackets with the toe facing the verge except for bracket 2 which should have the toe facing the direction of lay. For the first length of bar, position brackets 1 and 2 in adjacent troughs, nominal 200mm spacing. This creates a 'bridge' detail to resist sway. Remaining brackets in the first length of bar (numbers 3, 4 and 5) are at 800mm centres.</li> <li>Brackets can be installed either way around, but ensure that a 'bridge' is formed at the verge and after interruptions such as rooflights.</li> </ol>					

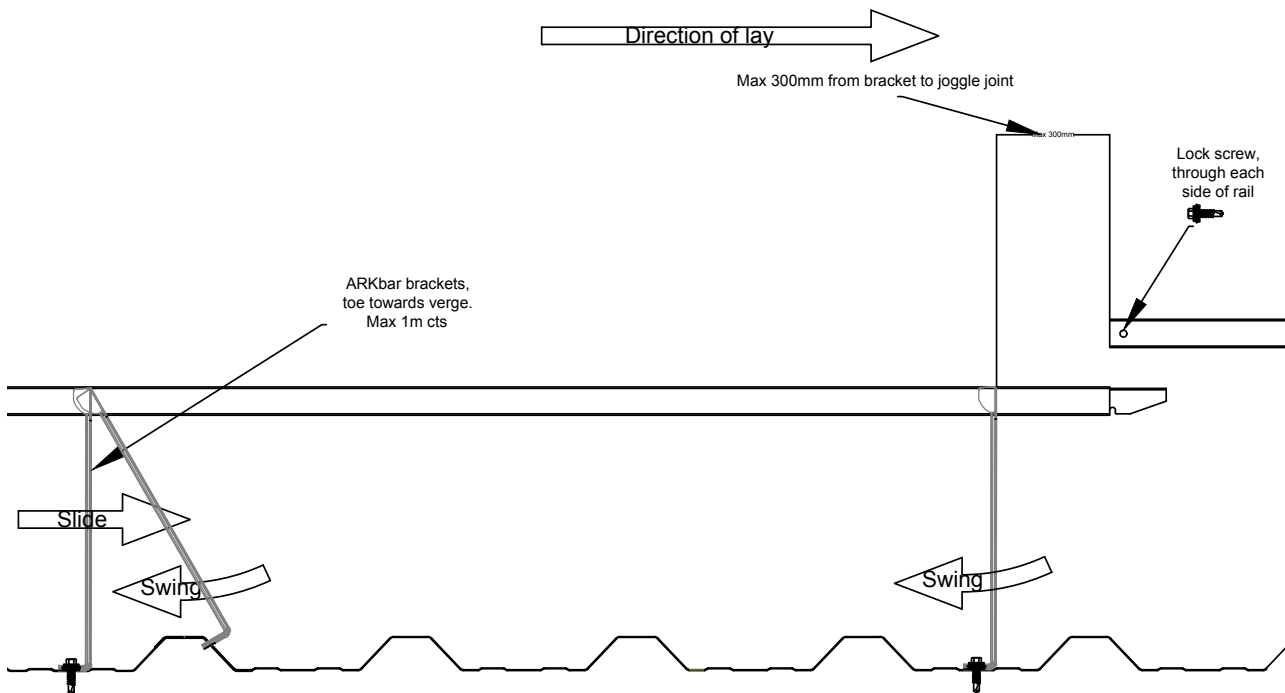
4. Subsequent bars have brackets at 1m spacings (unless the design requires other centres).
5. Brackets always have 2No fasteners, always lock bars together with 2No fasteners.
6. Max cantilever from bracket 300mm
7. Install anti-sway brackets in systems with brackets of 260mm and deeper.
8. Anti-sway brackets have 4No fasteners, 2No each end.
9. Note when loading out onto ARKbar that the strength of a bracket under compression reduces with depth. For example, a 2t pack set gently over 4 purlins and between brackets will apply 2.5kN per bracket, ok at up to 300mm deep brackets. A 2t pack over 4 purlins and set over the brackets will apply 5kN per bracket, ok at up to 200mm brackets.
10. At ridges tie brackets to the brackets on the opposite slope (or to firm ground) using 1.2mm x 35mm galv steel flat strips, to resist down slope loads and rotation effects

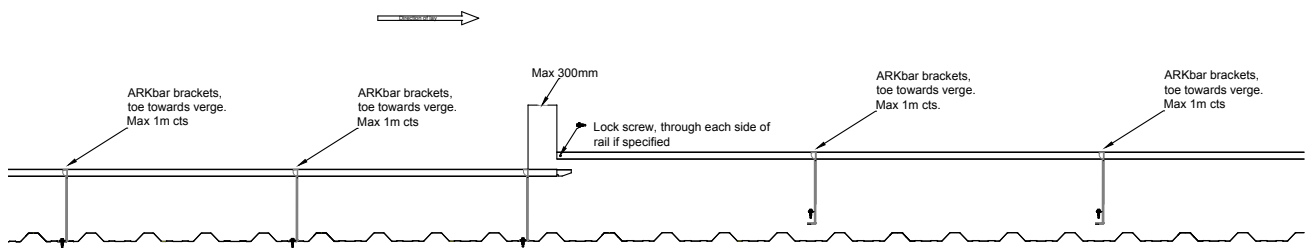
## Fitting a bracket into a bar:





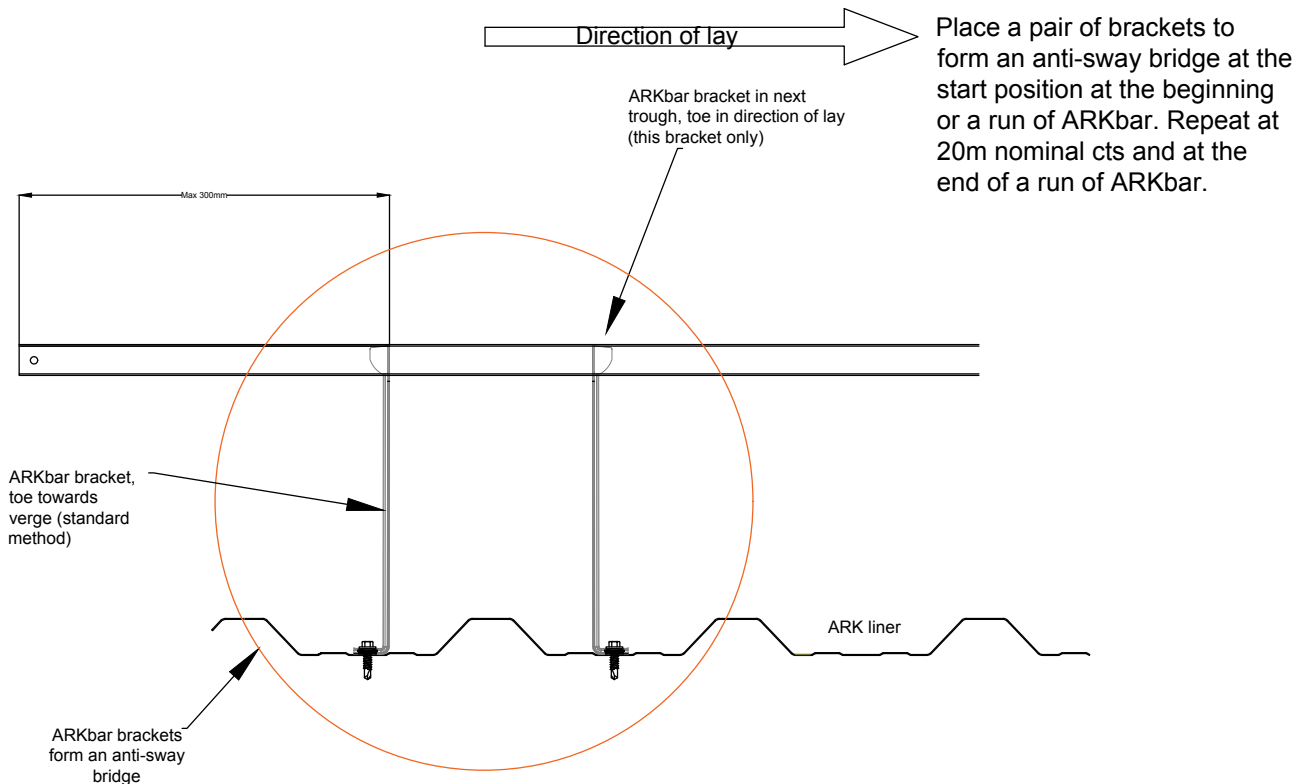
## Bar and bracket installation:





## Setting out from verge - 1

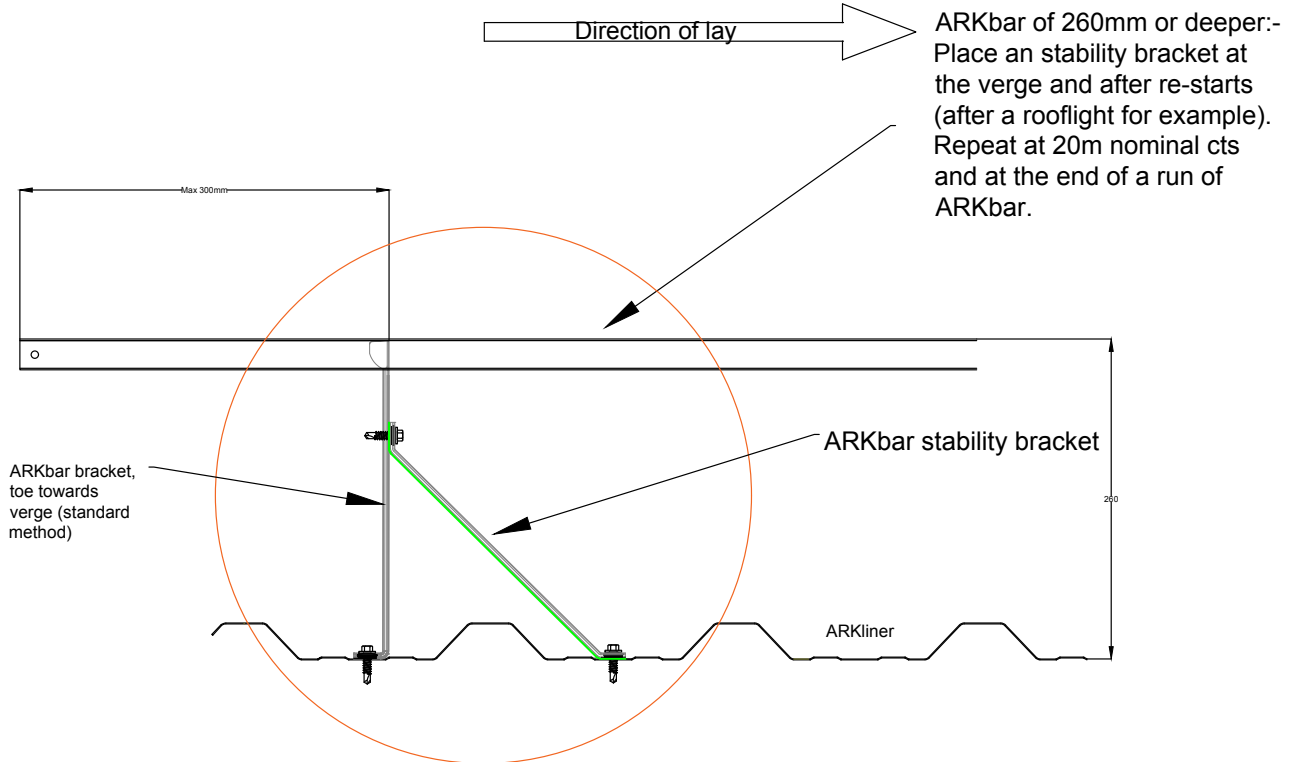
### Bar 1 (at verge for example), brackets 1 and 2. Stability bridge



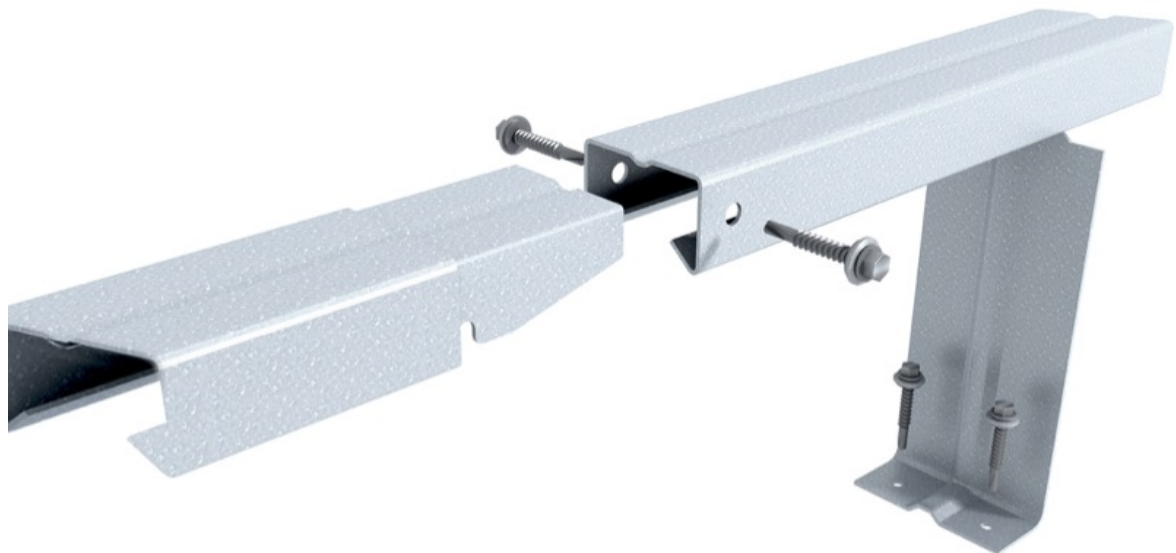


## Setting out from verge - 2

### Anti-sway bracket installation:

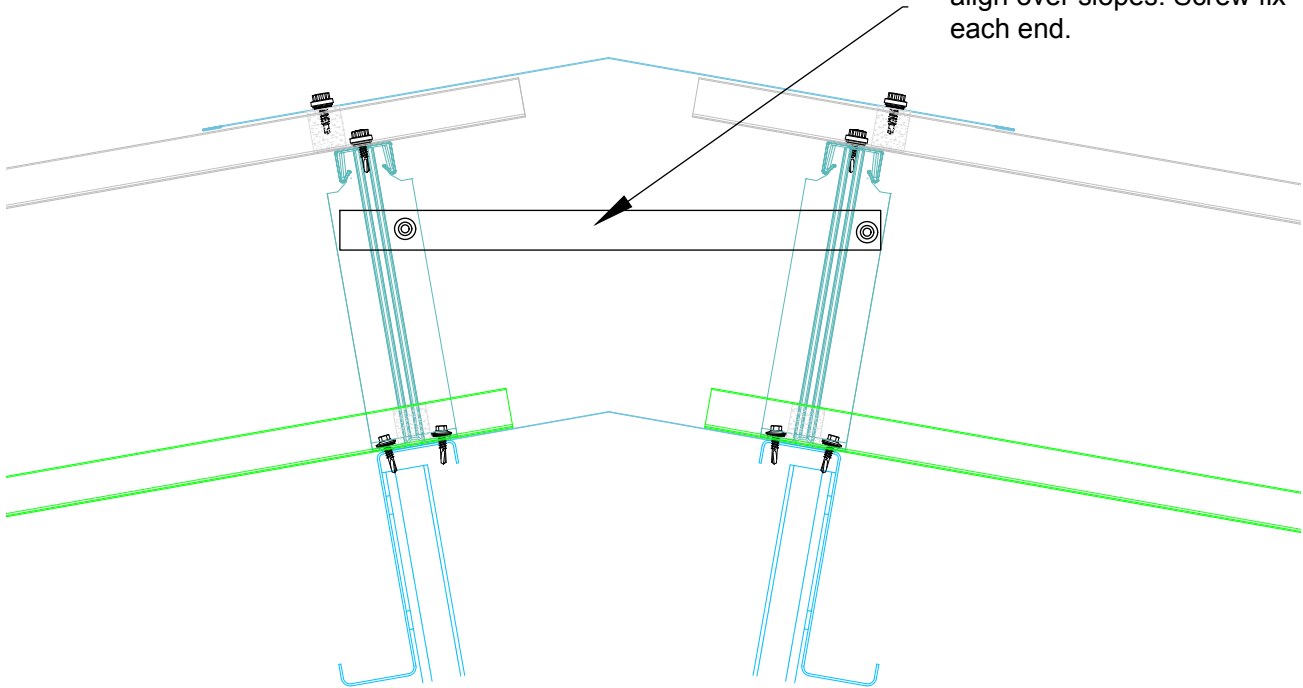


### Fastener arrangements



**Ridge brace**

1.2mm x 35mm galv strap fixed to ridge ARKbar brackets. Brackets need to align over slopes. Screw fix each end.



Reference/ Standards	Structural performance – Oxford Brookes University assessment 2018. BS EN 1993.1.3.2006	BS 5427:16
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