



ROOF SLOPE

Design Guide



ROOF SLOPE GUIDE



SELECTING THE OPTIMUM ROOFING PROFILE FOR APPLICATIONS WHERE ROOF SLOPE IS A KEY CONSIDERATION. INCORPORATES DETAILED REGIONAL RAINFALL INTENSITIES.



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ROOF SLOPE FACTORS

The major factors when considering roof slopes are

- Economy
- Safety
- Drainage
- Services
- Durability
- Aesthetics
- Wind resistance

This guide focuses particular attention on drainage and gives comprehensive information on the drainage characteristics of Stramit's range of roofing profiles. This, along with rainfall data for major locations, will enable easy selection of the best product for each application.

ECONOMY

Roof slope can have a significant effect on the cost of a building. The extent of this effect is dependent on building size and proportions. Generally the longer the roof slope and the lower the building height the greater the cost reduction from minimising roof slope. These savings are in the wall structure and wall cladding. It should be realised however that increasing the roof slope sufficiently could reduce wind pressures and lower the roof structure cost.

DRAINAGE

DESIGN BASIS

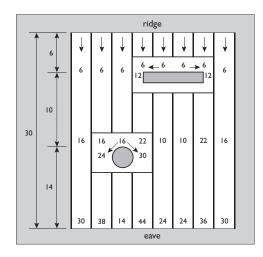
All roof slope/drainage capacities in this publication are based on rainfall intensity of 1% AEP (Annual Exceedance Probability - formerly 100 year ARI) of 5 minutes duration and AS1562.1:2018. The effective flow areas of roofing profiles are conservative. They are based on water being limited to the depth fully below each profile anti-capillary feature, and further reduced by a freeboard allowance. Tests at University of Technology, Sydney on several Stramit profiles have confirmed the adequacy of the data.

ROOF RUN LENGTH

The roof run length is the combined length of roofing run contributing to water flow in any one sheeting pan (or trough) at the lowest edge. If roof penetrations or spreaders are present it is likely that the maximum roof run length will exceed the distance from the ridge to the eaves.

(Note - if practical place roof penetrations towards the top of a roof slope where water flow is less significant.)

Water flow is complex. However a simplified method of estimating water flow is generally satisfactory. The illustration shows a typical roof arrangement where two penetrations influence the roof run length in various sheeting pans. Although the nominal roof length is 30m, the Maximum Roof Run Length is 44m in this case. This increase will be lower if water is re-directed back into the original pans below the penetrations.

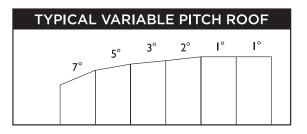


CURVED ROOFS

Spring-curved convex roofs can provide an excellent solution to roof drainage, particularly on large roofs. A convex curve approximates the increasing volume of water along the roof run and therefore can lead to efficient structures. Information on spring-curving of Stramit profiles can be found in the publication Spring Curving Guide.

VARIABLE PITCH ROOFS

On very large roofs drainage can lead to increases in roof slope and consequent increases in structure cost. A practical method to reduce the structure in these cases is to vary the pitch down the roof. Taking advantage of occasional expansion joints, each segment of roof sheeting can be at the optimised slope. For each roof segment the maximum roof run length is only considered from the lowest point of that segment to the ridge. The effects of any roof penetrations must be accounted for.



DURABILITY

Durability is considered from the perspective of minimum fall and the benefit of additional fall.

MINIMUM SLOPE

It is essential that the minimum fall of roof is maintained to ensure that water drains away. This minimum must be maintained over the entire roof, and throughout the life of the building. Water ponding on the roof will gather dirt and airborne particles. This compounds the problem by retaining moisture after most water has dried, and also soaking up condensation and dew. The ensuing prolonged exposure of a section of the roof to a damp 'chemical soup' will reduce life expectancy.

The minimum slopes set by Stramit for its profiles are based on two factors. These are sheeting stiffness (which resists permanent deflection) and the ability of a profile to be turned up or down at the sheet ends to prevent incursion of wind blown rain. AS 1562.1:2018 nominates the minimum slope required for common profiles.

THE BENEFIT OF ADDITIONAL SLOPE

Further durability benefits can be gained from increasing slope. The major benefit comes from increased cleanliness. Increasing slope increases water velocity and assists gravity and wind in removing debris. A minimum slope of around 5° is considered necessary to achieve these benefits.

WIND RESISTANCE

Many factors influence wind pressure on a building, and on the roof in particular. These include site factors such as location, topography and exposure, as well as building geometry factors such as height, plan ratio and permeability. The slope of the roof is another factor. The influence of slope on wind pressures is inter-dependent on the building geometry factors. There is however a trend worth considering in building design.

As wind uplift pressure is often the limiting criterion in roof sheet sizing and spacing, it can be worth minimising. This can only be achieved by increasing the slope to 10° up to 20°. Some higher slopes could also have a lower pressure depending on the building configuration. Use AS/NZS1170.2 when considering changes to roof slope to reduce wind pressure.

SAFETY

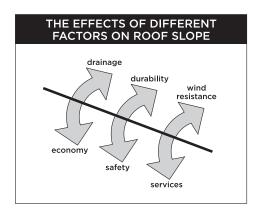
Metal roof sheeting has a relatively smooth surface and, particularly in combination with oil from manufacture or surface water, can be slippery. Increasing the slope increases this risk. It is difficult to define a safe slope; however, roofs with a slope of more than around 25° require the use of ladders or walkways.

SERVICES

Where services are to be installed on the roof it is generally more convenient to minimise the roof slope. This will make installation and maintenance easier, improve safety and may reduce the visual impact.

AESTHETICS

For many buildings the roof forms a major visual component. Whether it be minimising slope to hide necessary rooftop services, or increasing the slope for overall visual balance, this guide will assist in selecting the correct product for the desired slope.



HOW TO USE

- 1. Calculate the maximum roof run length.
- Establish the rainfall intensity for the location of the building. These can be read from the table for many Australian locations, or find the rainfall intensity from the Bureau of Meteorology web site using Latitude and Longitude.
- 3. Using the Roof Slope table for the next highest rainfall intensity, select a roofing profile and slope to match the maximum roof run length.
- 4. Check that the selected product is available for the building location using the Regional Product Availability chart.

REGIONAL RAINFALL INTENSITY

Values of rainfall intensity in the table have been derived from AS/NZS 3500.3:2021 and the Bureau of Meteorology website. Specific data for any location can be obtained from the Bureau of Meteorology website based on the Latitude and Longitude. It should however be emphasised that the extent and longevity of records in Australia are limited and any such data therefore carries with it a degree of uncertainty.

ONE PERCENT AEP RAINFALL INTENSITIES (mm/h)

Australian Capital T	erritory	Queensland	
Canberra	192	Brisbane	306
New South Wales		Bundaberg	339
Albury	180	Cairns	279
Armidale	238	Charleville	237
Batemans Bay	267	Charters Towers	249
Bathurst	164	Cloncurry	278
Bowral	220	Goondiwindi	257
Broken Hill	217	Gympie	278
Coffs Harbour	384	Innisfail	302
Cowra	190	Longreach	250
Dubbo	221	Mackay	315
Forbes	206	Mt.Isa	262
Gosford	307	Noosa Heads	332
Goulburn	154	Proserpine	290
Kempsey	288	Rockhampton	301
Lismore	271	Southport	337
Lithgow	194	Toowoomba	267
Maitland	266	Townsville	300
Mittagong	229	Warwick	253
Moss Vale	213	Tasmania	
Newcastle	316	Burnie	178
Nowra	253	Hobart	120
Orange	186	Launceston	123
Parramatta	209	Victoria	
Penrith	240	Ballarat	192
Port Macquarie	313	Geelong	143
Riverstone	234	Lakes Entrance	199
Robertson	248	Melbourne	187
Sydney	262	Mildura	219
Ulladulla	306	Stawell	187
Wagga Wagga	208	Western Australia	
Wollongong	311	Albany	179
Wyong	320	Broome	287
Northern Territory		Bunbury	198
Alice Springs	239	Derby	256
Darwin	274	Geraldton	194
Katherine	250	Perth	172
South Australia		Port Hedland	232
Adelaide	174		
Mt.Gambier	144		
Port Augusta	199		

PRODUCT AVAILABILITY

Not all profiles listed in this guide are available in all locations. The table below gives an indication of availability by region.

REGIONAL PRO	DUC	T A	VAI	LAE	3ILI	TY			
Sheeting/Decking	N.TER	N.QLD	S.QLD	NSW	ACT	VIC	TAS	S.AUS	W.AUS
Stramit* Corrugated	~	•	~	~	•	•	•	~	•
Stramit Longspan®	~	•	~	~	~	~	~	~	~
Sharpline*	×	×	~	~	~	•	•	~	•
Monoclad*	~	~	~	~	~	~	~	~	~
Stramit Speed Deck* 500	×	×	×	×	×	×	~	×	×
Speed Deck Ultra®	~	~	~	~	~	~	~	~	~
Capacity Plus™ 660	~	/	~	~	~	X	X	X	X

- ✓ readily available
- **x** not normally available

MINIMUM ROOF SLOPES (degrees) FOR A RAINFALL INTENSITY OF 160mm/h																	
	total roof run length (m)															minimum roof slope	maximum roof
sheeting/decking	10	20	30	40	50	50 60 70 80 90 100 110 120 130 140 15							150	decking	run length (m) at minimum slope		
Stramit* Corrugated	tramit* Corrugated 5.0 7.5 16 exceeds the scope of this guide												5.0	26			
Stramit Longspan®				3.0	6.0	9.5	14.0									3.0	40
Sharpline*									3.0	3.5	4.5	5.5	6.5	7.5	8.5	3.0	97
Monoclad®													2.0	2.5	3.0	2.0	137
Stramit Speed Deck® 500															1.0	1.0	153
Speed Deck Ultra®															1.0	1.0	183
Capacity Plus™ 660															1.0	1.0	286

MINIMUM ROOF SLOPES (degrees) FOR A RAINFALL INTENSITY OF 190mm/h																	
						to	tal roo	f run le	ngth (ı	n)						minimum roof slope	maximum roof
sheeting/decking	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	(degrees) for sheeting / decking	run length (m) at minimum slope
Stramit* Corrugated	Stramit* Corrugated 5.0 12.0 exceeds the scope of this guide													5.0	22		
Stramit Longspan®			3.0	5.0	9.5	15.0										3.0	33
Sharpline*								3.0	4.0	5.0	6.5	7.5	9.0	11.0	12.5	3.0	82
Monoclad*											2.0	2.5	3.0	3.5	4.0	2.0	116
Stramit Speed Deck® 500												1.0	1.5	1.5	2.0	1.0	128
Speed Deck Ultra®															1.0	1.0	154
Capacity Plus™ 660															1.0	1.0	241

MINIM	MUM	ROC)F SL	.OPE	ES (d	egre	es) I	OR	A R	AINF	ALL	INT	ENSI	TY C	F 22	Omm/h	
						to	tal roo	f run le	ength (i	m)						minimum roof slope	maximum roof run length (m) at minimum slope
sheeting/decking	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	(degrees) for sheeting / decking	
Stramit* Corrugated	* Corrugated 5.0 6.0 17.0 exceeds the scope of this guide													5.0	19		
Stramit Longspan®		3.0	3.5	7.5	13.5						3.0	29					
Sharpline*							3.0	4.5	5.5	7.0	9.0	10.5	12.5	14.5	17.0	3.0	71
Monoclad*										2.0	3.0	3.5	4.0	5.0	6.0	2.0	100
Stramit Speed Deck® 500										2.5	1.0	111					
Speed Deck Ultra®						1.0 1.5 1									1.5	1.0	133
Capacity Plus™ 660															1.0	1.0	208

MINIMUM ROOF SLOPES (degrees) FOR A RAINFALL INTENSITY OF 250mm/h																	
						to	tal roo	f run le	ngth (ı	n)						minimum roof slope	maximum roof run length (m)
sheeting/decking	10 20 30 40 50 60 70 80 90 100 110 120 130 140 15										150	(degrees) for sheeting / decking	at minimum slope				
Stramit* Corrugated	amit* Corrugated 5.0 8.5 exceeds the scope of this guide													5.0	16		
Stramit Longspan®		3.0	5.0	10.5	18.5												25
Sharpline*						3.0	4.0	6.0	7.5	9.5	11.5	14.0	16.5	19.0		3.0	62
Monoclad*								2.0	2.5	3.0	4.0	4.5	5.5	6.5	8.0	2.0	88
Stramit Speed Deck® 500									1.0	1.5	1.5	2.0	2.5	3.0	3.5	1.0	97
Speed Deck Ultra®											1.0	1.5	1.5	2.0	2.5	1.0	117
Capacity Plus™ 660															1.0	1.0	183

MINIMUM ROOF SLOPES (degrees) FOR A RAINFALL INTENSITY OF 280mm/h																	
						to	tal roo	f run le	ngth (m)						minimum roof slope	maximum roof
sheeting/decking	10 20 30 40 50 60 70 80 90 100 110 120 130 140 1											150	(degrees) for sheeting / decking	run length (m) at minimum slope			
Stramit® Corrugated	5.0	11.5			exceeds the scope of this guide											5.0	14
Stramit Longspan®		3.0	7.0	14.0												3.0	23
Sharpline®					3.0	4.0	5.5	7.5	9.5	12.0	14.5	17.5				3.0	55
Monoclad®							2.0	2.5	3.0	4.0	5.0	6.0	7.5	8.5	10.0	2.0	78
Stramit Speed Deck® 500								1.0	1.5	2.0	2.0	3.0	3.5	4.0	4.5	1.0	87
Speed Deck Ultra®										1.0	1.5	2.0	2.0	2.5	3.0	1.0	104
Capacity Plus™ 660															1.0	1.0	163

MINII	MINIMUM ROOF SLOPES (degrees) FOR A RAINFALL INTENSITY OF 310mm/h																
						to	tal root	f run le	ength (m)						minimum roof slope	maximum roof
sheeting/decking	10	20	30	40	50 60 70 80 90 100 110 120 130 140 1										150	(degrees) for sheeting / decking	run length (m) at minimum slope
Stramit® Corrugated	5.0	14.5				exceeds the scope of this guide											13
Stramit Longspan®		3.0	9.0	18.0												3.0	20
Sharpline*					3.0	5.0	7.0	9.5	12.0	15.0	18.0					3.0	50
Monoclad®							2.0	3.0	4.0	5.0	6.5	7.5	9.0	10.5	12.5	2.0	71
Stramit Speed Deck® 500							1.0	1.5	2.0	2.5	3.0	3.5	4.5	5.0	6.0	1.0	79
Speed Deck Ultra®									1.0	1.5	2.0	2.5	3.0	3.5	4.0	1.0	94
Capacity Plus™ 660														1.0	1.5	1.0	148

MINII	MUM	ROC)F SL	.OPE	S (d	egre	es)	FOR	A R	AINF	ALL	INTE	ENSI	TY C	F 39	00mm/h	
						to	tal roo	f run le	ength (i	n)						minimum roof slope	maximum roof
sheeting/decking	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	(degrees) for sheeting / decking	run length (m) at minimum slope
Stramit* Corrugated	5.0					(exceeds	the sc	ope of the	nis guid	le					5.0	10
Stramit Longspan®	3.0	5.5	15.5													3.0	16
Sharpline*				3.0	5.5	8.0	11.5	15.0	19.0							3.0	40
Monoclad®					2.0	2.5	4.0	5.0	6.5	8.5	10.5	12.5	15.0	17.0		2.0	56
Stramit Speed Deck® 500						1.0	1.5	2.5	3.0	4.0	5.0	6.0	7.0	8.5	10.0	1.0	62
Speed Deck Ultra®							1.0	1.5	2.0	2.5	3.5	4.0	5.0	6.0	7.0	1.0	74
Capacity Plus™ 660											1.0	1.5	1.5	2.0	2.5	1.0	117

Note: Computations based on AS1562.1:2018

CONTACT US

Visit stramit.com.au or contact us using the details below.

REGION	LOCATION	CONTACT DETAILS	TECHNICAL ENQUIRIES		
	SYDNEY 33-83 Quarry Rd, Erskine Park NSW 2759	Ph 02 9834 0909			
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NSW & ACT	COFFS HARBOUR 6 Mansbridge Dr, Coffs Harbour NSW 2450	Ph 02 6656 3800	Ph 02 9834 0964		
	NEWCASTLE 17 Nelson Rd, Cardiff NSW 2285	Ph 02 4041 3400			
	ORANGE 51 Leewood Dr, Orange NSW 2800	Ph 02 6360 9200			
	MELBOURNE 3/1464 Ferntree Gully Rd, Knoxfield VIC 3180	Ph 03 9237 6300			
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TAS	HOBART 57 Crooked Billett Dr, Brighton TAS 7030	Ph 03 6262 8788	Ph 03 9237 6353		
SA	ADELAIDE 11 Stock Rd, Cavan SA 5094	Ph 08 8219 2000	Ph 03 9237 6353		
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	ROCKHAMPTON 41 Johnson St, Parkhurst QLD 4702	Ph 07 4921 5600			
NORTH	CAIRNS 53 Vickers St, Edmonton QLD 4869	Ph 07 4034 6555	Db 07 7007 0060		
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WA	PERTH 605-615 Bickley Rd, Maddington WA 6109	Ph 08 9493 8800	Ph 07 3803 9869		

Talk to your local Stramit account manager to find out more.

Please contact us at techsupport@stramit.com.au for product installation instructions and further technical support.

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