



Natural Roofing Slate Design and Fixing Guide

Design considerations

Effective design of a slate roof must take into account a number of inter-related factors including site exposure, the pitch of the roof, the type of slate selected and the slate lap.

General guidance on the most important points to be considered is given below.

Further information can be obtained from BS 5534: 1997, Code of practice for slating and tiling, Part 1: Design. Reference should be made also to BS 8000: 1990 (1997), Workmanship on building sites, Part 6: Code of practice for slating and tiling of roofs and claddings.

Environmental conditions

a Rain exposure

The degree of exposure of a building to driving rain determines the minimum lap which should be specified.

The anticipated degree of exposure is given in Figure 3 (taken from BS 5534: Part 1: 1997).

Localised factors such as high buildings, buildings on the slopes or tops of hills and coastal sites, can increase the exposure grading which should be applied in a specific project. The tables over page show the recommended minimum lap for nail fix for severe exposure sites.

For more detailed information on exposure to rain refer to BS 8104: 1992.

b Wind uplift

Design calculations for wind load and wind uplift are given in BS 5534: Part 1, BRE Digest 346: Parts 1 to 7 and BS 6399: Part 2: 1990, Code of practice for wind loads, which replaces BS CP3: Chapter 5: Part 2: 1972.

Pitch of roof

In general, the lower the pitch of the roof, the greater should be the lap. This longer lap will help to resist both capillary action and wind uplift.

On steeper pitches with free-flowing drainage, smaller slates may be used.



For exposed sites, wide slates with a greater lap should be used (see Clause 18 of BS 5534).

Lap

The lap is calculated by taking account of wind uplift, exposure to driving rain and the roof pitch. The table over page gives the recommended minimum laps for various roof pitches and building exposures.



Categories of Exposure to Driving Rain

	Moderate <56.5 l/m ² per spell
	Severe >56.5 l/m ² per spell

Minimum Recommended Headlaps

The tables below show minimum Recommended headlaps and notes about wind load resistance.

Moderate Exposure (less than 56.5 l/m² per spell)

Slate (Nominal) (mm)	Minimum Rafter Pitch								
	20°	22.5°	25°	27.5°	30°	35°	40°	45-75°	85°
600 x 300	-	-	95	85	80	70	60	55	-
500 x 300	115	105	95	85	80	70	60	55	-
500 x 250	-	-	95	85	80	70	60	55	50
450 x 250	-	-	-	-	80	70	60	55	50
400 x 250	-	-	-	-	80	70	60	55	50
400 x 200	-	-	-	-	80	70	60	55	50
350 x 250	-	-	-	-	80	70	60	55	50
350 x 200	-	-	-	-	80	70	60	55	50
300 x 200	-	-	-	-	80	70	60	55	50

(Based on BS5534: 2003 – All headlaps have been rounded to the nearest 5mm)

Severe Exposure (56.5 l/m² or greater per spell)

Slate (Nominal) (mm)	Minimum Rafter Pitch								
	20°	22.5°	25°	27.5°	30°	35°	40°	45-75°	85°
600 x 300	-	-	-	-	100	90	80	70	-
500 x 300	-	130	120	110	100	90	80	70	-
500 x 250	-	-	-	110	100	90	80	70	65
450 x 250	-	-	-	-	100	90	80	70	65
400 x 250	-	-	-	-	100	90	80	70	65
400 x 200	-	-	-	-	100	90	80	70	65
350 x 250	-	-	-	-	100	90	80	70	65
350 x 200	-	-	-	-	100	90	80	70	65
300 x 200	-	-	-	-	100	90	80	70	65

(Based on BS5534: 2003 – All headlaps have been rounded to the nearest 5mm)

Wind Loads & Weather Resistance

Slates fixed in accordance with the details given in this guide will have adequate resistance to wind loads, wind uplift and rain penetration under most conditions. The tables above give minimum recommended laps according to exposure, roof pitch and slate size. Detailed guidance on wind load calculations is given in BS5534: 2003 and BS6399, Part 2: 1997 and Part 3: 1998.