

Roof Slate

Glendyne
natural slate from Canada blue/grey





Glendyne natural slate

The best natural and man-made slates the world has to offer are available from Cembrit. Cembrit are members of the Cembrit Holding A/S Group of Denmark, one of Europe's major building material producers with over 80 years experience in the manufacture of fibre reinforced cement products for the roofing and cladding industry.

Using skills accumulated over 80 years, Cembrit select natural slate from Spain, Canada, Brazil and North America. From UK quarries, Cembrit offer Welsh and Westmorland slates. A range of recommended accessories is also available.

Glendyne slate is produced in the town of Saint Marc du Lac Long, Quebec, Canada. This blue/grey slate is available exclusively from Cembrit.

Glendyne slate has a fast growing reputation for quality due to the exceptional slate deposit and the combination of modern extraction technology with traditional finishing skills. Produced from deposits laid down in the Ordovician era some 500 million years ago this quarry was first opened by British slate quarrymen in the early part of the 20th century. Roofs with Glendyne slate can still be seen today around the area of the quarries, some 90 years later.

Re-opened by a local family, Glendyne is manufactured to the highest standards in two thicknesses, Glendyne Fours which are 4 to 5mm thick and available in the following sizes: 508 x 254mm, 457 x 254mm, 457 x 220mm, 406 x 254mm, 406 x 220mm and 406 x 203mm, Glendyne Fives which are 5 to 6 mm thick available in 508 x 254mm. Slate and halves are also available.

Glendyne slate will withstand the most severe weather conditions: it is unaffected by sunlight, ultraviolet light and even acid rain.

Laid correctly Glendyne slate will last the lifetime of the building and is ideal for use on any major project including supermarkets, schools, city offices and prestige homes.

Since 2007 Glendyne slate has been approved by the Snowdonia National Park Authority as acceptable for use within the boundaries of the national park as it is equivalent in colour, texture and weathering characteristics to slates from the Blaenau Ffestiniog area.

Appearance

Glendyne slates are available in a variety of sizes, in blue/grey. Glendyne is classified as having a normal texture according to BS EN 12326.



Blue/grey

Quality

Glendyne slate is a tough natural material and samples are regularly tested to the following national standards:

British Standard

BS EN 12326-1:2004 Product specification for roofing slate.

- Exhibited the top Class A1 for water absorption
- Exhibited the top Class T1 for thermal cycle resistance
- Exhibited the top Class S1 for sulphur dioxide exposure resistance
- Good flexural strength both transversely and longitudinally
- Acceptable non-carbonate carbon content

American Standard

ASTM C406-06 standard specification for roofing slate

- Flexure test-modulus of rupture, modulus of elasticity (C120-06)
- Weather resistance (C121-06)
- Water absorption (C217-94 (reapproved 2004))

Glendyne slate samples have been classified as the highest S₁ grade in the ASTM test predicting a service life of 75 years plus.

French NF Marque

Samples are regularly tested, and the quarry and production processes are inspected by the LNE, Paris. Glendyne is one of a number of quarries able to use the prestigious NF Marque in accordance with the strict requirements of NF 228 – L 03. Glendyne complies with NF P 32-301 and NF 12326. This is confirmed by LNE certificate no. 5272-3.

Belgian Standard

Awarded Homologation Certification to the stringent Belgian Standard for Natural Slates, STS 34.03.6, following an inspection of the geology and production processes at the quarry and testing of independently selected slate samples.

Slate Grain and Surface Characteristics

Most slates have a secondary plane of cleavage or grain which can only be determined microscopically. However this grain should not be confused with the texture which can be seen on the surface of the slate which is influenced by the direction in which the slate is split with a chisel, either from the top or the side. Glendyne slate has a normal texture using the classifications detailed in BS EN 12326.

General design considerations

Glendyne slate laid to BS 5534 will meet the strength requirements for the imposed and uniformly distributed wind and snow loads etc. The site exposure rating and the pitch of roof rafters will determine the size, pattern, lap and fixings for the slates. For UK and Northern Ireland locations, BS 5534:2003 will indicate the expected degree of exposure. Wind driven rain ratings less than 56.5 l/m² per spell are described as 'moderate' (see table 1) and those above 56.5 l/m² per spell are described as 'severe' (see table 2). Detailed guidance on wind load calculations is given in BS 5534:2003 and in BS EN 1991-1-4:2005 and 1991-1-3:2003 to calculate the wind action (design loads) on a roof it will be necessary for the designer to use two documents at the same time; the Eurocode standard BS EN 1991 Part 1-4, and the associated National Annex. The authors of the National Annex have advised that reference should also be made to the background paper PD 6688-1-4 when it is published. In locations where abnormal conditions may be anticipated such as elevated sites, coastal locations, areas of heavy snowfall etc., the recommendation for 'severe' should be followed.

Additional information can also be found in BS 8104:1992. Where the location or construction might make a lower rafter pitch acceptable, designers are asked to seek advice.

Glendyne Tables

Table 1 Moderate exposure
less than 56.5 l/m² per spell

- In general, the recommendations below apply to rafter lengths of not more than 9m. The specifier should also take account of any abnormal local conditions that might apply.

Pitch deg	Slate Size	Minimum Headlap	Slates	Batten gauge	Holing gauge	Average Weight
	mm x mm	mm	no/m ²	mm	mm	kg/m ²
45°	508 x 280	54	15.73	227	291	27.69
	508 x 254	54	17.34	227	291	27.69
	457 x 254	54	19.54	202	266	28.07
	406 x 254	54	22.37	176	240	28.55
	406 x 203	54	27.99	176	240	28.55
40°	508 x 280	60	15.94	224	294	28.06
	508 x 254	60	17.58	224	294	28.06
	457 x 254	60	19.83	199	269	28.49
	406 x 254	60	22.76	173	243	29.04
	406 x 203	60	28.47	173	243	29.04
35°	508 x 280	67	16.20	221	298	28.51
	508 x 254	67	17.85	221	298	28.51
	457 x 254	67	20.19	195	272	29.00
	406 x 254	67	23.23	170	247	29.64
	406 x 203	67	29.06	170	247	29.64
30°	508 x 280	77	16.57	216	303	29.17
	508 x 254	77	18.27	216	303	29.17
	457 x 254	77	20.72	190	277	29.77
	406 x 254	77	23.93	165	252	30.54
	406 x 203	77	29.95	165	252	30.54
27.5°	508 x 280	83	16.81	213	306	29.58
	508 x 254	83	18.53	213	306	29.58
	457 x 254	83	21.05	187	280	30.24
25°	508 x 280	91	17.13	209	310	30.15
	508 x 254	91	18.88	209	310	30.15
	457 x 254	91	21.51	183	284	30.90
22.5°	508 x 280	101	17.55	204	315	30.89
	457 x 254	101	22.12	178	289	31.77

Table 2 Severe exposure
greater than or equal to 56.5 l/m² per spell

- In general, the recommendations below apply to rafter lengths of not more than 6m. The specifier should also take account of any abnormal local conditions that might apply.

Pitch deg	Slate Size	Minimum Headlap	Slates	Batten gauge	Holing gauge	Average Weight
	mm x mm	mm	no/m ²	mm	mm	kg/m ²
45°	508 x 280	69	16.27	220	299	28.64
	508 x 254	69	17.94	220	299	28.64
	457 x 254	69	20.29	194	273	29.15
	406 x 254	69	23.37	169	248	29.82
	406 x 203	69	29.24	169	248	29.82
40°	508 x 280	76	16.53	216	302	29.10
	508 x 254	76	18.23	216	302	29.10
	457 x 254	76	20.67	191	277	29.69
	406 x 254	76	23.86	165	251	30.45
	406 x 203	76	29.86	165	251	30.45
35°	508 x 280	86	16.93	211	307	29.79
	508 x 254	86	18.66	211	307	29.79
	457 x 254	86	21.22	186	282	30.49
	406 x 254	86	24.61	160	256	31.40
	406 x 203	86	30.79	160	256	31.40
30°	508 x 280	98	17.42	205	313	30.67
	508 x 254	98	19.20	205	313	30.67
	457 x 254	98	21.93	180	288	31.51
	406 x 254	98	25.56	154	262	32.63
	406 x 203	98	31.99	154	262	32.63
27.5°	508 x 280	106	17.77	201	317	31.28
	457 x 254	106	22.43	176	292	32.22
25°	508 x 280	116	18.22	196	322	32.07
	457 x 254	116	23.09	171	297	33.17
22.5°	508 x 280	128	18.80	190	328	33.09

- These tables are based on a nail hole positioned 25mm in from the side of the slate. It may be possible to use certain slates at lower pitches by holing the slates nearer to the edge under factory conditions.

- An allowance should also be made for cutting and wastage.

- For further details and assistance please contact our Technical Department.



Sitework

Storage and handling

Slates should be carefully stacked on their longer edges with timber bearers, battens or boards between layers. The lowest layer must be arranged on a firm level base.

Working

Slate can be cut and holed on site by hand or machine. Care must be taken to avoid undue spalling. Slates should be holed from the bed towards the face so that the nail-head is accommodated in the small cavity formed by the area of spalling. Individual slates should be holed so that the thicker end is at the tail of the slate.

Before fixing, the slates should be sorted into three or four groups of similar thickness (ideally the quantity to be sorted should be sufficient to cover at least one roof slope). The thickest group should be used in the courses nearest to the eaves and the thinnest group at the top of the roof.

The holing gauges for common laps are shown in tables 1 and 2.

Fixing

Glendyne slates must be laid in accordance with the Code of Practice for Slating and Tiling, BS 5534: 2003, and the Code of Practice for Workmanship on Building Sites – Slating and Tiling, BS 8000: Part 6: 1990. The roof structure should be checked to ensure that it is to a true line and squareness tolerance, and set out to ensure that:

- the minimum cutting of slates is necessary.
- the long edges of the slates are parallel to the direction at which the water will run off the roof. In some instances this may result in raking cuts to all the eaves and the ridges.
- the horizontal lines of the courses are straight and true.
- the perpendicular lines of the slate are to a true alignment and allow for a small 'perp' gap between slates (3mm ± 1mm).

The last two items are best achieved using a chalked line.

Slates should be twice centre-nailed to horizontal battens etc., as described in BS 5534, using:

- copper, aluminium, phosphor or silicon bronze nails to BS 5534: 2003

The minimum head diameter for nails used with natural slates is 10mm (which generally means a shank diameter of between 3.00 – 3.35mm) and they should penetrate into the batten by a minimum of 15mm.

Or, for hook fixing:

- stainless steel spike hooks to BS 5534: 2003 to suit common laps

The minimum recommended pitch for hook fixing is 25°. However, below 30° crimped hooks should be used. The slate grip gap should be small enough to hold the slate securely but not so small as to damage the slate.

Slates, generally, should be not less than 150mm wide. At all verges and abutments, alternate slate courses must start with half width or slate and half width to maintain bond. Slate and a half widths must be used if the half slate is less than 150mm wide.

At valleys and hips where slates need to be cut on the rake, wide slates must be used to maintain an adequate width at the head or tail. At mitred hips on low pitched roofs wide slates should be used beneath the hip capping.

Battens

In accordance with the recommendations in BS 5534: 2003, the minimum batten size, for rafter spacing up to 600mm for use with natural slates is 50 x 25mm. To avoid splitting the batten, the maximum nail diameter should not exceed one tenth of the batten width. The ends of any batten should be fully supported and the length of any batten should not be less than 1.2m (except where this is unavoidable) and nailed to a maximum of 600mm centres. Where the roof is close-boarded, counter battens should be used down the slope in the roof on the line of the rafters. Counter battens should be of sufficient thickness to provide ventilation between the boarding and underlay.

The batten gauges for common laps are shown in tables 1 and 2.

Underlay

Suitable underlay should have a minimum standard to BS 747: 2000

Type 1F and/or should have a BBA Certificate. The underlay should be draped over the rafters, or fully supported on boarding or sheathing, should allow any moisture to drain and should extend over the tilting fillet, fascia board and into the eaves gutter.

Ventilation

Regardless of the type of underlay used the roof space and/or batten cavity must always be ventilated in accordance with the latest edition of BS 5250: 2002. Particular attention should be given to the need for adequate ventilation where the insulation follows the rafter line. In this situation the batten space above the membrane and below the slate must be ventilated. The NHBC 2011 Standards require a continuous 5mm airgap along the ridge. Cembrit Ltd offer a comprehensive range of ventilation products to suit most applications and further information is available in the Cembrit Accessories technical brochure.

Lead staining risk

Lead develops a lead carbonate patina which, if washed over slates by rain or other moisture, causes unsightly staining. To prevent this reaction marring the work, it is advisable to treat all lead including soakers and flashings, with patination oil before any rain occurs, and not later than the day the lead is fixed. Patination oil, which is readily available from builders' merchants, should be applied following the manufacturer's instructions.

Typical specification

Roof to be covered with Glendyne slates, size mm x mm, laid to a minimum head lap of mm. An NBS specification is available either from our Technical Department or our website.

Accessories

A full range of accessories including fibre cement undercloak/soffit strip is available. Please contact our Technical Department or see our website for full details.

Supply

Cembrit Ltd's Glendyne natural slates are supplied directly to approved accounts, roofing contractors and builders merchants. Prices are available on request from Cembrit.





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The company's policy is one of continuous improvement. Cembrit Limited therefore reserves the right to alter specifications at any time and without notice.

As with all natural materials, colours and textures of slate may vary according to light and weather conditions. It is advisable to ask for samples of slate prior to specification and purchase.

Owing to this and limitations of the printing process, colours of slate in this brochure may only be taken as indicative.

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