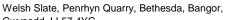




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WELSH SLATE
Part of the Breedon Group

	EN 12326-1:2014				Page 1 of 4	
Reference of this commercial document:	IMSD 8.2.4-22a Date of issue		May 2018 (Issue 2)			
Commercial document issued by: Welsh Slate, Penrhyn Quarry, Bethesda, Bangor, Gwynedd, LL57 4YG United Kingdom					ngdom	
Location of mine quarry : Penrhyn Quarry, Bethesda, Bangor, Gwynedd						
This document records the conformity of the pro-			-	-		
the meaning of the test results and the requiren are contained in EN 12326-1:2014 and EN 123:		6-1:2014. The te	sts referred to ar	nd the criteria		
Date of sampling	December 2017 Date of testing			Jan - April 2018		
Product description and	Penrhyn Capita	al Roofing Slate	<u> </u>			
commercial name	300x200mm				Conformity	
Relation between bedding and cleavage	Beds parallel to	cleavage				
Dimensional tolerances						
Format	Rectangular					
Deviation from declared length				±0mm	YES	
Deviation from declared width				±0mm	YES	
Deviation from declared squareness				1.0%	YES	
Deviation from straightness of edges				1.0mm	YES	
Slate type for deviation of flatness	Very flat	Flat (Capital)	Normal (County)	Non-flat (Celtic)		
Deviation from flatness		0.1%			YES	
2. Thickness						
Nominal thickness and variation of individual thickness against nominal thickness	5.5mm, ± 35%			YES		
3. Strength						
Characteristic MoR	Transverse	54.9 N/mm²	Longitudinal	79.1 N/mm²	NR	
4. Water absorption	Code W1 (≤0.6): 0.21%			YES		
5. Freeze thaw					NR	
6. Thermal cycle test	T1				YES	
7. Apparent calcium carbonate content	0.0%				YES	
8. Sulfur dioxide ≤ 20% apparent calcium carbonate	S1 YES NA			YES		
exposure tests > 20% apparent calcium carbonate				NA		
9. Non-carbonate carbon content	0.9%				YES	
10. External fire exposure	Deemed to satisfy class BROOF				YES	
11. Reaction to fire	Deemed to satisfy class A1				YES	
2. Release of dangerous substances None in conditions of use as roofing or external cladding NR				NR		



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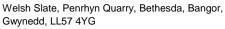
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			EN 12326-1	:2014			Page 2 of 4	
Date of sampling	g and testing	If more than one date is applicable to sampling or testing they should be indicate against the individual test results				ndicated		
Product description		Slate for roofing and external cladding or carbonate slate for roofing and external cladding.						
		Slate type and	Slate type and origin					
1. Dimensional t	olerances							
Length and width		Maximum devia	Maximum deviation ± 5mm					
Deviation from s	Deviation from squareness		ation ± 1% of t	he length				
Doviction from a	traightness of addess	Slate length ≤ 5	500mm Permit	ted deviation ≤	5mm			
Deviation from S	traightness of edges	Slate length > !	500mm Permit	ted deviation ≤	1% of the lengt	:h		
Flatness · The li	mits of deviation from the	Slate type	Maximum de	eviation from fla	itness as a % of	f the slate leng	jth	
flatness are defin	ned for four types of	Very flat	< 0.9					
	led edges shall be onvex face. Slates with	Flat	< 1.0					
deviation from fla	atness in excess of the d for special applications.	Normal	< 1.5					
iiiiii may be use	d for special applications.	Non-flat	< 2.0					
3. Strength:	local climate conditions a relation to the slates perfunction. Longitudinal and transverthe basic nominal thicknet climate conditions and transvertions.	rse characteristiess is determine	appropriate su c modulus of r d as a functior	Ifur dioxide test upture; there is n of the bend st	t (if required) as no limit for cha	shown in 7 ar	nd 8 below. dulus. However	
el = X and et = X	$\sqrt{\frac{I}{Rcl}}$	Where el is the longitudinal thickness, (in mm); et is the transverse thickness, (in mm); l is the length of the slate, (in mm); b is the width of the slate, (in mm); Rcl is the characteristic longitudinal modulus of rupture, (in N/mm²); Rct is the characteristic transverse modulus of rupture, (in N/mm²); X is a constant determined as a function of climate and the traditional construct techniques (in N½.mm-½). NOTE: It may be different for each formula and is selected for the member state of use according to the table below.						
National X Factors:		Member state	Transverse	Longitudinal	Member state	Transverse	Longitudinal	
					Czech Repub.	1.2		
		Belgium	1.0	1.0	Czecii Kepub.	1.2	1.2	
		Belgium Ireland	0.9	1.0	Italy	1.2	1.2	
		Ireland						

Those member states that have not declared a national value should select a value or pair of values in relation to their countries climate and traditional construction techniques. It should not be less than the minimum value or pair of values given above.

el and et are determined by using the length / and the width b of the slates. The maximum value determined is the basic individual thickness of the slate, ebi. The basic individual thickness is increased in relation to the slates performance in the appropriate sulphur dioxide test as shown in 7 and 8 below.

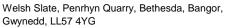




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. Water Absorp	otion:	Code W1 (≤0.6	6), W1 (>0.6), or W2			
5. Freeze-thaw test:		Slates tested indicate the mean value of the modulus of rupture after 50 cycles in transverse and longitudinal directions before and after the freeze/thaw test, if relevant (test (if W1(>0.6)), or not required).				
6. Thermal cycle test:		The following table explains the meaning of the test codes				
Code		Observat	ion in the test	Conformity to the standar		
T1	No changes in appearand that neither affect the stru		dation of metallic minerals. Co runs of discolouration.	Acceptable		
T2		n or appearance changes of the metallic inclusions with runs of ration but without structural changes.			Acceptable	
Т3	Oxidation or appearance and risk the formation of	r appearance changes of the metallic minerals which penetrate the slate Acc			Acceptable subject to the note below	
			potentially may result in water es showing exfoliation splitting			
		I				
7. Apparent ca	lcium carbonate content:	carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur	it on apparent calcium carbon tent determines which sulfur d d, together with the strength, the e content is less than or equal in EN 12326-2:2011, 14.1 appr dioxide exposure test proceduress is calculated using the ta	ioxide exposurene minimum not to 20% then the olies. If the carb lure in EN 1232	e test procedure should be minal thickness of the ne sulfur dioxide exposure conate content is more than	
		carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicks	tent determines which sulfur d d, together with the strength, the e content is less than or equal in EN 12326-2:2011, 14.1 apprendix dioxide exposure test process	ioxide exposurence minimum not to 20% then the class. If the carbure in EN 1232 able below.	e test procedure should be minal thickness of the ne sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The	
		carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicked apparent calcius	tent determines which sulfur dat, together with the strength, the content is less than or equal in EN 12326-2:2011, 14.1 apper dioxide exposure test proceduress is calculated using the tax	to 20% then the blies. If the carbure in EN 1232 able below.	e test procedure should be minal thickness of the ne sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The	
s. Minimal nomir Carbonate	nal thickness in relation to SO2 exposure test	carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicked apparent calcius	tent determines which sulfur day, together with the strength, the content is less than or equal in EN 12326-2:2011, 14.1 approposition of the test process is calculated using the talk carbonate content and sulform Depth of softened layer	to 20% then the blies. If the carbure in EN 1232 able below.	e test procedure should be minal thickness of the me sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The sure code	
3. Minimal nomir Carbonate content %	nal thickness in relation to SO2 exposure test EN 12326-2:201	carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicked apparent calcius	tent determines which sulfur day, together with the strength, the content is less than or equal in EN 12326-2:2011, 14.1 approposition of the test process is calculated using the talk carbonate content and sulform Depth of softened layer	to 20% then the blies. If the carbure in EN 1232 able below.	e test procedure should be minal thickness of the minal thickness of the ne sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The sure code	
s. Minimal nomir Carbonate	nal thickness in relation to SO2 exposure test EN 12326-2:201 S1	carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicked apparent calcius	tent determines which sulfur day, together with the strength, the content is less than or equal in EN 12326-2:2011, 14.1 approposition of the test process is calculated using the talk carbonate content and sulform Depth of softened layer	ioxide exposurene minimum nor to 20% then the class. If the carblure in EN 1232 able below. Thickets in EN 1232 able below.	e test procedure should be minal thickness of the minal thickness of the me sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The sure code ckness adjustment	
S. Minimal nomin Carbonate content % ≤ 5.0	nal thickness in relation to SO2 exposure test EN 12326-2:201 S1 S2	carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicked apparent calcius	tent determines which sulfur day, together with the strength, the content is less than or equal in EN 12326-2:2011, 14.1 approposition of the test process is calculated using the talk carbonate content and sulform Depth of softened layer	ioxide exposurene minimum nor to 20% then the class. If the carblure in EN 1232 able below. Thickets in EN 1232 able below.	e test procedure should be minal thickness of the minal thickness of the me sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The sure code ckness adjustment None ebi + 5% or switch to the test in	
3. Minimal nomir Carbonate content %	SO2 exposure test EN 12326-2:201 S1 S2	carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicked apparent calcius	tent determines which sulfur day, together with the strength, the content is less than or equal in EN 12326-2:2011, 14.1 approposition of the test process is calculated using the talk carbonate content and sulform Depth of softened layer	ioxide exposurene minimum nor to 20% then the class. If the carblure in EN 1232 able below. Thickets in EN 1232 able below.	e test procedure should be minal thickness of the minal thickness of the me sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The sure code ckness adjustment None ebi + 5% or switch to the test in El 326-2:2011, 14.2	
3. Minimal nomir Carbonate content % ≤ 5.0	SO2 exposure test EN 12326-2:201 S1 S2 S3	carbonate cont carried out and product. If the carbonate test procedure 20%, the sulfur minimum thicked apparent calcius	tent determines which sulfur day, together with the strength, the content is less than or equal in EN 12326-2:2011, 14.1 approposition of the test process is calculated using the talk carbonate content and sulform Depth of softened layer	ioxide exposurane minimum normal to 20% then the polices. If the carblure in EN 1232 able below. Thick ebi ≥ 8.0mm con 12	e test procedure should be minal thickness of the minal thickness of the me sulfur dioxide exposure conate content is more than 26-2:2011, 14.2 applies. The sure code ckness adjustment None ebi + 5% or switch to the test in 326-2:2011, 14.2 ebi + 5%	

9. Non-carbonate carbon content: The non-carbonate carbon content shall be less than 2%





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CE Marking

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Welsh Slate roofing products conform to the requirements of the CE mark.

The following table provides the necessary information required to demonstrate conformity of Penrhyn Capital Roofing Slate

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Welsh Slate Ltd, Penrhyn Quarry, Bethesda, Near Bangor, Gwynedd, Wales, UK, LL57 4YG				
10				
001PQ-DoP2015-05-28				
EN 12326-1:2014				
Penrhyn Capital				
Intended to be used as dis	scontinuous roofing and external cladding			
Din	nensional variation			
Nominal thickness	5.5mm			
Individual thickness	5.5mm (< +/- 35%)			
Deviation of length and width	Complies			
Deviation of edge straightness	Complies			
Deviation of rectangularity	Complies			
Mechanical resistance (Characteristic modulus of rupture)				
Transverse	54.9 N/mm²			
Longitudinal	79.1 N/mm²			
Water permeability - water absorption	W1 (≤0.6%)			
Apparent calcium carbonate content	≤ 5%			
Durability				
Water absorption	W1 (≤0.6%)			
Freeze-thaw cycling	Not required			
Thermal cycling	T1			
Sulfur dioxide exposure \$1				
Non-carbonate carbon content Complies: ≤ 2%				
Release of dangerous substances: None in conditions of use as roofing or external cladding				
External fire performance: Deemed to satisfy				