Lagan Building Solutions Ltd, Sheepwalk Road, Lisburn. Co Antrim BT28 3RD.

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EN 12326-1:2014					
Commercial document issued by: LBS, Sheepwalk Road, Lisburn. BT28 3RD.					
Location of the Quarry: La Bana, Spain					
This document records the conformity of the product described below and is incomplete without the explanation of the meaning of the test results and the requirements of EN 12326-1:2014. The tests referred to and the criteria are contained in EN 12326-1:2014 & -2:2011					
Date Issued: Jun- 16					
Date of Sampling: May -16			**Date of Testing:** May- 16		
Product description & commercial name:	Leon Natural Roofing Slate		Conformity		
1) DIMENSIONAL TOLERANCES					
Format	Rectangular				
Deviation from declared Length	< +/- 5mm		PASS		
Deviation from declared Width	< +/- 5mm		PASS		
Deviation from squareness	< +/- 1%		PASS		
Deviation from Straightness of Edges	Length ≤ 500mm = ≤ 5mm deviation Length > 500mm = ≤ 1% deviation	0.3%	PASS		
Slate Type for Deviation from Flatness			NON FLAT (6mm)		
Deviation from Flatness	< 2.0%		PASS		
2) THICKNESS					
Nominal Thickness and Variation	+/- 5mm Decl. +/- 35%		PASS		
3) STRENGTH					
Strength	**Characteristic MOR**	*Transverse*	51.3 MPa	*Longitudinal*	57.4 MPa
	Mean Failure Load	*Transverse*	964.9 N	*Longitudinal*	1075.3 N
4) WATER ABSORPTION					
Water absorption	0.41%		W1		
5) FREEZE THAW	Not Required		NR		
6) THERMAL CYCLE TEST	T1		PASS		
7) CALCIUM CARBONATE CONTENT	0.3%		PASS		
8) SULPHUR DIOXIDE EXPOSURE	< 20%		S1		
9) NON CARBONATE CARBON CONTENT	0.3%		PASS		
10) EXTERNAL FIRE PERFORMANCE	Deemed to Satisfy		PASS		
11) REACTION TO FIRE	Deemed to Satisfy-A1		PASS		
12) RELEASE OF DANGEROUS SUBSTANCES			NONE		

EN 12326-1:2014						
Date of sampling & testing	If more than one date is applicable to sampling or testing they should be indicated against individual test results.					
Product description	Slate for roofing and external cladding or carbonate slate for roofing and external cladding.					
1. Dimensional tolerances						
Length & Width	Maximum Deviation ± 5mm					
Deviation from squareness	Maximum Deviation ± 1% of the length					
Deviation from straightness of edges	Slate length ≤ 500mm permitted deviation ≤ 5mm					
	Slate length > 500mm permitted deviation ≤ 1% of the length					
Flatness: The limits of deviation from the flatness are defined for 4 types of slate. The bevelled edges shall be applied to the convex face. Slates with deviation from flatness in excess of the limit may be used for special applications.	**SLATE TYPE**	**Maximum deviation from flatness as a % of slate length**				
	Very smooth	< 0.9				
	Smooth	< 1.0				
	Normal	< 1.5				
	Textured	< 2.0				
2. Thickness:	The basic nominal thickness is determined as a function of the bending strength using the equations given in 3, local climate conditions and traditional construction techniques. The basic nominal thickness is increased in relation to the slates performance in the appropriate sulphur dioxide test (if required) as shown in 7 and 8 below.					
3. Strength	Longitudinal and transverse bending strength and modulus of rupture; there is no limit for bending strength or modulus. However, the basic nominal thickness is determined as a function of the bend strength using the equations given below, local climate conditions and traditional construction techniques.					
$el = X \sqrt{\frac{l}{Rcl}}$ $et = X \sqrt{\frac{b}{Rct}}$	Where el is the longitudinal thickness, in millimetres (mm); et is the transverse thickness, in millimetres (mm); *l* is the length of the slate, in millimetres (mm); b is the width of the slate, in millimetres (mm); Rcl is the characteristic longitudinal modulus of rupture in Megapascals (Mpa); Rct is the characteristic transverse modulus of rupture in Megapascals (Mpa); X is a constant determined as a function of climate and the traditional construction techniques, (in N112 ½). Note – it may be different for each formula and is selected for the country of use according to the table below.					
National factors X	***Country***	***Transverse***	***Longitudinal***	***Country***	***Transverse***	***Longitudinal***
	Belgium	1.35	1.35	Italy	1.2	1.2
	France	1.25	1.4	Spain	1.2	1.2
	Germany	1.2	1.2	UK	0.9	1.1
el and et are determined by using the length *l* 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.						
4. Water Absorption	Code W1 (≤ 0.6), W1 (> 0.6) or W2					

5. Freeze-thaw test:	Tested slates indicate the mean value of 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 meanings of the test codes:

Code	Observation in test	Conformity to the standard
T1	No changes in appearance. Surface oxidation of metallic minerals. Colour changes that neither affect the structure nor	Acceptable
T2	Oxidation or appearance changes of the metallic inclusions with runs of discolouration but without structural changes.	Acceptable
T3	Oxidation or appearance changes of metallic minerals which penetrate the slate and risk the formation of holes.	Acceptable subject to the note below.

NOTE: It is best only to use slates within code T3, which potentially may result in water penetration selectively with suitable methods of construction that avoid such penetration. Slates showing exfoliation splitting or other structural changes in this test are not acceptable.

7. Apparent calcium carbonate content: There is no such limit on apparent calcium carbonate content. However, the apparent calcium carbonate content determines which sulfur dioxide exposure test procedure should be carried out and, together with the strength, the minimum nominal thickness of the product. If the carbonate content is less than or equal to 20% then the sulfur dioxide exposure test procedure in EN 12326-2:2011, 14.1, applies. If the carbonate content is more than 20%, the sulfur dioxide exposure test procedure in EN 12326-2:2011, 14.2 applies. The minimum thickness is calculated using the table below

8. Minimal nominal thickness in relation to apparent calcium carbonate content and sulfur dioxide exposure code.

Carbonate content (%)	**SO2 exposure test code from EN 12326-2:2011, 14.1**	**Depth of softened layer from EN 12326-2:2011, 14.2**	**Thickness adjustment**
≤5.0	S1		None
	S2		ebi + 5%
	S3		ebi ≥8.0 mm or switch to the test in EN 12326-2:2011, 14.2
>5.0 ≤20.0	S1		ebi + 5%
	S2		ebi+10%
	S3		ebi ≥ 8.0mm or switch to the test in EN 12326-2:2011, 15.2
>20.0		0mm to 0.70mm	ebi + 0.50 mm + $7t^2$

ebi is the basic individual thickness obtained from 3 above (in mm). t is the thickness of the softened layer obtained from EN 12326-2:2011, 14.2 (in mm).

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

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CE Marking

Lagan Building Solutions Ltd (LBS) products conform to the requirements of the CE mark. The following table provides the necessary information required to demonstrate conformity of LEON roofing slate

CE

Lagan Building Solutions Ltd, 11B Sheepwalk Road, Lisburn. Co Antrim. BT28 3RD.					
10		EN12326-1			
Roofing and external cladding slate					
Dimensions and dimensional variation		Complies (deviation: < ± 5mm)			
Nominal thickness and variation		6.0mm (< ± 35%)			
Mechanical Resistance	Characteristic MoR	Transverse	51.3 MPa	Longitudinal	57.4 MPa
	Mean failure load	Transverse	964.9 N	Longitudinal	1075.3 N
Water Permeability – water absorption		Complies < 0.6%			
Carbonate content		≤ 5%			
Durability water absorption		Complies < 0.6%			
Durability Freeze thaw cycling		Not required			
Durability thermal cycling		Complies with code T1			
Durability sulphur dioxide exposure		Complies with code S1			
Durability non-carbonate carbon		Complies:< 2%			
Release of dangerous substances		None in conditions as roofing or external cladding			
External fire performance		Deemed to satisfy			
Reaction to fire		Deemed to satisfy class A1			