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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
87/1907
Product Sheet 1

REDLAND SLATES

REDLAND CAMBRIAN INTERLOCKING SLATES

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Redland Cambrian Interlocking Slates for use on conventional pitched timber roofs with a rafter pitch of 15° and over, or hung vertically as a cladding on the outer face of external walls.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Strength — the product has adequate strength to resist the loads associated with the installation of the roof or an external wall cladding (see section 5).

Properties in relation to fire — the product will enable a roof or an external wall cladding to be restricted/unrestricted under the Building Regulations (see section 6).

Weathertightness — the product will resist the passage of moisture into the building (see section 7).

Durability — under normal service conditions the product will provide a durable covering with a service life of in excess of 60 years (see section 9).

The BBA has awarded this Agrément Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 14 June 2010
Originally certificated on 4 September 1987

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Regulations

In the opinion of the BBA, Redland Cambrian Interlocking Slates if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	B3(2)	Internal fire spread (structure)
Requirement:	B4(1)	External fire spread
Comment:		The product has a Class 2 surface and can be used in the situations set out in sections 6.1 to 6.4 of this Certificate.
Requirement:	B4(2)	External fire spread
Comment:		A roof incorporating the product has an AA classification and meets this Requirement. See also sections 6.1 to 6.4 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		A roof or wall cladding incorporating the product meets this Requirement provided the installation complies with the conditions set out in sections 3.2, 7.1 and 7.2 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See sections 9.1 and 9.2 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the product satisfies the requirements of this Regulation. See sections 8, 9.1 and 9.2 and the *Installation* part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.1	Compartmentation
Standard:	2.2	Separation
Comment:		The product can contribute to satisfying these Standards, with reference to clauses 2.1.15[2], 2.2.7[2] and 2.2.10[1] respectively. See sections 6.1 to 6.4 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Standard:	2.8	Spread from neighbouring buildings
Comment:		A roof incorporating this product is unrestricted under these Standards, with reference to clauses 2.6.4[1][2] and 2.8.1[1][2] respectively. See sections 6.1 to 6.4 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		Walls incorporating the product have a 'high risk' reaction to fire, with reference to clause 2.7.1[1][2] of this Standard and are restricted in use. See sections 6.1 to 6.4 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The product will contribute to a roof or external wall satisfying this Standard, with reference to clauses 3.10.1[1][2] and 3.10.8[1][2]. See sections 3.2, 7.1 and 7.2 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for this product under Regulation 9, also apply to this Regulation, with reference to clause 0.12.1[1][2] and Schedule 6[1][2].

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See sections 9.1 and 9.2 and the *Installation* part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The product is acceptable. See section 8 of this Certificate.
Regulation:	C4(a)(b)	Resistance to ground moisture and weather
Comment:		A roof or wall cladding incorporating this product satisfies this Regulation. See also sections 3.2, 7.1 and 7.2 of this Certificate.
Regulation:	E4(4)	Internal fire spread — Structure
Comment:		Concealed cavities should be sub-divided in accordance with this Regulation. See sections 6.1 to 6.4 of this Certificate.
Regulation:	E5(a)(b)	External fire spread
Comment:		The product is unrestricted/restricted in use under this Regulation. See sections 6.1 to 6.4 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 1 *Description* (1.3), of this Certificate.

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of Redland Cambrian Interlocking Slates, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.2 *External timber framed walls* and Chapter 7.2 *Pitched roofs*.

Technical Specification

1 Description

1.1 Redland Cambrian Interlocking Slates are manufactured from crushed slate and other fillers, polyester resin and chopped glass fibre strands, mixed to dough, extruded, cut to weight and moulded under pressure and heat. The exposed face is finished by shot-blasting to give the required shade of colour. When installed the product gives the appearance of natural riven slate (see Figure 1).

Figure 1 Redland Cambrian Interlocking Slates

1.2 Slates are available in the natural colours of grey, green and heather. Slight colour variations may exist between batches; therefore, slates should be randomised on site to achieve a consistent appearance when installed.

1.3 The covering dimensions of each slate are as follows:

width (mm)	
standard slate	300
slate-and-a-half	450
double slate	600
max gauge (mm)	
pitches between 15° and 24°	225
pitches greater than 25°	250
weight ($kg \cdot m^{-2}$)	17 to 20 (depending on gauge)

1.4 A left-hand verge slate and slate-and-a-half are available for use at left-hand verges. Double width slates are also available to facilitate coursing. Hi-Flow ThruVent and 4.5k ThruVent slates are available for soil, mechanical and roof space ventilation where required (see Figure 2).

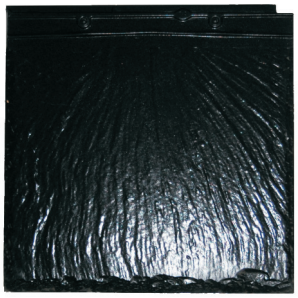
1.5 Each slate is fixed at the head by two stainless steel ring-shank nails and fastened at the tail with a stainless steel slate clip, eaves clip or verge clip, depending on its location. The nails and fixing clips are supplied by the Certificate holder. No other nails or fixing clips should be used.

1.6 Quality control includes checks on the raw materials and tests on the finished slates for:

- flexural strength
- weight
- cure
- appearance and soundness
- dimensions.

Figure 2 Types of slate

interlocking slate



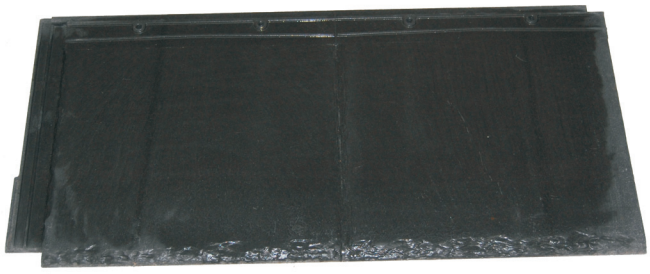
left-hand verge interlocking slate

ThruVent interlocking slate

Hi-Flow ThruVent

interlocking slate-and-a-half

left-hand verge interlocking slate-and-a-half



double slate

2 Delivery and site handling

2.1 Slates are banded in packs of 10 and delivered to site on pallets of 600 protected by a polythene wrapping. Hi-Flow ThruVent and 4.5k ThruVent slates are available individually. Other fittings are available banded in packs of 10 except Double Slates which are banded in packs of 5. All material should be stored on a level base and away from the possibility of damage.

2.2 Each pallet carries a label bearing the BBA identification mark incorporating the number of this Certificate.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Redland Cambrian Interlocking Slates.

Design Considerations

3 General

3.1 Redland Cambrian Interlocking Slates, are satisfactory for use on conventional pitched timber roofs with a rafter pitch of 15° and over, or as cladding on the outer face of external walls. It is essential that such roofs and walls are designed and constructed so as to incorporate the normal precautions to prevent moisture penetration and the formation of condensation.

3.2 Roofs and wall cladding incorporating the slates that are subject to the national Building Regulations should be designed and constructed in accordance with the relevant recommendations of BS 5534 : 2003 and BS 8000-6 : 1990. In particular, the designer should follow the recommendations of Clauses 5.1, 5.2, 5.5 and 5.8 of BS 5534 : 2003, on weather resistance, structural stability and condensation, respectively, and select a construction appropriate to its location, paying due attention to design detailing, workmanship and materials to be used.

3.3 Other roofs and wall cladding incorporating the slates that are not subject to any of the Regulations given in section 3.2 should be constructed in accordance with BS 5534 : 2003 and BS 8000-6 : 1990.

4 Practicability of installation

The slates are designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

5 Strength

5.1 The slates have adequate resistance to damage during site handling and installation using conventional roofing methods.

5.2 The slates have adequate resistance to the uniformly distributed loads (eg wind and snow) likely to be imposed in service. In situations where high local snow loads may occur, the manufacturer's advice should be sought. Consideration should also be given to the guidance contained in BRE Digest 332 *Loads on roofs from snow drifting against vertical obstructions and in valleys*.

5.3 When fixed in accordance with the Certificate holder's instructions, the slates are resistant to the effects of wind uplift likely to be encountered in the United Kingdom. Where conditions of exposure may be severe, consideration should be given to the recommendations outlined in BS 5534 : 2003.

6 Properties in relation to fire

6.1 When tested in accordance with BS 476-3 : 1958, the slates achieved an EXT.S.AA designation.

6.2 A roof incorporating the slates is designated AA and, consequently, is unrestricted by the relevant requirements of the national Building Regulations:

England and Wales — Regulation B4(2)

Scotland — Mandatory Standard 2.8, clause 2.8.1

Northern Ireland — Regulation E5(b)

6.3 When tested in accordance with BS 476-6 : 1968 and BS 476-7 : 1971 Redland Cambrian Interlocking Slates had a fire propagation index (I) of 12.3, a sub-index (i_1) of 0.1 and a Class 2 surface.

6.4 The slates have a Class 2 surface or are 'low risk' and are suitable for use as an external cladding to walls less than 15 metres above the ground and at a distance of one metre or more from any point on the relevant boundary as defined in the national Building Regulations:

England and Wales — Regulation B4(1)

Scotland — Mandatory Standard 2.6, clause 2.6.4

Northern Ireland — Regulation E5(a)

6.5 Cavity barriers should be used to satisfy the requirements of the national Building Regulations.

7 Weathertightness

7.1 Results of wind tunnel driving rain tests confirm that the slates are resistant to the ingress of wind-driven rain when installed on a roof with a pitch of 15°.

7.2 When used at pitches of 15° or greater in conjunction with a suitable underlay, the slates will provide a roof or wall cladding with satisfactory resistance to the passage of rain or snow.

8 Maintenance

Care is required when carrying out maintenance work on any roof or wall cladding in slating, and the recommendations contained in BS 5534 : 2003, Clause 6.13 *Installation, Repairs and maintenance*, and BS 8000-6 : 1990, Section 5, Clause 5.2 *Safety*, should be followed.

9 Durability

9.1 Redland Cambrian Interlocking Slates will have a life expectancy of 60 years when used in the normal exposure conditions encountered in the United Kingdom. This durability is based on the results of physical tests on samples of the slates after both natural weathering and accelerated ageing. The expected life may be reduced if the product is used in environments which subject the roof to abnormally high alkali levels (eg in the vicinity, and downwind, of cement works or chemical plants producing alkali pollution).

9.2 After natural weathering, some slight change in colour may occur. However, this process is not likely to be progressive.

10 General

10.1 Redland Cambrian Interlocking Slates are installed on pitched roofs or hung vertically as a cladding on the outer face of external walls strictly in accordance with the Certificate holder's instructions and, where appropriate, BS 5534 : 2003 and BS 8000-6 : 1990. Consideration should also be given to the advice contained in BRE Defect Action Sheets, DAS 124 : 1998 *Pitched roofs: Renovation of older type timber roofs — re-tiling and re-slating*, DAS 125 : 1988 *Pitched roofs: Re-tiling or re-slating older type timber roofs*.

10.2 The slates may be cut (eg at abutments, verges, hips, valleys), using a carborundum disc cutter. Additional holes may be drilled using a rotary masonry drill.

10.3 Where excessive concentrations of dust may be generated due to cutting of slates, the recommendations contained in section 11.1 should be followed.

11 Health and safety

11.1 If it is necessary to cut slates using a dust-generating technique, and on such a scale as to generate excessive concentrations of dust, the measures defined in the Health and Safety Executive Guidance Note EH44/1997 *Dust : General principles of protection*, should be followed.

11.2 Any slated roof or wall cladding should be treated as fragile, and the recommendations contained in section 8 should be followed.

12 Procedure

12.1 Slates are laid interlocking and each fixed using two 30 mm ring-shank, stainless steel nails and one stainless steel slate clip. Special clips are available for use at eaves and verges (see Figures 3 to 5).

Figure 3 Cambrian verge and slate clips

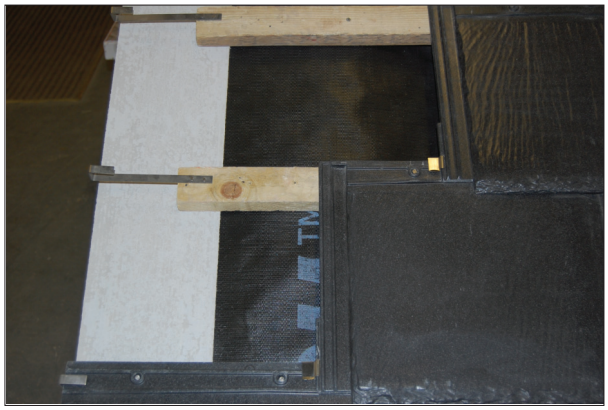
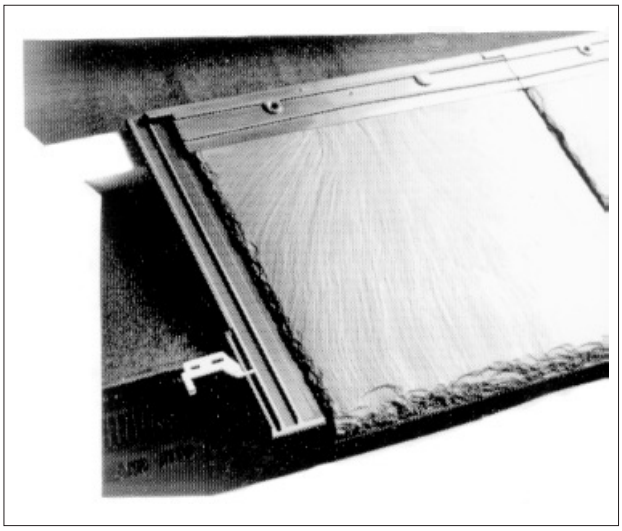


Figure 4 Cambrian slate clips

Figure 5 Cambrian eaves clip



12.2 It is essential that the fixing clips are correctly installed and the interlocks seat neatly in position.

12.3 Care is required to ensure that nails are not overdriven. Nails should be tapped rather than driven home.

12.4 Where the product is to be used on an existing roof structure, the recommendations contained in BS 5534 : 2003, Clause 6.13 and BS 8000-6 : 1990, Section 5, Clause 5.1.3 on re-covering, should be followed.

12.5 Ridge details may be completed using the Redland Dry Vent Ridge System, Redland Rapid Vented Ridge or the Redland Rapid Ridge System. Alternatively, traditional mortar-bedded methods may be used, with the condition that all ridge tiles are mechanically fixed.

12.6 Hip details may be completed using the Redland Dry Hip System, Redland Rapid Hip or the Redland Cambrian Mitred Hip System. Alternatively, traditional mortar bedded methods may be used, with the condition that all hip tiles are mechanically fixed.

12.7 Verge details are completed using the Redland Slate Dry Verge System. Alternatively, traditional mortar bedded methods can be used, with the condition that all verge slates are mechanically fixed.

13 Repair

13.1 Damaged slates can be replaced by following the Certificate holder's instructions, and the relevant sections of BS 5534 : 2003 and BS 8000-6 : 1990. Any difference in appearance between new and existing slates may mellow with age.

13.2 The Certificate holder's advice should be sought regarding the replacement of isolated slates.

13.3 Precautions should be taken to prevent danger to the public from falling, broken or displaced slates.

Technical Investigations

14 Tests

As part of the assessment resulting in this Certificate:

Tests were carried out to determine:

- performance when tested in accordance with MOAT No 9 : 1973
- thermal cycling and thermal shock resistance
- bending strength
- integrity.

Test data from independent laboratories, in relation to the following, were examined:

- fire tests to BS 476-3 : 1958, BS 476-6 : 1968, BS 476-7 : 1971
- resistance to rain penetration
- resistance to wind uplift
- freeze/thaw resistance
- colour stability.

15 Investigations

15.1 Data on the durability of a material of similar composition were examined and related to Redland Cambrian Interlocking Slates.

15.2 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

16 Further investigations

16.1 As part of the assessment resulting in the issue of this Certificate, a re-examination was made of the original data and investigations on which the original issue of the Certificate was based. The conclusions drawn from the original data remain valid.

16.2 Calculations and/or test data from the Certificate holder's laboratory were examined in relation to:

- mechanical characteristics
- resistance to wind uplift
- weathertightness at 15° pitch
- resistance to sulphuric acid immersion
- resistance to accelerated weathering and colour stability.

16.3 The Certificate holder's laboratory was re-visited to inspect the test facilities and to examine the data.

16.4 A visit was made to a site in progress to assess the practicability of installation and the effectiveness of detailing techniques.

16.5 A user survey was conducted to evaluate performance in use.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*
BS 476-6 : 1968 *Fire tests on building materials and structures — Method of test for fire propagation for products*
BS 476-7 : 1971 *Fire tests on building materials and structures — Surface spread of flame tests for materials*

BS 5534 : 2003 *Code of practice for slating and tiling (including shingles)*

BS 8000-6 : 1990 *Workmanship on building sites — Code of practice for slating and tiling of roofs and claddings*

MOAT No 9 : 1973 *Directive for the Assessment of Products in Glass-Reinforced Polyester for use in Building*

Conditions of Certification

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

17.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

17.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

17.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.

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