CI / SfB
(37) Rj7 (M2)

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

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Agrément Certificate No 00/3696
*Second issue**

Designated by Government to issue European Technical Approvals

JABROOF SLIMFIX SANDWICH ROOF ELEMENTS

Panneaux isolés de toits
Isolierfelder für Dächer

Product

- *THIS CERTIFICATE OF CONFIRMATION RELATES TO JABROOF SLIMFIX SANDWICH ROOF ELEMENTS.*
- *The roof elements are used to provide insulation and structural support to slate or tile coverings, in roofs with pitches between 15° and 70°, in domestic or commercial buildings with a maximum gable height of 9 m.*
- *The basic roof elements comprise an inner and outer chipboard skin with an expanded polystyrene foam core.*
- *The product is manufactured by IsoBouw Systems bv, Postbus 1, 5710 AA, Someren, Netherlands Tel: 00 31 493 498111 Fax: 00 31 493 495971.*

Confirmation of Dutch Agrément No 20288/02 issued by KOMO to IsoBouw Systems bv (the product is referred to as IsoBouw in the Dutch Agrément Certificate).

Regulations

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

The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of roof insulation and structural support with the Building Regulations. In the opinion of the BBA, Jabroof SlimFix Sandwich Roof Elements, if used in accordance with the provisions of this Certificate, will meet, or contribute to meeting, the relevant requirements.

Requirement:	A1	Loading
Comment:		The product has sufficient strength and stiffness to sustain the design loads in accordance with sections 9.1 to 9.4 of this Certificate.
Requirement:	B2	Internal fire spread (linings)
Comment:		The elements have a Class 3 surface spread of flame rating which restricts use to rooms with a floor area of not more than 4 m^2 (residential accommodation) and not more than 30 m^2 (non-residential building) in roof / ceiling situations without further protection. See section 12.2 of this Certificate.
Requirement:	F2	Condensation in roofs
Comment:		Provided the product is installed in accordance with this Certificate, and used in a suitable design and specification, the formation of condensation will be negligible. See sections 11.1 and 11.2 of this Certificate.

Requirement:	L1(a)(i)	Dwellings
Requirement:	L2(a)	Buildings other than dwellings
Comment:		The roof elements will enable, or contribute to enabling, a roof to meet the requirements of the Elemental Approach for maximum U values given in Table 1 of the Approved Document. See sections 10.3 to 10.6 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		When used in accordance with the provisions of this Certificate this product is acceptable. The timber ribs are untreated and are therefore restricted under this Regulation. See sections 15.1 and 15.2 of this Certificate.

2 The Building Standards (Scotland) Regulations 1990 (as amended)

In the opinion of the BBA, Jabroof SlimFix Sandwich Roof Elements, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Technical Standards as listed below.

Regulation:	10	Fitness of materials and workmanship
Standard:	B2.1	Selection and use of materials, fittings and components, and workmanship
Comment:		The product can contribute to a construction meeting this Standard. See the *Installation* part of this Certificate.
Standard:	B2.2	Selection and use of materials, fittings and components, and workmanship
Comment:		This product is an acceptable material. See section 15.1 of this Certificate.
Regulation:	11	Structure
Standard:	C2.1	Stability
Comment:		The product has sufficient strength and stiffness to sustain the design loads in accordance with sections 9.1 to 9.4 of this Certificate.
Regulation:	12	Structural fire precautions
Standards:	D7.1 and D7.2	Fire spread on internal linings — Principles
Comment:		The 'high risk' elements have a surface spread of flame rating which restricts use to rooms with a floor area of not more than 4 m^2 (excluding kitchens in dwellings) and rooms with floor areas not more than 30 m^2 that are not dwellings or institutional or other residential accommodation, in roof / ceiling situations without further protection. See section 12.2 of this Certificate.
Regulation:	18	Resistance to condensation
Standard:	G4.1	Condensation — Interstitial condensation
Standard:	G4.2	Condensation — Surface condensation
Comment:		Provided the product is installed in accordance with this Certificate, and used in a suitable design and specification, the formation of condensation will be negligible. See sections 11.1 and 11.2 of this Certificate.
Regulation:	22	Conservation of fuel and power
Standard:	J3.1	Buildings in purpose group 1 — Building fabric
Standard:	J4.1	Buildings in purpose group 1 — Limiting thermal bridging at junctions and around openings
Standard:	J5.1	Buildings in purpose group 1 — Limiting infiltration
Standard:	J8.1	Buildings in purpose groups 2 to 7
Standard:	J9.1	Buildings in purpose groups 2 to 7 — Limiting thermal bridging at junctions and around openings
Comment:		The product can enable a roof to satisfy the requirements of the Elemental Method for maximum U values given in Standards J3.2 and J8.3. See sections 10.3 to 10.6 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000

In the opinion of the BBA, Jabroof SlimFix Sandwich Roof Elements, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable when used in accordance with the provisions of this Certificate. See section 15.1 of this Certificate.
Regulation:	C5	Condensation
Comment:		Provided the product is installed in accordance with this Certificate, and used in a suitable design and specification, the formation of condensation will be negligible. See sections 11.1 and 11.2 of this Certificate.

Regulation:	D1	Stability
Comment:		The product has sufficient strength and stiffness to sustain the design loads in accordance with sections 9.1 to 9.4 of this Certificate.
Regulation:	E3	Internal fire spread — Linings
Comment:		The elements have a Class 3 surface spread of flame rating which restricts use to rooms with a floor area not more than 4 m^2 (residential accommodation) and not more than 30 m^2 (non-residential accommodation) in roof / ceiling situations without further protection. See section 12.2 of this Certificate.
Regulation:	F2	Building fabric
Comment:		The product can enable a roof to satisfy the requirements of the Elemental Approach for maximum U values given in Tables 1.2 and 1.4 of Technical Booklet F. See sections 10.3 to 10.6 of this Certificate.

4 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: 6 *Delivery and site handling* (6.1) and 16 *General* (16.1) (*Installation*).

Technical Specification

5 Description

5.1 Jabroof SlimFix Sandwich Roof Elements comprise panels of expanded polystyrene (EPS) foam (various thicknesses) bonded on internal and external faces with 8 mm thick chipboard (see Table 1 and Figure 1). The external chipboard has an orange paper and polyurethane film finish on the exposed face and the internal chipboard a white finish on the exposed face. The element incorporates longitudinal timber ribs, gutter rail and counter battens (see Figure 2).

Table 1 Element sizes

Jabroof SlimFix element	Thickness of EPS insulation (mm)	Thickness of element(1) (mm)	Weight (kgm^{-2})
79 8/8	79	95	15
97 8/8	97	113	16
113 8/8	113	129	17
131 8/8	131	147	18
157 8/8	157	173	19
200 8/8	200	216	20

(1) Thickness excluding counter battens.

Figure 1 Section through element

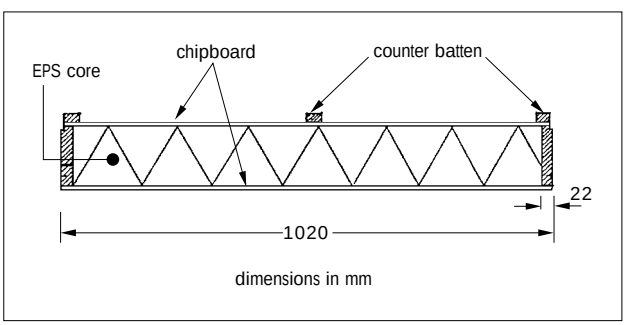
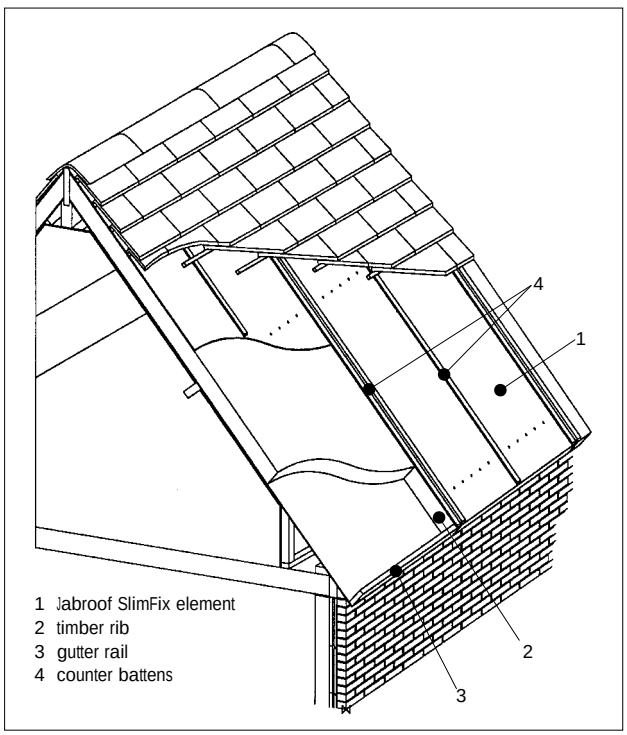


Figure 2 Typical construction detail



5.2 The elements are available in the sizes given in Table 2. Ridge-chamfered elements are available to special order.

Table 2 Dimensions and tolerances

	Size (mm)	Tolerance in the nominal size
Length	variable up to 7520	1%
Width	1020	± 3 mm
Height (thickness of element)(1)	95 to 216	± 3 mm

(1) Excluding counter battens.

5.3 Three timber counter battens (20 mm by 30 mm) are bonded to the external chipboard surface (see Figure 1).

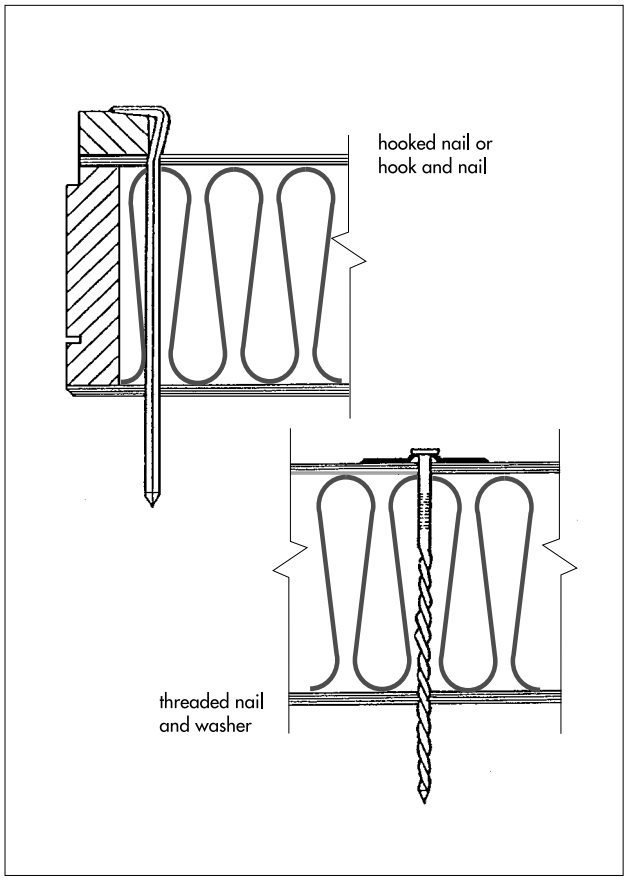
5.4 Various ancillary components[1] are available for use with the roofing system:

- fixings to suit the substrate — hooked nails, threaded / profiled nails, washer and hooks (length varying depending on panel thickness) (see Figure 3)
- self-adhesive, butyl / aluminium, foil tape[2]
- expanding polyurethane foam gap filler[2].

(1) Not assessed by the BBA.

(2) Supplied with the product.

Figure 3 Fixings



6 Delivery and site handling

6.1 The elements should be stored flat in an enclosed, dry building, and should be supported on timber bearers at 1.5 metre centres (maximum) with the counter battens of the bottom element facing downward. Where temporary storage outside cannot be avoided, the stacks should be covered with polyethylene or tarpaulin sheet with the sides folded back to allow ventilation and be kept at least 150 mm clear of the ground.

6.2 The elements can withstand normal site handling and usage. Damaged elements which cannot be repaired easily must not be used.

6.3 Each element bears the BBA identification mark incorporating the number of this Certificate.

Design Data

7 General

7.1 Jabroof SlimFix Sandwich Roof Elements are satisfactory for use on buildings as an insulating, structural support for a conventional roofing of slate or tiles on roofs with a pitch of between 15° and 70° where access is limited to maintenance and repair. The pitch should be determined by the type of tiles / slates used.

7.2 The selection of the elements[1] and roof design must be carried out by, or under direct supervision of, chartered structural or civil engineers, or other suitably qualified persons, in accordance with UK building practice and Building Regulations.

(1) Based on the load limitations given in sections 9.2 to 9.4.

8 Practicability of installation

The elements are practicable to install using the methods described in this Certificate and the manufacturer's recommended fixing instructions.

9 Strength and stability

9.1 The elements will have adequate strength and stiffness to sustain specified loads when used in accordance with the provisions of this Certificate.

9.2 The permissible span for a range of loading conditions is given in Tables 3 to 8 and is based on the requirements of DD ENV 1995-1.1 : 1994, the UK National Application Document and the criteria summarised below, specifically items (4) and (5). For loading conditions outside of these criteria (ie tile weights greater than 42 kgm^{-2}), the Certificate holder's advice should be sought:

(1) Span refers to the maximum length along the roof slope.

(2) The data are based on compliance with the wind loading defined in NEN 6702 : 1991[1]. The checks include:

- strength and rigidity of the roof construction in accordance with SKH publication 94-2
- deflection under service limited to span / 200
- bending stresses in the timber.

(1) The requirements in the UK (BS 6399, Parts 1 and 2) are slightly less onerous.

(3) It is assumed in the design that local buckling is prevented by the full support given by the expanded polystyrene.

(4) In the calculation, it is assumed that roof tiles have a dead load of less than 42 kgm^{-2}.

(5) Allowance is not made for battens or plasterboard.

Table 3 Spans[1][2] — Jabroof SlimFix 79 8/8

Roof slope	Span (mm)					
	Wind pressure 1275 Nm^{-2}			Wind pressure 1613 Nm^{-2}		
	Single span	Two spans	Three spans	Single span	Two spans	Three spans
15°	2000	2250	2187	1719	1800	1899
20°	2270	2550	2427	1899	2040	2049
25°	2390	2610	2652	2139	2160	2302
30°	2540	2345	2682	2349	2158	2452
35°	2600	2465	2802	2379	2248	2572
40°	2630	2525	2862	2439	2308	2632
45°	2690	2514	2850	2499	2280	2603
50°	2670	2461	2748	2400	2227	2497
55°	2617	2355	2708	2301	2121	2391
60°	2511	2249	2602	2249	2015	2285
65°	2405	2143	2496	2090	1909	2179
70°	2379	2140	2440	2079	1900	2140

(1) Maximum distance between centres of the support purlins.

(2) See section 9.2.

Table 4 Spans[1][2] — Jabroof SlimFix 97 8/8

Roof slope	Span (mm)					
	Wind pressure 1275 Nm^{-2}			Wind pressure 1613 Nm^{-2}		
	Single span	Two spans	Three spans	Single span	Two spans	Three spans
15°	2200	2637	2485	1963	2130	2167
20°	2740	2907	2725	2173	2370	2317
25°	2860	2937	3081	2413	2490	2628
30°	2890	2695	3043	2623	2458	2748
35°	3040	2785	3163	2743	2548	2868
40°	3070	2845	3223	2773	2608	2988
45°	3100	2830	3253	2803	2580	2944
50°	2972	2788	3117	2726	2474	2838
55°	2919	2629	3067	2620	2368	2732
60°	2813	2579	2908	2514	2315	2573
65°	2707	2420	2749	2408	2156	2467
70°	2619	2440	2770	2319	2140	2439

(1) Maximum distance between centres of the support purlins.

(2) See section 9.2.

Table 5 Spans[1][2] — Jabroof SlimFix 113 8/8

Roof slope	Span (mm)					
	Basic wind speed 1275 Nm^{-2}			Basic wind speed 1613 Nm^{-2}		
	Single span	Two spans	Three spans	Single span	Two spans	Three spans
15°	2400	2871	2711	2245	2394	2340
20°	3082	3219	2981	2455	2664	2550
25°	3202	3249	3418	2695	2784	2878
30°	3163	2901	3365	2905	2678	3058
35°	3253	3051	3485	3025	2798	3178
40°	3343	3141	3575	3085	2888	3268
45°	3320	3111	3545	3054	2852	3226
50°	3267	3058	3439	2948	2746	3120
55°	3161	2899	3333	2842	2640	3014
60°	3055	2846	3227	2736	2481	2908
65°	2949	2687	3068	2577	2375	2696
70°	2859	2680	3040	2559	2350	2680

(1) Maximum distance between centres of the support purlins.

(2) See section 9.2.

Table 6 Spans[1][2] — Jabroof SlimFix 131 8/8

Roof slope	Span (mm)					
	Wind pressure 1275 Nm^{-2}			Wind pressure 1613 Nm^{-2}		
	Single span	Two spans	Three spans	Single span	Two spans	Three spans
15°	2650	3165	3021	2487	2688	2597
20°	3513	3495	3291	2757	2928	2807
25°	3603	3525	3752	3027	3048	3175
30°	3444	3230	3699	3147	2942	3355
35°	3564	3350	3819	3297	3092	3475
40°	3654	3440	3909	3387	3152	3595
45°	3625	3411	3892	3334	3121	3547
50°	3572	3358	3786	3228	3015	3441
55°	3413	3199	3680	3122	2909	3335
60°	3307	3093	3574	2963	2750	3190
65°	3148	2934	3362	2857	2644	3010
70°	3159	2950	3340	2799	2590	2979

(1) Maximum distance between centres of the support purlins.

(2) See section 9.2.

Table 7 Spans[1][2] — Jabroof SlimFix 157 8/8

Roof slope	Span (mm)					
	Wind pressure 1275 Nm^{-2}			Wind pressure 1613 Nm^{-2}		
	Single span	Two spans	Three spans	Single span	Two spans	Three spans
15°	3010	3604	3403	2970	3021	2979
20°	4086	3964	3733	3270	3321	3189
25°	4206	4024	4221	3510	3471	3603
30°	3835	3653	4168	3540	3365	3783
35°	3985	3773	4288	3690	3485	3963
40°	4075	3893	4408	3780	3575	4053
45°	4046	3854	4362	3727	3533	4000
50°	3993	3748	4256	3621	3427	3894
55°	3834	3642	4150	3515	3268	3735
60°	3728	3536	3991	3356	3109	3576
65°	3569	3324	3779	3197	3003	3354
70°	3519	3340	3760	3159	2950	3340

(1) Maximum distance between centres of the support purlins.

(2) See section 9.2.

Table 8 Spans[1][2] — Jabroof SlimFix 200 8/8

Roof slope	Span (mm)					
	Wind pressure 1275 Nm^{-2}			Wind pressure 1613 Nm^{-2}		
	Single span	Two spans	Three spans	Single span	Two spans	Three spans
15°	4000	4303	409	3770	3720	3569
20°	4955	4721	4489	4160	4020	3869
25°	4985	4781	5050	4340	4170	4325
30°	4584	4410	4997	4234	4064	4535
35°	4704	4560	5117	4384	4184	4745
40°	4284	4680	5267	4474	4274	4865
45°	4791	4636	5222	4421	4227	4812
50°	4738	4530	5116	4315	4121	4653
55°	4579	4371	5010	4156	3962	4494
60°	4420	4256	4798	3997	3803	4335
65°	4261	4053	4586	3732	3591	4070
70°	4179	4030	4540	3639	3580	4059

(1) Maximum distance between centres of the support purlins.

(2) See section 9.2.

9.3 Wind loads must be evaluated in accordance with BS 6399-2 : 1997. The spans given in Tables 3 to 8 are based on wind pressures of 1275 Nm^{-2} and 1613 Nm^{-2} which cover the range of pressures likely to occur in the UK.

9.4 Imposed snow loads must be checked in accordance with the recommendations of BS 6399-3 : 1988. A basic snow load of 800 Nm^{-2} is assumed in Tables 3 to 8.

9.5 The number of fixings required to secure the panels to the roof structure will depend upon various factors, such as the site location, geometry of the roof and type of roof structure. Therefore, it is recommended that the fixings are calculated for each site using the provisions of BS 5268-2 : 2002. The specifications and design calculations must be determined by the engineer responsible for the stability of the building(1).

(1) Strength data for the hooked and threaded nails can be supplied by the Certificate holder.

9.6 In general, each element is secured at the wall plate, purlin(s) and ridge by a minimum of three hooked or threaded nails at each counter batten, up to a pitch of 60°, and four nails for steeper pitches. Additional nails are required at the wall plate where the element length exceeds 3600 mm depending on the pitch of the roof (see Table 9), but must be confirmed by the engineer responsible for the roof design.

Table 9 Number of additional nails per element

Roof pitch	Element length (maximum) (mm)				
	3600	4800	5400	6000	7200
15° to 45°	0	2	3	3	5
45° to 70°	1	3	3	4	6

9.7 Except where otherwise stated in this Certificate, the fixing of components including tiling / gutter laths, slates and tiles, should be carried out in accordance with BS 5534 : 2003.

9.8 All transverse joints between the roof elements must be supported.

9.9 Gutters should be fixed to avoid water overshoot.

10 Thermal insulation

10.1 A typical roof construction finished internally with 12.5 mm thick plasterboard and externally with tiles or slates, will achieve the U values given in Table 10.

Table 10 Thermal resistances of roof elements and U values of roof

Insulation thickness (mm)	Thermal resistance of roof elements (m^2KW^{-1})	Maximum U value of roof ($Wm^{-2}K^{-1}$)
79	2.36	0.37
97	2.88	0.31
113	3.33	0.27
131	3.84	0.24
157	4.58	0.20
200	5.80	0.16

10.2 Calculations for particular constructions can be carried out in accordance with the Combined Method given in BS EN ISO 6946 : 1997 and the document BR 443 : 2002 *Conventions for U-value calculations*. The thermal conductivity values ($Wm^{-1}K^{-1}$) to be used are:

expanded polystyrene insulation	0.03(1)
timber	0.15
chipboard	0.15

(1) Manufacturer's declared $\lambda_{90/90}$ *value*.

10.3 A roof constructed with the appropriate element will meet or satisfy the requirements of the Elemental Method of compliance with the national Building Regulations:

England and Wales

0.25 $Wm^{-2}K^{-1}$ — for all buildings

Scotland

0.25 $Wm^{-2}K^{-1}$ — for dwellings with gas or oil central heating boiler SEDBUK(1) not less than that specified in Table 2 to Standard J3.2 and all other purpose groups

0.22 $Wm^{-2}K^{-1}$ — for all other dwelling heating systems

Northern Ireland

0.20 $Wm^{-2}K^{-1}$ — for dwellings with SAP energy rating(1) less than 60

0.35 $Wm^{-2}K^{-1}$ — for dwellings with SAP energy rating(1) greater than 60 and residential buildings

0.45 $Wm^{-2}K^{-1}$ — for places of assembly, offices, shops, industrial and storage buildings.

(1) SEDBUK is the Seasonal Efficiency of a Domestic Boiler in the UK as defined in *The Government's Standard Assessment Procedure for Energy Rating of Dwellings 2001 Edition* (SAP 2001).

10.4 Alternative approaches to the Elemental Method are described in the respective documents supporting each of the national building regulations and these allow more flexibility in the design of individual construction elements.

10.5 Care should be taken to ensure that the design allows for limiting excessive additional heat loss and risk of surface condensation at openings within the elements and at junctions between them and other building elements. Reference can be made to *Limiting thermal bridging and air leakage : Robust construction details for dwellings and similar buildings* (TSO 2002) or BR262 : 2002 *Thermal insulation : avoiding risks*.

10.6 The thermal insulation fully fills each of the roof elements and, when joints are properly sealed, the roof elements will adequately limit unwanted air infiltration.

11 Condensation risk

11.1 Provided the sandwich elements are sealed to each other and the surrounding structure, as detailed in section 17, the risk of interstitial condensation under normal domestic or commercial use will be minimal for constructions with roofing tiles, and either without roof tile underlay or one with a low vapour resistance (< 0.2 GNskg^{-1}).

11.2 Where roofing slates are used, ventilation under the sarking felt and / or a suitably positioned vapour control layer should be used unless a condensation risk assessment in accordance with BS 5250 : 2002 shows this to be unnecessary. The vapour resistance of the external orange finish of the chipboard can be taken as 14 GNskg^{-1} and that of the internal white finish can be taken as 24 GNskg^{-1}.

11.3 When the roof elements are used in 'room-in-the-roof' (cathedral roof) constructions, the timber ribs in roof elements will constitute thermal bridges with a consequent increase in risk of condensation. This may result in some pattern staining of the integral ceiling unless plasterboard is used in conjunction with the panel.

11.4 The risk of interstitial condensation is greatest when the building is drying out after construction. Guidance on preventing condensation from this and other sources is given in the BRE Digest 369 *Interstitial Condensation and Fabric Degradation* and BR 262 *Thermal Insulation : Avoiding Risks.*

12 Behaviour in relation to fire

12.1 Tests to BS 476-3 : 1958 have shown that, when installed below concrete or clay tiles or slates, a roof incorporating Jabfloor SlimFix elements would achieve an EXT.S.AA designation.

12.2 The chipboard surface of the elements can be regarded as having a Class 3 surface spread of flame ('high risk' in Scotland). Once installed, all of the product range present a chipboard surface to the occupied space. Hence, compliance with the Building Regulations limits its use to rooms with a floor area of 4 m^2 [residential accommodation (other than kitchens in Scotland)] and 30 m^2 (non-residential accommodation) in roof / ceiling situations without additional protection. Therefore, for most practical purposes, an additional lining of 12.5 mm thick plasterboard, or similar, with a Class 1 surface spread of flame rating will be required to satisfy the Regulations.

12.3 Where other forms of construction are used, an appropriate assessment or test must be undertaken. Testing must be carried out by a UKAS approved fire testing laboratory.

13 Weathertightness

13.1 The long-term weathertightness of a roof constructed using Jabroof SlimFix Sandwich Roof Elements will depend upon the quality and use of an interlocking slating and tiling system.

13.2 It is important to ensure that the joints between the elements are adequately sealed.

14 Maintenance

Maintenance of the elements will not be required provided the weathertightness of the slating or tiling system is kept in good repair.

15 Durability

15.1 The elements will have a durability comparable to that of particle board types P5 and P7 in accordance with BS EN 312 : 2003. Therefore they will have adequate durability provided they are not exposed to repeated condensation and the roof covering is kept in good repair. To ensure these conditions are maintained, the roof covering must be in accordance with the requirements of BS 5534 : 2003. The underside of the elements must be protected against dampness at eaves and gable projections by such measures as painting, boarding or panelling.

15.2 The timber ribs are not preservative treated and therefore are not suitable for use in roof spaces in the House Longhorn beetle (*Hylotrupes bajulus L*) areas defined in the Approved Document to Regulation 7 of the Building Regulations (England and Wales).

Installation

16 General

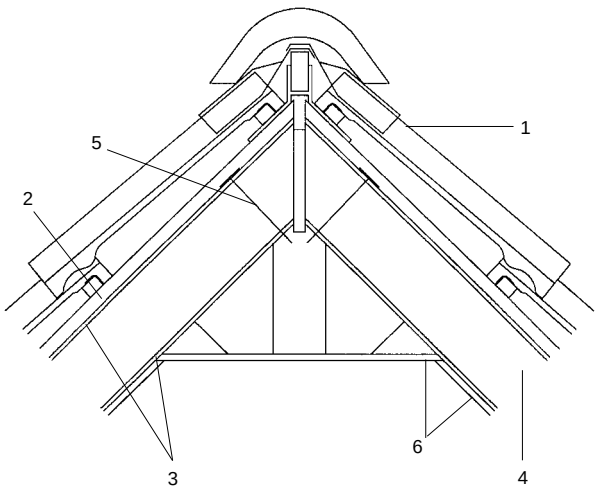
16.1 Jabroof SlimFix Sandwich Roof Elements should be fitted by roof contractors or carpenters. Where hoisted by crane, webbing slings or cradle should be used, attached to the element in the designated lifting zone. The company's technical literature contains recommendations for the installation of the roof elements. Typical details are shown in Figures 4 to 7.

16.2 The fixings used in the installation will depend upon the type of element framework and roof pitch. Fixings are supplied with the elements and details can be found in Jabroof SlimFix fixing instructions. The number and centres for these fixings are found by calculation (see section 9.5).

16.3 Each roof element must have a minimum bearing of 30 mm at each support, with intermediate supports at least 59 mm wide. When laying onto steelwork or masonry material, a strip of compressible material (eg 2 mm roofing felt) should be fitted under the roof element.

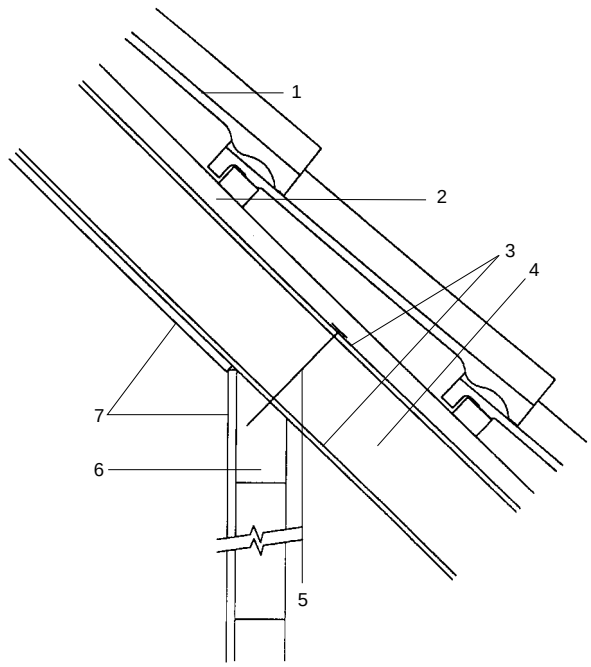
16.4 The elements may be cut on site using a power saw. The minimum width of a sawn panel is 300 mm. The sawn edge of the panel should be laid near the gable wall, and supported by a 38 mm by 50 mm timber rib.

Figure 4 Ridge detail



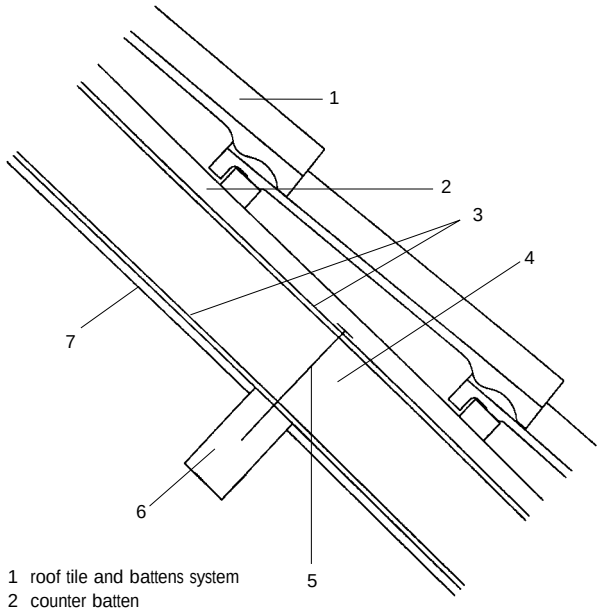
1 roof tile and battens system
2 counter batten
3 8 mm chipboard
4 EPS core
5 fixing
6 12.5 mm plasterboard

Figure 5 Structural support detail



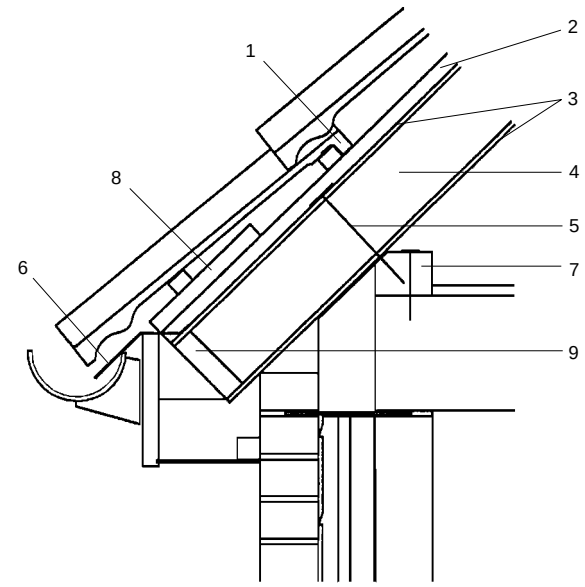
1 roof tile and battens system
2 counter batten
3 8 mm chipboard
4 EPS core
5 fixing
6 structural timber stud
7 12.5 mm plasterboard

Figure 6 Intermediate purlin detail



1 roof tile and battens system
2 counter batten
3 8 mm chipboard
4 EPS core
5 fixing
6 purlin
7 12.5 mm plasterboard

Figure 7 Wall plate eaves detail



1 roof tile and battens system
2 counter batten
3 8 mm chipboard
4 EPS core
5 fixing
6 flashing
7 wall plate
8 gutter lath
9 gutter rail

16.5 Gable ends can overhang by a maximum of 150 mm without additional support.

16.6 At openings, eg rooflights, trimming is not required provided they fall within the longitudinal timber rib of one element.

16.7 A collar should be fitted to a chimney or flue penetrating an element to prevent temperatures exceeding 90°C.

17 Procedure

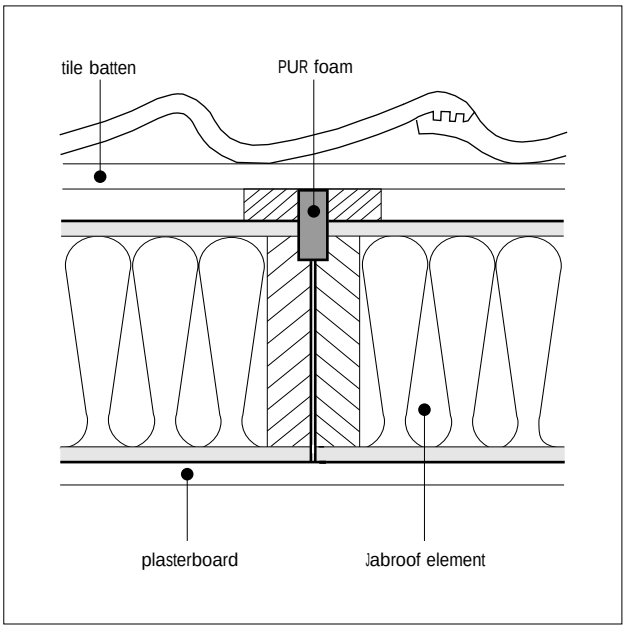
17.1 The first element is secured at each purlin or rafter position and to the wall plate by the appropriate number and type of fixing.

17.2 The next element is butted against the first and fastened to the purlins, rafters or wall plate with the appropriate fasteners. Subsequent elements are fastened to complete the roof.

17.3 The last element should be trimmed lengthways and secured. If necessary, elements can be butt jointed end to end over a support.

17.4 When the installation is complete the joints should be sealed. Vertical joints are sealed on the top surface using expanding PU foam. Excess amounts of PU must be trimmed (see Figure 8). Horizontal joints between elements are filled with PUR foam, trimmed and sealed with foil tape.

Figure 8 Detail of vertical joint between elements



17.5 At the ridge, the elements can be bevelled to suit the pitch of the roof. The joint on the top surface is sealed with PU foam.

17.6 Joints to the surrounding structure, eg walls, are sealed with PU foam.

17.7 When elements are joined onto adjacent structures, the horizontal joints must be finished water-, wind- and draught-proof.

17.8 The Certificate holder supplies a self-adhesive bitumen/aluminium tape or a flashing for sealing horizontal butt joints.

17.9 The roof structure must be protected from precipitation by making the joints, recesses and ridge waterproof as soon as possible, with the roof covering applied soon afterwards.

17.10 Adequate ventilation must be provided to the roof space formed, particularly if the building operations create a more humid environment than would be expected from normal occupation.

17.11 The underside of roof projections at the eaves gables, and at open wall cavities, must be protected against dampness by such measures as painting, boarding or panelling.

17.12 Tile battens, gutter laths, tiles or slates are laid in the traditional manner to provide the final roof finish.

17.13 Plasterboard can be fixed directly to the element or on battens. The latter are used where service runs are to be incorporated.

Technical Investigations

The following is a summary of the technical investigations carried out on Jabroof SlimFix Sandwich Roof Elements.

18 Tests

18.1 Tests were carried out by SKH(1) to include:

- short-term behaviour
- long-term behaviour
- fire resistance
- bonding strength.

(1) SKH is a Dutch assessment authority.

18.2 Tests were carried out for the BBA to determine resistance to penetration by fire.

19 Investigations

19.1 The products were examined and assessed by SKH to determine:

- practicability of installation
- durability
- hygrothermal behaviour.

19.2 The manufacturer's installation instructions were evaluated and the installation procedures outlined and found to be practicable.

19.3 Independent examination of the manufacturing process was made on behalf of SKH, including methods adopted for quality control.

19.4 An examination was made of data on:

- structural behaviour
- hygrothermal behaviour
- durability
- fire resistance.

19.5 The load/span tables were verified by calculations against the requirements of DD ENV 1995-1.1 : 1994 and the UK National Application Document by SKH.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

BS 5250 : 2002 *Code of practice for control of condensation in buildings*

BS 5268-2 : 2002 *Structural use of timber — Code of practice for permissible stress design, materials and workmanship*

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

BS 6399-1 : 1996 *Loading for buildings — Code of practice for dead and imposed loads*
BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

BS EN 312 : 2003 *Particleboards — Specifications*

BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

DD ENV 1995-1.1 : 1994 *Eurocode 5. Design of timber structures — General rules and rules for buildings (together with United Kingdom National Application document)*

NEN 6702 : 1991 *Technical principles for building structures — TGB 1990 — Loadings and deformations*

Conditions of Certification

20 Conditions

20.1 This Certificate:

(a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;

(b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;

(c) is valid only within the UK;

(d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;

(e) is copyright of the BBA;

(f) is subject to English law.

20.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

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

(a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) remain covered by a valid Dutch Agrément; and

(c) are reviewed by the BBA as and when it considers appropriate.

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

(a) the presence or absence of any patent, intellectual property or similar rights subsisting in the product or any other product;

(b) the right of the Certificate holder to market, supply, install or maintain the product; and

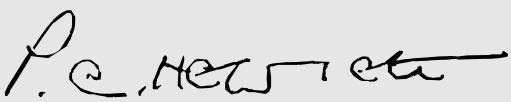
(c) the actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

20.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do 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 or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future 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 installation and use of this product.

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, Jabroof SlimFix Sandwich Roof Elements are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 00/3696 is accordingly awarded to Vencel Resil Limited.

On behalf of the British Board of Agrément



Date of Second issue: 11th November 2004 Chief Executive

**Original Certificate issued 28th March 2000. This revised version includes change of product name and core material, new span and thermal tables, reference to revised Regulations and Standards, and revised* Conditions of Certification.

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