

Jabroof SlimFix in a Structural Pitched Roof



Table 1

Thickness	U-value					
	0.25W/m ² K	0.27W/m ² K	0.28W/m ² K	0.30W/m ² K	0.35W/m ² K	0.40W/m ² K
100	0.18	0.19	0.20	0.21	0.22	0.23
120	0.17	0.18	0.19	0.20	0.21	0.22
140	0.16	0.17	0.18	0.19	0.20	0.21
160	0.15	0.16	0.17	0.18	0.19	0.20
180	0.14	0.15	0.16	0.17	0.18	0.19
200	0.13	0.14	0.15	0.16	0.17	0.18
220	0.12	0.13	0.14	0.15	0.16	0.17
240	0.11	0.12	0.13	0.14	0.15	0.16
260	0.10	0.11	0.12	0.13	0.14	0.15
280	0.09	0.10	0.11	0.12	0.13	0.14
300	0.08	0.09	0.10	0.11	0.12	0.13

APPLICATION:

Roof insulation – structural pitched roof

Product: Jabroof SlimFix

Traditional UK roofs are designed and constructed with the insulation at ceiling level, leaving a cold roof and under-used loft space. The Jabroof SlimFix insulated structural pitched-roof system provides a new method of constructing a tiled or slated pitched roof which offers structural support and, at the same time, satisfies the relevant U-value requirements. By spanning from eaves to ridge with a minimum number of purlin supports, the Jabroof SlimFix system also provides a useful insulated space in the roof void.

Jabroof SlimFix

Jabroof SlimFix consists of a sandwich construction incorporating a low lambda expanded polystyrene (EPS) core and moisture-resistant chipboard facings to provide a warm-roof construction. Cold bridging at the structural members is eliminated, substantially reducing the risk of condensation.

Construction

Longitudinal ribs and gutter laths of European Fir are fitted to the edges of the Jabroof SlimFix. Where ridge chamfering of the top end of the unit, to match the ridge board angle, is carried out in the factory, the top lath will be omitted. The upper layer of chipboard has a factory-bonded, orange-coloured, moisture resistant chipboard facing, over which are fitted three vertical counter battens. The lower chipboard facing has a white finish.

Longer spans

For new buildings, a minimum number of purlins can be used with the structural Jabroof SlimFix units enabling longer spans to be achieved. (See *Jabroof SlimFix span tables 29.3 – 29.8*)

Ventilation

Creating a warm-roof construction, which includes a breathable sarking membrane, removes the need for ventilation of the roof void.

Rooflight openings

Subject to dimensions and position, openings for rooflights or roof windows do not require trimming.

Protection to services

Because the insulation is at rafter level, the roof space remains warm, providing thermal protection to water services in the loft.

Speed of construction

Jabroof SlimFix is available in a choice of lengths providing fast, economical installation. Counter battens and gutter laths are already fitted. The insulated structural pitched roof system has been in use in Europe for over thirty years.

Approvals

Jabroof SlimFix has been assessed and approved by the British Board of Agrément, certificate number 00/3696. The units are manufactured in the Netherlands by Vencel Resil's sister company IsoBouw Systems bv.

Dimensions

Length: 3630 – 7520mm

Width: 1020mm

Type

The insulation core of Jabroof SlimFix is supplied as low lambda EPS and classified as Class E, flame-retardant additive material, as defined in BS EN 13163.

Shape

Jabroof SlimFix is square-edged; ridge-chamfered units have a splayed edge at one end only.

Accessories

The following accessories are available:

- White plastic internal finishing trims for the edges if required.
- In-situ polyurethane foam for sealing joints and gaps.
- Aluminium-butyl rubber tape for sealing horizontal butt joints.
- Hooked nails to suit product.
- Threaded or profiled nails with hooks or washers to suit product.
- Lifting hoist.

Fire

The insulation core is manufactured from Class E, flame-retardant additive material. Where Jabroof SlimFix panels are exposed, 12.5mm plasterboard will be required to be fixed over them once they have been installed, in order to achieve a Class 1 Surface Spread of Flame rating. The external fire exposure rating will depend on the selected roof finish.

Water-Vapour Transmission

Jabroof SlimFix can be considered to provide a vapour control if installed correctly.

Roof insulation – structural pitched roof

U-values

Approved documents L1 and L2 will recommend the required U-value for an integrated roof. Table 29.1 gives the U-values achieved based on the various thicknesses of Jabroof SlimFix.

Table 29.1

Jabroof SlimFix Product and Properties

U-values				
Type:	U-value (W/m ² K)	Overall* Thickness (mm)	Thickness of EPS insulation (mm)	Weight (Kg/m ²)
Jabroof SlimFix 79 8/8	0.37	95	79	14.6
Jabroof SlimFix 97 8/8	0.31	113	97	15.3
Jabroof SlimFix 113 8/8	0.27	129	113	16
Jabroof SlimFix 131 8/8	0.24	147	131	16.7
Jabroof SlimFix 157 8/8	0.20	173	157	17.7
Jabroof SlimFix 195 8/8	0.16	211	195	19.5

*excluding counter battens

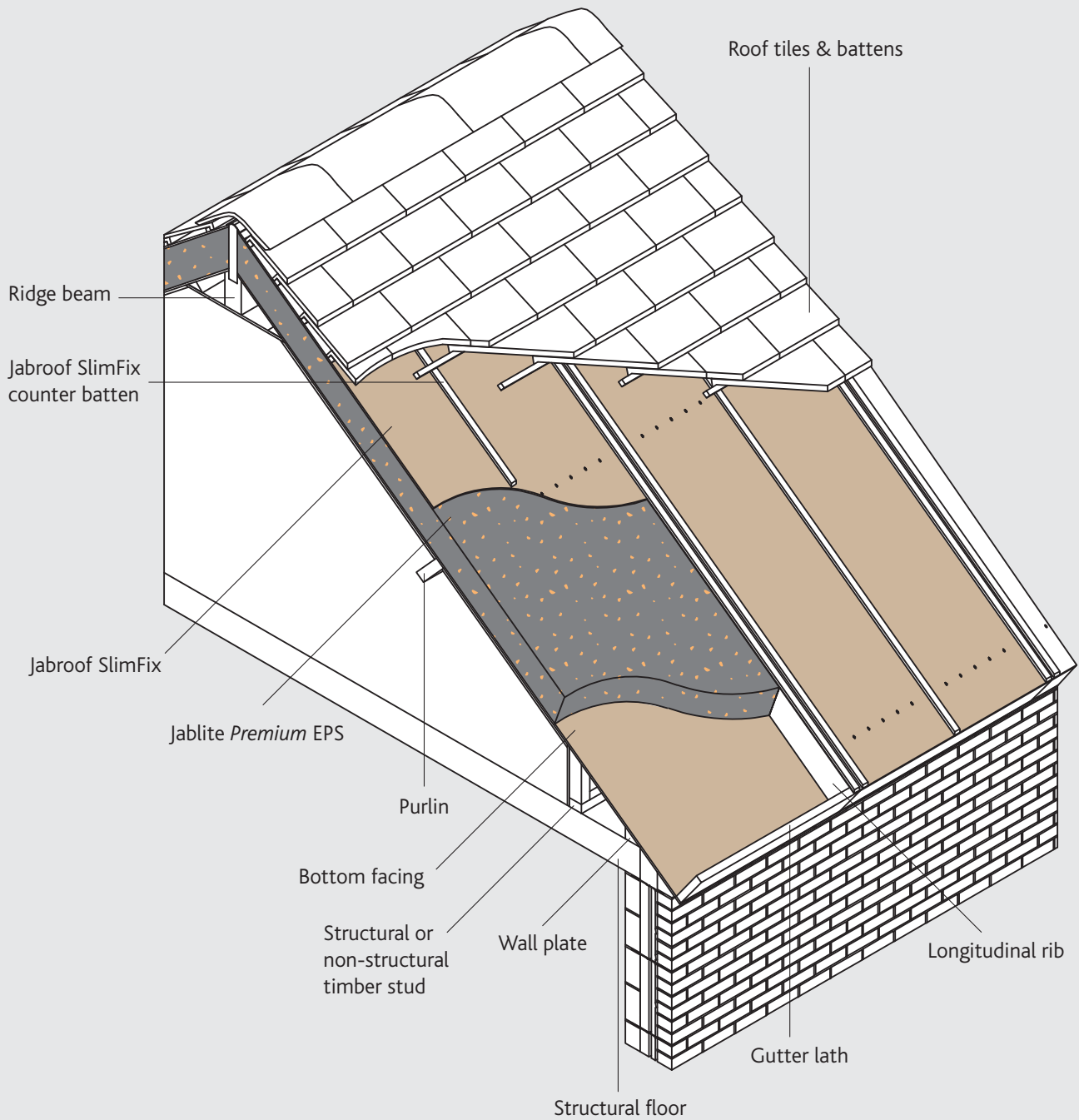
Table 29.2

Jabroof SlimFix 195 plus additional thickness of Jablite <i>Premium</i> board (mm)	U value achieved (W/m ² K)
25	0.14
50	0.13
75	0.12
100	0.11

Table 29.2 shows how the U-value of Jabroof SlimFix 195 can be improved by using an additional thickness of Jablite *Premium* board between 50mm-wide timber cross-battens at 600mm centres. For U-values for other combination, please contact Vencel Resil's technical services department.

APPLICATION: Roof insulation – structural pitched roof

Figure 29.1



Roof insulation – structural pitched roof

INSTALLATION

Jabroof SlimFix units are simply lifted (a crane is recommended) and positioned in accordance with the Vencel Resil layout drawing provided. They are secured, in accordance with the Vencel Resil fixing schedule provided, to the wallplate, ridge beam and purlin(s) using a combination of hooked and washered nail fixings supplied (*See figures 29.2 – 29.5 for typical section drawings*). All joints between units should be tightly butted and sealed using the in-situ polyurethane foam spray supplied, which can also be used to seal gaps at the ridge. Rooflight apertures are cut out when the units have been installed. If necessary, a breathable sarking membrane is installed. Tile battens are nailed to the counter battens and the roof finish is installed in the normal way.

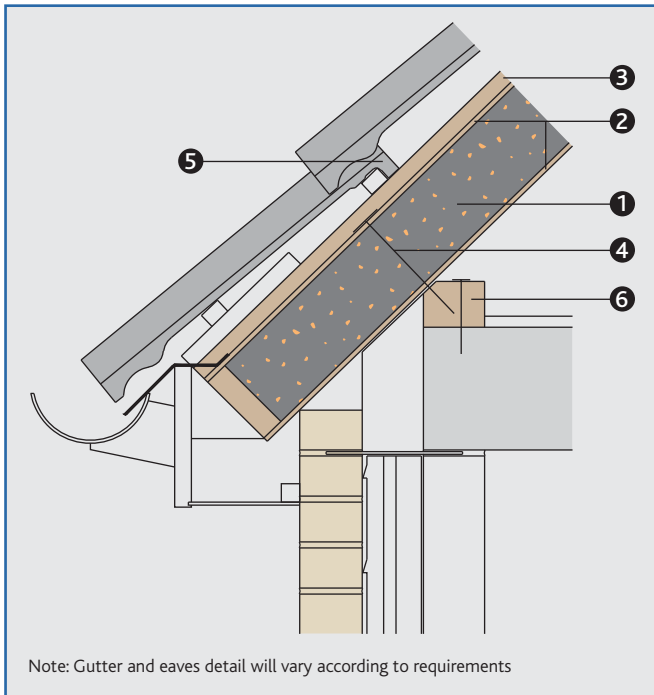
Design

The following general points should be noted:

- Most roof shapes on plan can be accommodated.
- Maximum span depends on the roof pitch, wind loading, element loading, element thickness and weight of the roof covering and internal finishes.
- The design can incorporate gutter overhangs up to 700mm according to the roof pitch.
- Gable ends can overhang to a maximum of 150mm without additional support.
- Trimming at openings is not required providing they fall within the longitudinal timber ribs of one structural unit.
- Chimney or flue penetrations should include a collar or other device to prevent the outer temperature of the chimney or flue exceeding 90°C.
- Accepts a tile or slate finish. Concrete tiles do not require a breathable membrane in this application. For advice on other finishes please contact Vencel Resil's technical services department.
- If the units are to be moved manually, they should be kept upside-down, i.e. with the counter battens downward so that when they are slid upwards over the wall plate and purlins damage to the internal face of the chipboard is avoided.
- Design advice is available from Vencel Resil's technical services department.

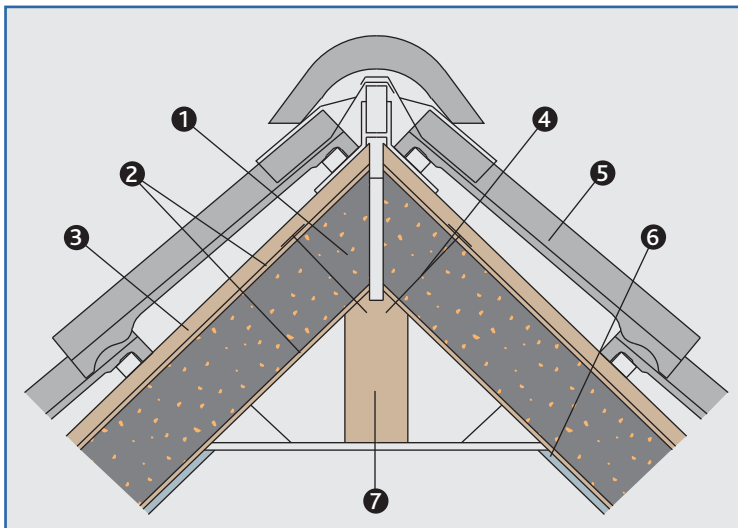
APPLICATION: Roof insulation – structural pitched roof

Figure 29.2
Detail at eaves



1. Jablite *Premium* EPS
2. Jabroof SlimFix – 8mm Chipboard
3. Jabroof SlimFix – Counter batten
4. Jabroof SlimFix – Fixing
5. Roof tile and batten system
6. Wall plate

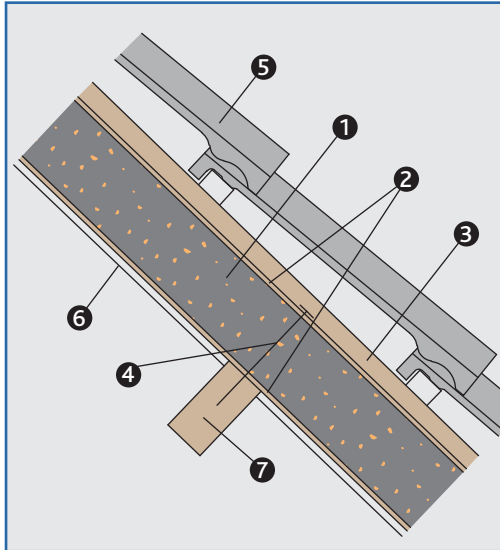
Figure 29.3
Detail at ridges



1. Jablite *Premium* EPS
2. Jabroof SlimFix – 8mm Chipboard
3. Jabroof SlimFix – Counter batten
4. Jabroof SlimFix – Fixing
5. Roof tile and batten system
6. 12.5mm Plasterboard
7. Ridge beam

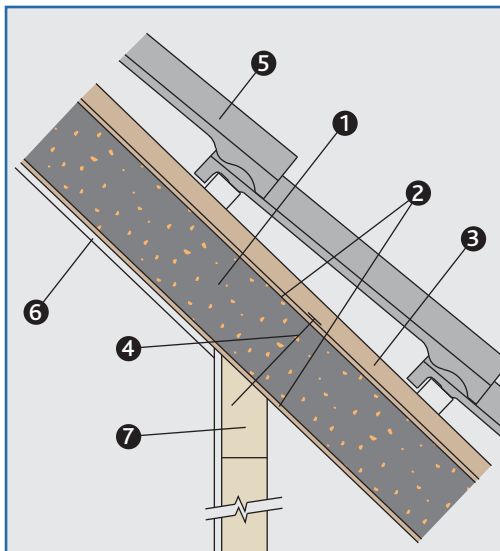
Roof insulation – structural pitched roof

Figure 29.4
Detail at intermediate purlin



1. Jablite *Premium* EPS
2. Jabroof SlimFix – 8mm Chipboard
3. Jabroof SlimFix – Counter batten
4. Jabroof SlimFix – Fixing
5. Roof tile and batten system
6. 12.5mm Plasterboard
7. Purlin

Figure 29.5
Detail at structural stud wall



1. Jablite *Premium* EPS
2. Jabroof SlimFix – 8mm Chipboard
3. Jabroof SlimFix – Counter batten
4. Jabroof SlimFix – Fixing
5. Roof tile and batten system
6. 12.5mm Plasterboard
7. Structural timber stud

APPLICATION:

Roof insulation – structural pitched roof

Jabroof SlimFix span tables

Table 29.3

Jabroof SlimFix 79mm, U-value 0.37W/m²K

Roof Slope	Span (mm) maximum distance between centres of the supports					
	Dynamic wind pressure (q _s) 1210 N/m ²			Dynamic wind pressure (q _s) 1530 N/m 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

Jabroof SlimFix overall thickness 95mm (excluding counter battens),
EPS thickness 79mm.

Table 29.5

Jabroof SlimFix 131mm, U-value 0.24W/m²K

Roof Slope	Span (mm) maximum distance between centres of the supports					
	Dynamic wind pressure (q _s) 1210 N/m ²			Dynamic wind pressure (q _s) 1530 N/m 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

Jabroof SlimFix overall thickness 147mm (excluding counter battens),
EPS thickness 131mm.

Table 29.4

Jabroof SlimFix 97mm, U-value 0.31W/m²K

Roof Slope	Span (mm) maximum distance between centres of the supports					
	Dynamic wind pressure (q _s) 1210 N/m ²			Dynamic wind pressure (q _s) 1530 N/m 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

Jabroof SlimFix overall thickness 113mm (excluding counter battens),
EPS thickness 97mm.

Table 29.6

Jabroof SlimFix 157mm, U-value 0.20W/m²K

Roof Slope	Span (mm) maximum distance between centres of the supports					
	Dynamic wind pressure (q _s) 1210 N/m ²			Dynamic wind pressure (q _s) 1530 N/m 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	3364
70°	3519	3340	3760	3159	2950	3340

Jabroof SlimFix overall thickness 173mm (excluding counter battens),
EPS thickness 157mm.

Roof insulation – structural pitched roof

Table 29.7

Jabroof SlimFix 113mm, U-value 0.27W/m²K

Roof Slope	Span (mm) maximum distance between centres of the supports					
	Dynamic wind pressure (q _s) 1210 N/m ²			Dynamic wind pressure (q _s) 1530 N/m 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

Jabroof SlimFix overall thickness 129mm(excluding counter battens),
EPS thickness 113mm.

Table 29.8

Jabroof SlimFix 195mm, U-value 0.16W/m²K

Roof Slope	Span (mm) maximum distance between centres of the supports					
	Dynamic wind pressure (q _s) 1210 N/m ²			Dynamic wind pressure (q _s) 1530 N/m ²		
	Single Span	Two Spans	Three Spans	Single Span	Two Spans	Three Spans
15°	3990	3850	4120	3090	3280	3520
20°	4530	4240	4480	3510	3580	3850
25°	4830	4570	5050	3930	3850	4300
30°	4470	4360	4900	4170	4000	4530
35°	4710	4540	5130	4350	4184	4720
40°	4830	4660	5260	4470	4300	4840
45°	4710	4600	5190	4350	4210	4750
50°	4650	4480	5070	4230	4060	4590
55°	4470	4360	4900	4110	3940	4420
60°	4350	4210	4750	3930	3760	4270
65°	4170	4000	4530	3750	3580	4050
70°	4110	3940	4460	3630	3520	3970

Jabroof SlimFix overall thickness 211mm (excluding counter battens),
EPS thickness 195mm.

Notional Dynamic Wind Pressure Map

In accordance with BS6399-2:1997



Jablite *Premium*

Low lambda Expanded Polystyrene (EPS) Technical Information

Jablite *Premium* low lambda EPS is a lightweight cellular plastic material suitable for a wide range of applications. Uniquely identifiable by its grey board with orange speckles, it is an excellent insulating medium which exhibits consistent thermal performance over the range of temperatures normally encountered in buildings.

Technical Description Composition

Jablite *Premium* is manufactured from EPS. The material comprises of expanded beads of low lambda polystyrene pre-foamed and fused together in a steam-heated mould under pressure. This produces a block of material, up to 7314mm long, which is then cut to size and/or shape. After cutting to size, the material may be faced or laminated with other materials to suit its application.

Alternatively, the beads, may be moulded into a finished shaped section which requires no further processing.

Jablite *Premium* is supplied as Reaction to Fire Class E, containing a flame-retardant additive.

Tolerances

In accordance with BS EN 13163 tolerances on the cut dimensions are defined as follows:

Length: $\pm 3\text{mm}$ or $\pm 0.6\%$ whichever is greater (L1)

Width: $\pm 3\text{mm}$ or $\pm 0.6\%$ whichever is greater (W1)

Thickness: $\pm 2\text{mm}$ (T1)

Squareness: $\pm 5\text{mm}$ per 1000mm (S1). Alternative tolerances can be provided for specific applications.

Dimensional stability: $\pm 0.5\%$ under constant laboratory conditions (DS(N)5)

Standards

Jablite *Premium* is produced to the requirements of BS EN 13163 'Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) – specification'.

Vencel Resil Limited has been assessed and approved to BS EN ISO 9001 (2000) Quality Management Systems – Requirements.

Properties and Performance

Mechanical properties

Jablite *Premium* has a high strength to weight ratio.

Moisture Properties

Although Jablite *Premium* has significant resistance to the passage of water vapour, it should not be regarded as a damp-proof membrane or vapour-control layer, and will not provide a barrier against damp penetration.

A suitable damp-proof membrane or vapour-control layer will be required in most forms of construction – see individual product and application data.

Typical properties of Jablite <i>Premium</i>		
	Jablite <i>Premium</i> Type	
	EPS 70	EPS 100
Mechanical Properties		
Compressive strength @ 10% compression (kPa)	70	100
Compressive strength @ 1% nominal strain (kPa)	20	45
Bending strength (kPa)	115	150
Moisture Properties		
Water vapour diffusion resistance factor μ	20-40	30-70
Water vapour permeability δ mg/(Pa.h.m)	0.018-0.036	0.010-0.024
Vapour resistivity (MNs/gm)	145	200
Thermal Properties		
Thermal conductivity (W/mK, at 10°C)	0.030	0.030
Thermal resistivity (mK/W)	33.33	33.33

Fire Properties

In common with all organic materials, Jablite *Premium* is combustible. However, provided it is specified and installed correctly, in accordance with the manufacturer's instructions and BS 6203 guidance, it will not present any undue fire hazard. The standard recommends that for all applications, the material should be protected by either a laminated facing layer, or fully enclosed by the form of construction.

Class E 'flame-retardant' additive material reduces the rate of flame spread but should not be considered as offering enhanced fire performance.

Combustion

EPS is 'combustible' as defined in BS 476: Part 4.

When burning, EPS behaves like other hydrocarbons such as wood and paper. Class E material products of uncontrolled combustion are carbon monoxide, carbon dioxide, styrene, hydrogen bromide and water vapour; the decomposing styrene will give off a certain amount of dense black soot.

Ignition temperature

Flash ignition temperature is between 350°C and 490°C depending on the application and the exact circumstances of use. Under certain circumstances the material can be readily ignited by a naked flame but providing it is correctly installed, this does not present any disadvantage in use.

Biological Properties

EPS will not sustain mould growth, and has no nutrient value to insects or vermin. The material is non-biodegradable and care should be taken to dispose of waste and off cuts at a licensed waste site.

Thermal Properties

Thermal movement

Coefficient of linear expansion:
0.6 x 10⁻⁶°C.

The material is sufficiently resilient and flexible that no allowance need be made for thermal expansion.

Working temperature range

EPS can be used within the temperature range -150°C to +80°C.

Compatibility with other materials

EPS is soluble in aromatic, halogenated solvents and ketones; it should be protected from contact with hydrocarbons and strong solvents using a suitable membrane.

EPS should not be permitted to come into contact with PVC-sheathed electrical cables since this will lead to migration of plasticiser from the PVC resulting in embrittlement of the cable sheath. Cables should be protected by the use of a physical barrier, for example by being enclosed in a conduit or by an air gap.

Health, Safety and Environment

EPS is non-toxic and biologically inert. It is not irritating to the eyes or skin and no medical treatment or action is required as a result of accidental ingestion.

No special precautions are required during handling or cutting when carried out in well-ventilated areas.

The volume of EPS boards is 98% air; consequently the components in a given volume are typically 18-26kg/m³. In polystyrene, styrene monomer, shown to be safe in use, constitutes a maximum of 0.1% by weight of the product. This minute trace of styrene monomer constitutes no threat to health.

The expanding agent, pentane is a saturated hydrocarbon and is non-toxic and constitutes no threat to the ozone layer.

EPS, Class E, flame-retardant additive material, contains around 0.5% of the flame-retardant hexa-bromocyclododecane (HBCD) which is entrapped in the polymer matrix of the EPS.

Storage

Store Jablite *Premium* boards under cover, protected from high winds and out of direct sunlight. Care should be taken in storage not to bring the boards into contact with highly flammable materials such as paint, solvent or petroleum products. Smoking should be prohibited in the storage area and the products must not be exposed to flame or other ignition source.

Floors | Walls | Roofs

Table 2.1

Thickness	U-values					
	0.25 W/m ² K	0.22 W/m ² K	0.20 W/m ² K	0.18 W/m ² K	0.15 W/m ² K	0.10 W/m ² K
100	0.0	0.0	0.0	0.0	0.0	0.0
150	0.0	0.0	0.0	0.0	0.0	0.0
200	0.0	0.0	0.0	0.0	0.0	0.0
250	0.0	0.0	0.0	0.0	0.0	0.0
300	0.0	0.0	0.0	0.0	0.0	0.0
350	0.0	0.0	0.0	0.0	0.0	0.0
400	0.0	0.0	0.0	0.0	0.0	0.0
450	0.0	0.0	0.0	0.0	0.0	0.0
500	0.0	0.0	0.0	0.0	0.0	0.0
550	0.0	0.0	0.0	0.0	0.0	0.0
600	0.0	0.0	0.0	0.0	0.0	0.0
650	0.0	0.0	0.0	0.0	0.0	0.0
700	0.0	0.0	0.0	0.0	0.0	0.0
750	0.0	0.0	0.0	0.0	0.0	0.0
800	0.0	0.0	0.0	0.0	0.0	0.0
850	0.0	0.0	0.0	0.0	0.0	0.0
900	0.0	0.0	0.0	0.0	0.0	0.0
950	0.0	0.0	0.0	0.0	0.0	0.0

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