

Jablite Premium Board in an Internally Lined Pitched Roof

Table 1

Thickness	U-value					
	0.25Wjmk	0.27Wjmk	0.28Wjmk	0.30Wjmk	0.35Wjmk	0.40Wjmk
100	0.18	0.17	0.16	0.15	0.13	0.11
125	0.16	0.15	0.14	0.13	0.11	0.09
150	0.14	0.13	0.12	0.11	0.09	0.07
175	0.12	0.11	0.10	0.09	0.07	0.05
200	0.10	0.09	0.08	0.07	0.05	0.04
225	0.08	0.07	0.06	0.05	0.04	0.03
250	0.06	0.05	0.04	0.03	0.02	0.01
275	0.04	0.03	0.02	0.01	0.01	0.00
300	0.02	0.01	0.00	0.00	0.00	0.00

APPLICATION: Roof insulation – internally lined pitched roof

Product: Jablite *Premium* board

Jablite *Premium* board is commonly used to upgrade buildings, it is equally applicable to new build and can also be used on existing cold-deck flat-roof constructions.

Jablite *Premium* board can be used in conjunction with 12.5mm-thick plasterboard to provide both insulation and a ceiling finish to the underside of a pitched roof.

Jablite *Premium* board

Jablite *Premium* board is intended for insulating new or existing roofs, or for increasing the performance of such elements where the original insulation standards are not adequate. By using this technique, existing roofs can be upgraded to meet the current Building Regulations' insulation requirements.

Easy to handle

Jablite *Premium* board is manufactured from low lambda expanded polystyrene (EPS), and is lightweight and easy to handle on site.

Permanent

Jablite *Premium* Board is rot-proof and durable and will remain effective for the life of the building. The recommended fixing methods will retain the insulation permanently in position.

Environment

Expanded polystyrene has been awarded an A+ rating by the BRE's Green Guide to Specification.

Ventilation

Applied beneath and/or between the rafters, Jablite *Premium* board maintains the required ventilation space to the underside of the sarking membrane or the roof deck.

Rapid heat response

Roof constructions which have been internally insulated with Jablite *Premium* board respond rapidly to heat input and good standards of comfort are readily obtained.

Type

Jablite *Premium* board is supplied as EPS 70 as defined in Bs En 13163 - Reaction to Fire Class E – containing a flame retardant additive.

Dimensions

Standard size: 2400 x 1200mm.

Thickness: 25, 30, 40, 50, 60, 75, 100, 120, 150 and 200mm; other thicknesses available to order.

Fire

When properly installed, the insulation is protected by the plasterboard or other lining and will have no adverse effect on either the surface spread of flame rating or the fire resistance of the roof lining.

Water-vapour transmission

Jablite *Premium* board has a significant resistance to the passage of water, but should not be regarded as a vapour-control layer. The risk of interstitial condensation is reduced by lacing a vapour-control layer between the Jablite *Premium* board and the plasterboard facing, or by using plasterboard which incorporates an integral vapour control membrane.

U-values

Table 27.1 shows the thicknesses of Jablite *Premium* board required to meet various U-values where the insulation is positioned between and below the rafters/joists.

Table 27.2 shows the thicknesses of Jablite board required to meet various U-values where the insulation is positioned wholly between the rafters/joists. Their calculation complies with the procedures contained in the "Conventions for U-value calculations" document accompanying the Building Regulations. The values given are based on a k-value of 0.030W/mK for the insulation and are calculated in accordance with BS EN ISO 6946.

Thermal resistance

The thermal resistance, R-value, of Jablite *Premium* board for a range of thicknesses is as follows:

25mm	0.83m ² K/W
30mm	1.00m ² K/W
40mm	1.33m ² K/W
50mm	1.67m ² K/W
60mm	2.00m ² K/W
75mm	2.50m ² K/W
100mm	3.33m ² K/W
120mm	4.00 m ² K/W
150mm	5.00 m ² K/W
200mm	6.66 m ² K/W

These figures can be used for calculating U-values for constructions not described in the tables.

Roof insulation – internally lined pitched roof

Table 27.1

Jablite *Premium* board between 50mm wide rafters at the stipulated centres, with a 50mm continuous insulation board placed below the rafters.

U-values (W/m ² K)	400mm Centres	600mm Centres
	Thickness in mm	
0.14	220	200
0.16	180	165
0.18	150	135
0.20	125	115
0.25	85	80
0.30	55	55
0.35	40	35
0.40	25	25
0.45	25	25

Table 27.2

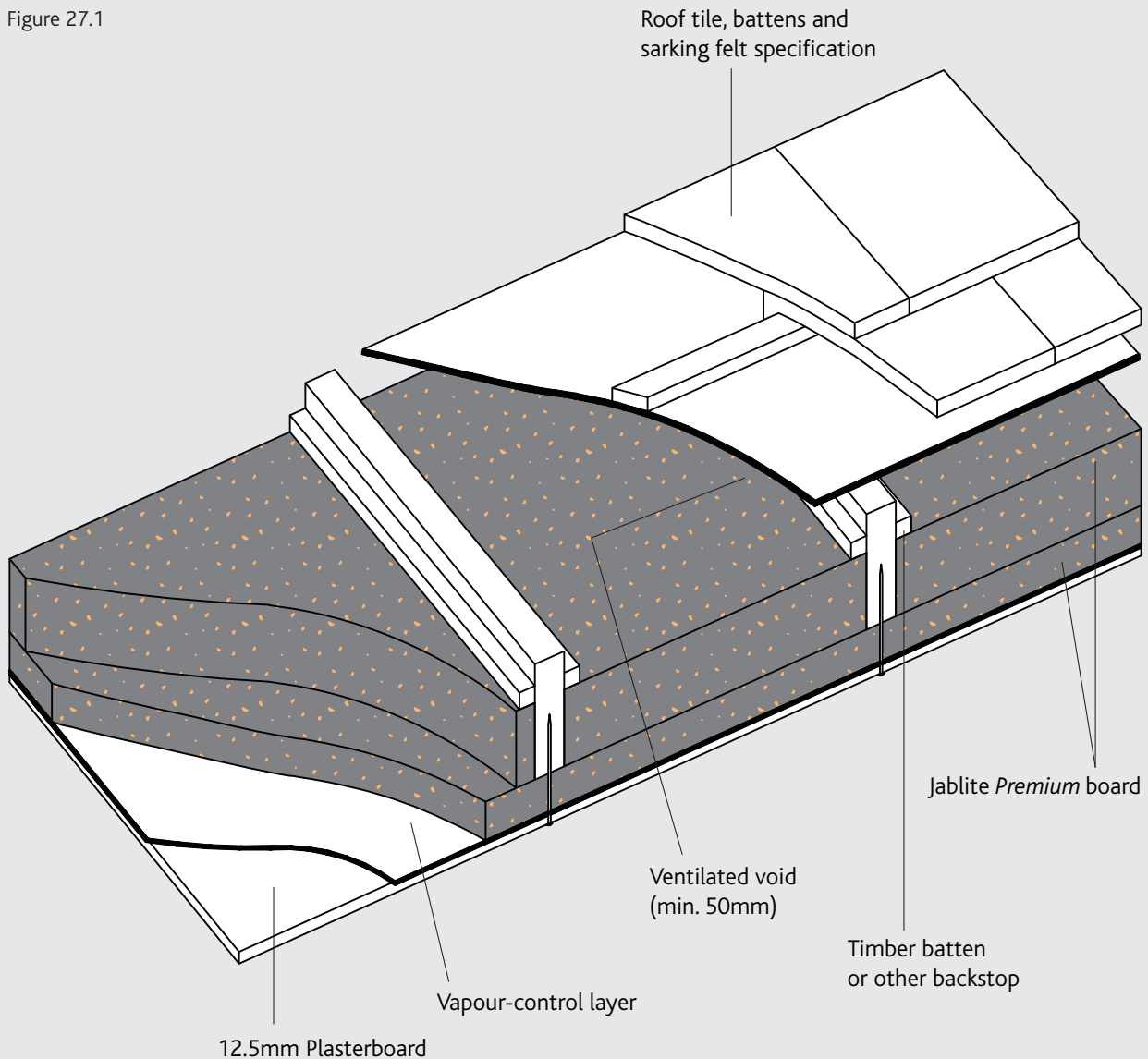
Jablite *Premium* board between 50mm wide rafters at the stipulated centres.

U-values (W/m ² K)	400mm Centres	600mm Centres
	Thickness in mm	
0.14	280	255
0.16	245	225
0.18	220	200
0.20	195	180
0.25	155	140
0.30	130	115
0.35	110	100
0.40	95	85
0.45	85	75

Cold pitched roofs require a 50mm clear ventilated airspace below the sarking membrane. There are accredited 'Breathable Membranes' which when used as a sarking layer may allow the airspace to be reduced. For recommended air spaces the advice of the membrane manufacturer should be sought.

APPLICATION: Roof insulation – internally lined pitched roof

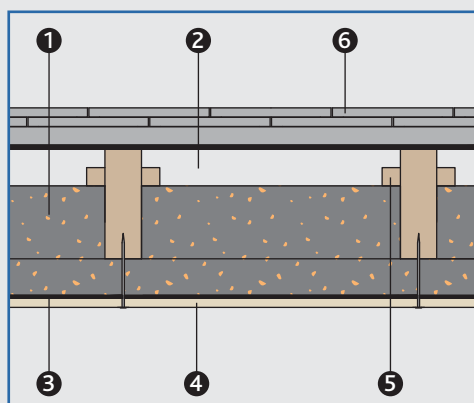
Figure 27.1



NOTE: Maximum thickness of Jablite *Premium* Board below rafter is 50mm

INSTALLATION

Figure 27.2
Pitched-roof double layer insulation



1. Jablite *Premium* Board
2. Ventilated void
3. Vapour-control layer
4. 12.5mm Plasterboard
5. Timber batten or other backstop
6. Tiles or slates on battens and sarking felt

Roof insulation – internally lined pitched roof

Figures 27.2 – 27.4 show typical methods of installing Jablite *Premium* board to pitched and flat roofs.

Vapour-control layer

The risk of interstitial condensation can be reduced by placing a vapour-control layer between the Jablite *Premium* board and the plasterboard facing or by using plasterboard which incorporates an integral vapour control membrane. All vapour control membranes and boards should be sealed at joints and at all abutments with a suitable mastic sealant.

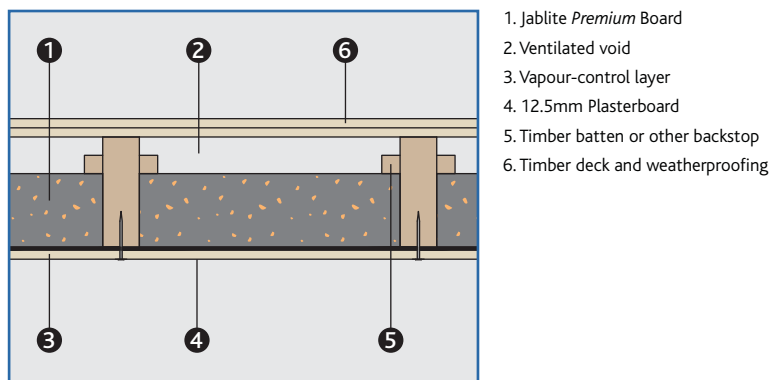
Services

Service runs should be installed before the lining and secured to the rafters. Jablite *Premium* board should not be allowed to come into direct contact with PVC-sheathed cable, nor closer than 12mm to hot-water pipes; cables should be protected by the use of a physical barrier, for example by being enclosed in a conduit. Where cables are surrounded by insulation they should be de-rated in accordance with the recommendations given in BRE Defect Action Sheet 62.

Pitched roofs

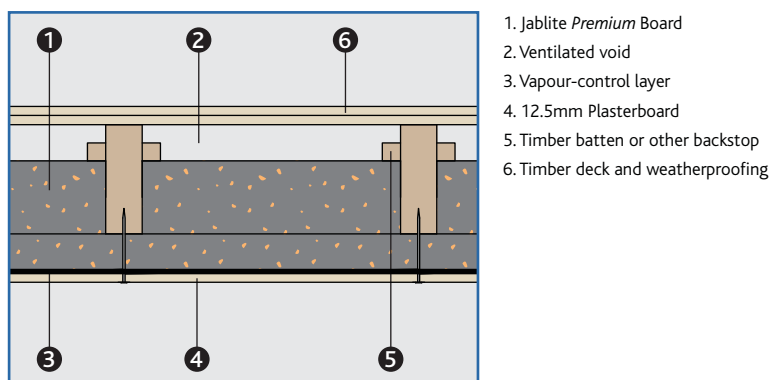
Backstops, typically of 25 x 25mm timber battens, should be attached to the rafters in such a way that a 50mm ventilation gap will be maintained above the insulation material. The first layer of Jablite *Premium* board should be cut to fit snugly between the rafters and push-fitted into position up to the backstop, with the ends of adjacent boards tightly butted. If necessary, a second layer of insulation should be cut to span across the rafters, completely covering the first, and should be lightly pinned in position until the plasterboard is fixed. (See figure 27.2). If the plasterboard does not incorporate a vapour-control membrane, then a separate vapour control, consisting of a minimum

Figure 27.3
Flat-roof single layer insulation



1. Jablite *Premium* Board
2. Ventilated void
3. Vapour-control layer
4. 12.5mm Plasterboard
5. Timber batten or other backstop
6. Timber deck and weatherproofing

Figure 27.4
Flat-roof double layer insulation



1. Jablite *Premium* Board
2. Ventilated void
3. Vapour-control layer
4. 12.5mm Plasterboard
5. Timber batten or other backstop
6. Timber deck and weatherproofing

1000g polythene, should be placed over the insulation, and the edges and joints sealed. Finally, the plasterboard should be fixed to the rafters in accordance with the manufacturer's instructions, and finished as required.

Flat roofs

The method of installation is generally as described for pitched roofs but in many cases the dimensions of the timber roof joists will be sufficient to allow all of the required thickness of insulation to be accommodated within the depth of the joist, (See figure 27.3). If this is not possible, then a second layer of insulation should be attached to span across the joists as described above. (See figure 27.4). It is important in this type of

construction to ensure adequate ventilation above the insulation by provision of air gaps at the roof perimeter. See BRE document – Insulation avoiding the risks. The vapour-control layer should be placed between the insulation and the plasterboard.

Composite boards

The manufacturers of proprietary EPS/plasterboard and other EPS insulated composite boards have developed a range of adhesive and mechanical fixing systems for their products used in this application and their recommendations should be followed. Further information on manufacturers and suppliers of these products is available from Vencel Resil's technical services department.

References

- BRE Defect Action Sheet 62. Electrical services: avoiding cable overheating.
 BS EN 13163 Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) – Specification.
 BRE Report 262, Thermal insulation: avoiding risks –third edition 2002.

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

R-value	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
0.05	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.00	0.00	0.00	0.00	0.00	0.00
0.15	0.01	0.00	0.00	0.00	0.00	0.00
0.20	0.01	0.00	0.00	0.00	0.00	0.00
0.25	0.02	0.00	0.00	0.00	0.00	0.00
0.30	0.02	0.00	0.00	0.00	0.00	0.00
0.35	0.03	0.00	0.00	0.00	0.00	0.00
0.40	0.03	0.00	0.00	0.00	0.00	0.00
0.45	0.04	0.00	0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00	0.00	0.00	0.00
0.55	0.05	0.00	0.00	0.00	0.00	0.00
0.60	0.05	0.00	0.00	0.00	0.00	0.00
0.65	0.06	0.00	0.00	0.00	0.00	0.00
0.70	0.06	0.00	0.00	0.00	0.00	0.00
0.75	0.07	0.00	0.00	0.00	0.00	0.00
0.80	0.07	0.00	0.00	0.00	0.00	0.00
0.85	0.08	0.00	0.00	0.00	0.00	0.00
0.90	0.08	0.00	0.00	0.00	0.00	0.00
0.95	0.09	0.00	0.00	0.00	0.00	0.00
1.00	0.09	0.00	0.00	0.00	0.00	0.00

For more information about Jablite please contact us on:
Tel: 0870 600 3666
Email: sales@jablite.co.uk
Visit: www.jablite.co.uk



Jablite Limited
Head Office: Infinity House, Anderson Way, Belvedere, Kent DA17 6BG