



# EcoTherm Pitched-Roof

Thermal insulation for pitched roofs

Polyurethane foam core with  
aluminium foil to both sides

For warm / cold pitched roofs and loft ceilings





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Thermal insulation for pitched roofs

- EcoTherm Pitched-Roof is ZERO ODP.
- Roofs insulated at rafter level create a warm roof; no pipe or tank lagging is required.
- EcoTherm Pitched-Roof allows traditional forms of construction without modern problems of condensation.
- Designers are not bound by the constraints of horizontal ceilings.
- Attic space can be transformed into warm usable living space.
- EcoTherm Pitched-Roof can be used to insulate the roof and cheeks of dormers.

## Introduction

During the past few years there has been an increasing demand for improved thermal standards in new and refurbished buildings. In pitched roof constructions it was originally thought that improvement and higher standards could be achieved by simply applying thicker layers of fibrous insulation. However, this practice led to problems of condensation in the cold voids above the insulation layer. The immediate answer was to ventilate the air space, but this was not always easy, especially in multi-pitched roof designs.

EcoTherm Pitched-Roof provides the solution and at the same time lend itself to 'design innovation' which will achieve still higher thermal values but without causing problems of condensation and rot in the roof timbers. With EcoTherm Pitched-Roof board, designers can achieve required thermal standards without radical changes to construction methods and more importantly without risking a subsequent deterioration of the structure owing to the effects of

roof-space condensation.

EcoTherm Pitched-Roof insulation board laid at rafter level creates a warm roof construction and provides insulation (thickness for thickness) to a much greater thermal value than fibrous insulation products. Attic space is transformed into warm, usable living space and water tanks and pipes in the roof space no longer need be lagged to prevent them from freezing during cold winter months. Warm pitched roof constructions ensure that roof timbers remain at the internal ambient temperature of the building. Where a loft space is retained, gang-nails are not subjected to condensation and corrosion, while wiring and pipes in attics and lofts remain uncovered and immediately available for maintenance.

EcoTherm Pitched-Roof offers a simplicity and functionality to insulated pitch roofs. Usable building space is increased by up to 15% with little, if any, increase in costs, and designers are no longer restricted by the constraints of horizontal ceilings. External wall heights can be reduced offering further savings in construction

costs. Prefabricated dormer windows with the insulation in place, in the cheeks and roof, can be incorporated into the design.

## Environment

EcoTherm Pitched-Roof is available in a CFC and HCFC free grade which has positive environmental characteristics and has no deleterious effect on the ozone layer, offering ZERO ODP (Ozone Depletion Potential).

## Application

EcoTherm Pitched-Roof is a warm/cold pitched roof insulation board which is applied over and/or between the rafters under slated or tiled constructions.

## Description

The board is faced on both sides with a fire-rated foil facing.

# Fixing Details

## Counter battens

In all over-rafter applications the EcoTherm Pitched-Roof insulation boards should be restrained by the use of counter battens. These allow an additional space to be formed which separates the breathable sarking membrane from the board. It allows the membrane to be stretched across and between the battens, avoiding contact with the board. Counter battens also allow slate and tile laths to be fixed in the traditional manner, using standard sized nails.

## Mansard roof – walls

EcoTherm Pitched-Roof insulation boards can be used for the construction of, insulated, tiled or slated, mansard roofs.

## Layers

Where very low 'U' values are required it may be more practicable to layer the insulation, between and over the rafters.

## Sarking membrane

The water vapour permeable sarking membrane should be fixed in accordance with the manufacturer's instructions. Generally, the membrane should be stretched tight over the counter-battens and be secured by the use of tile or slate laths. The membrane should not be allowed to sag between the counter-battens.

## Vapour control

There is no need to use a vapour control layer below the insulation. Water vapour will permeate through to the cavity formed above the sarking membrane where it will ventilate through the tile joists. Where continuous high humidity conditions are envisaged ventilation ports at the ridge and eaves are recommended.

## Single layer insulation

The boards are placed covering the whole roof area with the joints staggered and lightly butted. The insulation is then fixed by use of a counter batten (minimum size 50mm x 25mm) placed above the insulation down the line of each rafter. The boards are secured by nailing through both the counter-batten and the EcoTherm Pitched-Roof insulation board. The counter battens form the base for the fixing of the tile or slate laths.

## Double layer

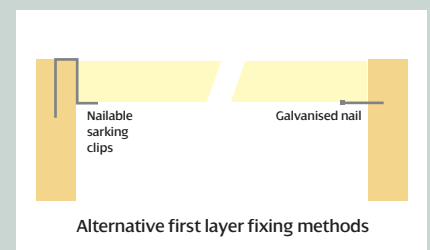
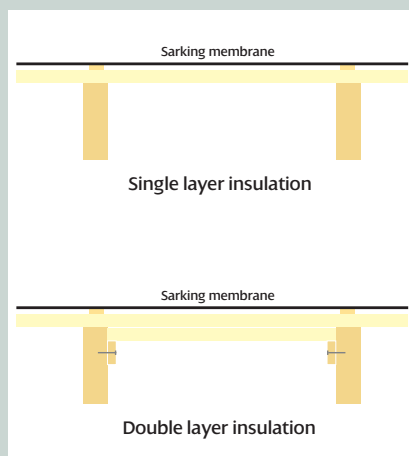
The procedure for double layer insulation is similar except that strips of board are first cut between the joists. A support is then fixed maintaining its position to each side of the rafters. This can be a batten with nails spaced at 1m centres down the line of the rafter or a proprietary nailable sarking clip may be used. The second layer is applied as detailed in 'Single layer insulation'.

## Cutting

Cutting should be carried out using a fine toothed saw, or by scoring with a knife and snapping the board over a straight edge and then cutting the foil facing on the other side.

## Health and safety

These rigid polyurethane (PUR) and polyisocyanurate (PIR) foam products are chemically inert and safe to use. A leaflet about satisfying the requirements of the 'Control of Substances Hazardous to Health Regulations, 1988' (COSHH) is available.



# Technical Details

## Dimensions

EcoTherm Pitched-Roof is available in standard sizes and thicknesses as shown below.

### Width (mm)

1200

### Length (mm)

2400

### Thickness (mm)

25, 30, 35, 40, 45, 50, 60, 65, 70, 75, 80, 90, 100, 110, 120

## Compressive strength – foam

Exceeds 140 kPa at 10% compression when tested to BS 4370 Part 1:1988 Method 3.

## Manufacturing tolerances

The manufacturing tolerances of the boards shall not exceed:

20 - 30mm: ± 1.5mm

31 - 50mm: ± 2mm

51 - 75mm: ± 3mm

76mm and over: ± 4mm

Diagonals should not differ by more than 9mm

## Fire protection

Pitched roofs insulated with EcoTherm Pitched-Roof offer excellent fire protection. The fire performance characteristics of the roof remain unchanged from those of a roof insulated at ceiling level. The roof will attain an SAA rating when tested to BS 476, Part 3: 1968 Ext. Fire Exposure Roof Test.

## Storage

EcoTherm Pitched-Roof insulation board is supplied wrapped. On site, the boards should be stored clear of the ground on a clean level surface under cover to protect them from moisture or mechanical damage. Boards should not be stored in areas subject to elevated temperature or adjacent to sources of ignition.

## Resistance to solvents – foam

EcoTherm Pitched-Roof board resists attack from alkalis, dilute acids, mineral oil and petrol. The foam core of either board is not resistant to ketonic solvents. Boards

which have been in contact with harsh solvents, petrol, mineral oil or acids should not be used. Damaged boards should not be used.

## Durability

When correctly installed EcoTherm Pitched-Roof board has an indefinite life. Durability will depend on the method of application, the supporting structure, and the conditions of its use.

## Thermal conductivity

The thermal conductivity,  $\lambda$  value, of EcoTherm Pitched-Roof is 0.023 W/mK, the thermal resistance 'R' varies with the thickness as shown in the table below.

## Typical 'U' values

Installed in a pitched tiled roof construction and under drawn with 12.5mm plasterboard following the plane of the roof, in layers as indicated, EcoTherm Pitched-Roof insulation board gives typical insulation values as shown in the table below.

EcoTherm Pitched-Roof is available in the following standard sizes and thicknesses:

Thickness (mm)	R-value (m <sup>2</sup> k/W)	Single layer laid over rafters (W/m <sup>2</sup> k)	Double layer with 25mm laid over rafters (W/m <sup>2</sup> k)
25	1.07	0.61	0.37
30	1.30	0.54	0.34
35	1.52	0.48	0.32
40	1.74	0.44	0.31
50	2.17	0.37	0.28
60	2.61	0.32	0.25
70	3.04	0.28	0.24
80	3.48	0.25	0.22
90	3.91	0.22	0.21
100	4.35	0.20	0.20
110	4.78	0.19	0.19
120	5.22	0.17	0.18

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EcoTherm is a member of the British Rigid Urethane Foam Manufacturers' Association