

# Hambleside Danelaw

## In-Plane GRP Rooflights

# Ins<sup>u</sup>lator

### BUILDING DESIGN

The design of the building must consider the use of the building, the thermal performance of all of the envelope elements together with the energy consumption required for heating, cooling and illumination.

The methodology for this is the national calculation tool produced by the BRE and known as SBEM (Simplified Building Energy Model). Whilst it varies from building to building, depending on size, use, construction, heating and lighting methods, it is likely that the optimum rooflight area for energy in large industrial buildings will be in the region of 17 to 22% of the roof.

### THE CONCEPT

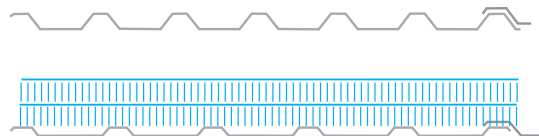
Hambleside first developed the patented Insulator Rooflight System in 2001\*. The heart of the system is the transparent tessallating core insulant which is simply incorporated within the GRP double-skin assembly. The result of the combination of the traditional with this innovative solution to providing thermal insulation, took the market by surprise. U-values which were in excess of 3.3 for GRP rooflights could be dramatically reduced to as low as 0.8. This is achieved with no impact on normal installation methods and no change to the fasteners. To obtain the thermal performance requirement for the building design it is only necessary to select the insulation core assembly as illustrated below. The choice of weather sheet and liner profile in either the In-Plane 45, or the Contour GRP ranges has no material effect on the U-values. All of the Insulator U-values quoted have been independently verified by IFT Rosenheim, Germany.

### Factory Assembled Rooflights Elemental U-value

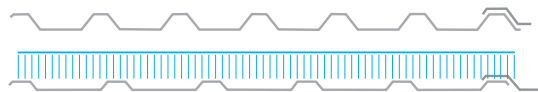


**0.8 W/m<sup>2</sup>K** 64mm Bi-Elemental assembly  
ift Certificate No. 405 30043/5

### Site Assembled Rooflights Elemental U-value



**0.9 W/m<sup>2</sup>K** 64mm Bi-Elemental assembly  
ift Certificate No. 405 30043/5



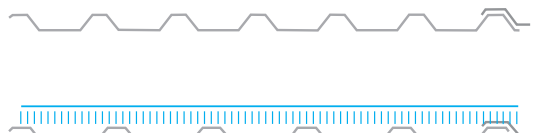
**1.1 W/m<sup>2</sup>K** 40mm core assembly  
ift Certificate No. 405 30043/3



**1.2 W/m<sup>2</sup>K** 40mm core assembly  
ift Certificate No. 405 30043/3



**1.4 W/m<sup>2</sup>K** 20mm core assembly  
ift Certificate No. 405 27602/1



**1.5 W/m<sup>2</sup>K** 20mm core assembly  
ift Certificate No. 405 27602/1



**1.6 W/m<sup>2</sup>K** 12mm core assembly  
ift Certificate No. 405 30043/1

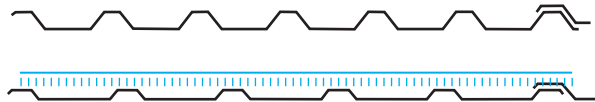
\*Patent Numbers GB 2399380 and GB 2378976b.



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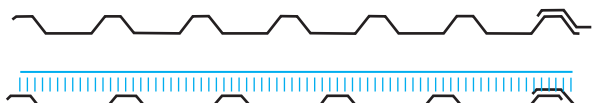
## In-Plane GRP Rooflights

### Insulator

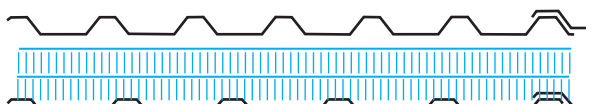


#### Calculating the energy cost savings of Insulator rooflights

This typical rooflight construction with a **20mm** transparent tessallating prism core will achieve a U-value rating of **1.4 - 1.5 W/m<sup>2</sup>K**.



This typical rooflight construction with a **40mm** transparent tessallating prism core will achieve a U-value rating of **1.1 - 1.2 W/m<sup>2</sup>K**.



This typical rooflight construction with an **64mm** bi-elemental transparent tessallating prism core will achieve a U-value rating of **0.8 - 0.9 W/m<sup>2</sup>K**.

#### Potential rooflight energy cost savings\*\*\*

This calculator demonstrates the cost/benefit analysis through specifying a higher performance rooflight. Figures are based on a 10,000 square metre building with 15% rooflight area. 1500m<sup>2</sup> rooflight with 2.2 U-value, provides a base calculation of 1500 x 2.2 = 3,300 which converts to energy savings\* of £11,043. However, by reducing the elemental U-value, more dramatic savings will be achieved. For example, by specifying a U-value of 1.4 to 1.5, the net savings are increased by approximately 70%; by specifying a U-value of 0.8 to 0.9 the additional savings are more than doubled. Remember this applies EVERY year the rooflight is in place. By their necessity the figures are indicative to establish a starting point for discussion with the client.

#### Hambleside Danelaw Insulator Rooflights

ELEMENTAL U VALUE	PRODUCT TYPE	ΣA x U VALUE ±kWh/°C	ENERGY SAVING kWh pa FOR BUILDING	SAVING IN Te CO <sub>2</sub> (grid electric)	POTENTIAL SAVINGS (£pa** Including service charge)
1.6 (FAIRS)	INSULATOR	2400	148230	63.81	£17,064
1.4 - 1.5	INSULATOR	2100	165870	71.32	£19,075
1.1 - 1.2	INSULATOR	1800	183330	78.83	£21,082
0.8 - 0.9	INSULATOR	1200	218250	93.85	£25,098

#### Comparison with uninsulated units, the Building Regulations and polycarbonate

3.3	Uninsulated GRP	4950	0	0	£0
<b>2.2</b>	<b>Regulation Minimum</b>	<b>3300</b>	<b>96030</b>	<b>41.29</b>	<b>£11,043</b>
2	Polycarbonate	3000	113490	48.8	£13,051

\* Energy saving equals the differential between rooflight values, divided by kWh, multiplied by degree days, multiplied by 24 hours.

\*\* This table is provided by Hambleside as an approximate UK guide only and is based on current day electric grid heating costs. Actual energy savings will be affected by factors such as varying energy costs charged by the energy providers and any regional or national variations in tariffs or duties. Other energy sources may also effect the calculations. These figures are based on Summer 2006 electric energy costs.

\*\*\* These figures have been calculated by reference to a report commissioned by the Company from Building Sciences Limited.