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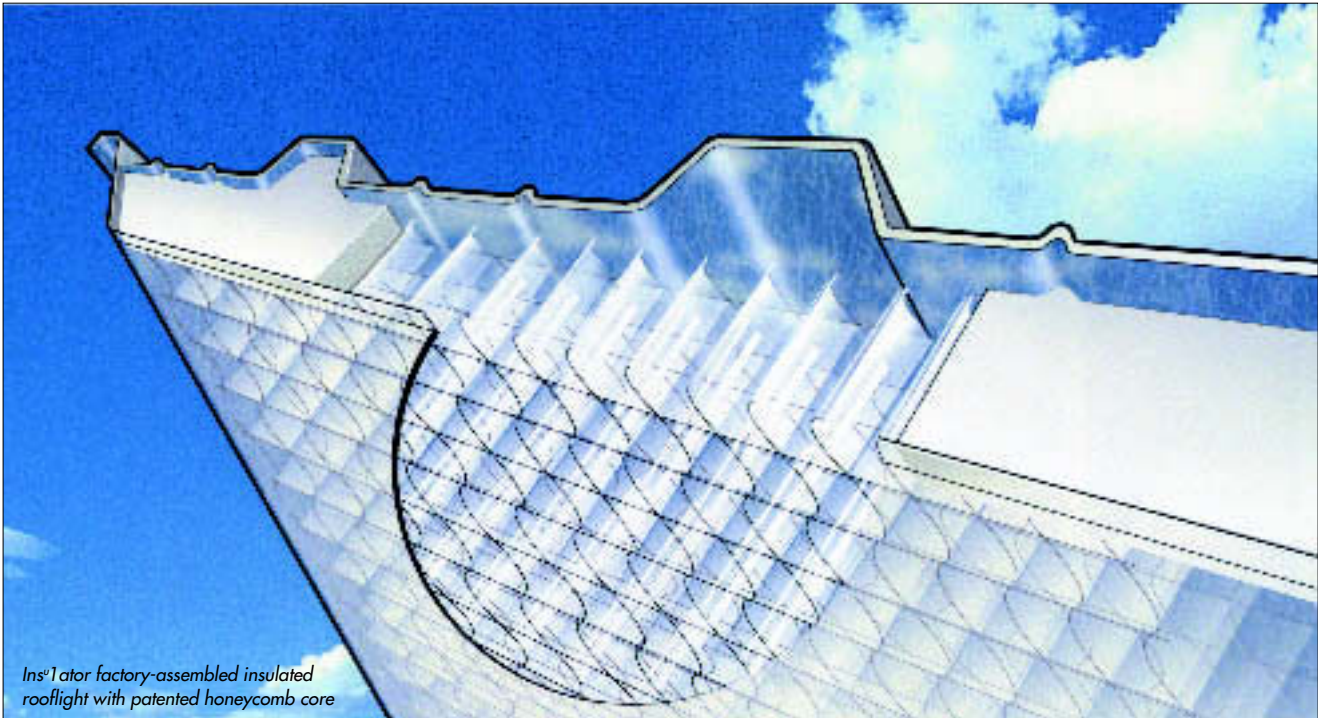
**Agrément
Certificate
No 03/3996**

Designated by Government
to issue
European Technical
Approvals

INS^UTATOR IN-PLANE GRP ROOFLIGHTS

Lucarnes au même plan
Dachoberlichten in der gleichen Ebene

Product




Ins^UTator factory-assembled insulated rooflight with patented honeycomb core

- THIS CERTIFICATE RELATES TO INS^UTATOR⁽¹⁾ IN-PLANE GRP ROOFLIGHTS, CONSISTING OF A FACTORY-PRODUCED, GLASS-FIBRE REINFORCED POLYESTER RESIN, PROFILED SHEET, FEATURING AN INTERNAL TRANSPARENT HONEYCOMB INSULATING CORE ELEMENT. THE ROOFLIGHTS ARE MECHANICALLY FIXED ON SITE.
 - The rooflights are for use in pitched roofs of profiled sheet and are designed to admit controlled daylight into non-domestic and commercial buildings.
 - It is essential that the rooflights are installed and used in accordance with the relevant clauses of the Certificate holder's instructions.
- (1) Registered trademark.

Regulations — Detail Sheet 1

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

 The Secretary of State has agreed with the British Board of Agrément the requirements of the Building Regulations to which rooflights can contribute in achieving compliance. In the opinion of the BBA, Ins^UTator In-plane GRP Rooflights, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: A1	Loading
Comment:	When installed in accordance with the provisions of this Certificate, Ins ^U Tator in-plane GRP Rooflights will have sufficient strength and stiffness to sustain the design load. See sections 7 and 8 of these Front Sheets and section 4 of Detail Sheet 3.
Requirement: B2(1)	Internal fire spread (linings)
Comment:	See sections 10.1 to 10.4 of these Front Sheets.
Requirement: B4(2)	External fire spread
Comment:	See sections 10.1 to 10.4 of these Front Sheets.
Requirement: C4	Resistance to weather and ground moisture
Comment:	When installed in accordance with this Certificate, the rooflights will not adversely affect the resistance of the roof to the passage of moisture.

continued

continued

continued

These Front Sheets must be read in conjunction with the accompanying Detail Sheets, which provide information relating to specific rooflights.

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Requirement:	L2	Buildings other than dwellings
Comment:		When demonstrating compliance with Requirement L2 the U values given in sections 3.1 and 3.2 of Detail Sheet 4 may be used for the Ins ^u lator in-plane Factory Assembled Insulator Rooflights.
Requirement:	Regulation 7	Materials and workmanship
Comment:		Ins ^u lator in-plane GRP Rooflights are acceptable when used in accordance with this Certificate. See sections 4.1 and 4.2 of Detail Sheets 2 and 4 and sections 5.1 and 5.2 of Detail Sheet 3.

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



In the opinion of the BBA, Ins^ulator In-plane GRP Rooflights, 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
Standards:	B2.1 and B2.2	Selection and use of materials, fittings, and components, and workmanship
Comment:		The product is acceptable when used in accordance with this Certificate. See sections 4.1 and 4.2 of Detail Sheet 2 and 4 and sections 5.1 and 5.2 of Detail Sheet 3.
Regulation:	11	Structure
Standard:	C2.1	Stability
Comment:		When installed in accordance with the provisions of this Certificate, Ins ^u lator in-plane GRP Rooflights will have sufficient strength and stiffness to sustain design loads. See sections 7 and 8 of these Front Sheets and section 4 of Detail Sheet 3.
Regulation:	12	Structural fire precautions
Standard:	D7.1	Fire spread on internal linings — Principles
Standard:	D9.1	Fire spread from an adjoining building
Comment:		The GRP sheets used externally in the rooflights have a reaction to fire performance as indicated in sections 10.1 to 10.4 of these Front Sheets.
Regulation:	17	Resistance to moisture
Standard:	G3.1	Resistance to precipitation — Resistance to precipitation
Comment:		When installed in accordance with the provisions stated in this Certificate, the rooflights will not adversely affect the resistance of the roof to the passage of moisture.
Regulation:	18	Resistance to condensation
Standard:	G4.2	Condensation — Surface condensation
Comment:		The product is acceptable.
Regulation:	22	Conservation of fuel and power
Standard:	J8.1	Buildings in purpose groups 2 to 7
Comment:		The U values shown in sections 3.1 and 3.2 of Detail Sheet 4 should be used when showing compliance with the requirement of these Standards for the Ins ^u lator Factory Assembled Insulated Rooflights.
Regulation:	27	Miscellaneous hazards
Standard:	P2.4	Danger from accident — Cleaning of windows and rooflights
Standard:	P2.8	Danger from accident — Roof access
Comment:		Suitable roof access must be provided as described in the Standards or the deemed-to-satisfy provisions. The rooflights are not designed to provide access.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Ins^ulator In-plane GRP Rooflights, 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 this Certificate. See sections 4.1 and 4.2 of Detail Sheets 2 and 4 and sections 5.1 and 5.2 of Detail Sheet 3.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		When installed in accordance with the provisions stated in this Certificate, the rooflights will not adversely affect the resistance of the roof to the passage of moisture.

continued

continued

Regulation:	D1	Stability
Comment:		When installed in accordance with the provisions of this Certificate, the product will have sufficient strength and stiffness to sustain the design loads. See sections 7 and 8 of these Front Sheets and section 4 of Detail Sheet 3.
Regulation:	E3	Internal fire spread – Linings
Comment:		See sections 10.1 to 10.4 of these Front Sheets.
Regulation:	E5	External fire spread
Comment:		See sections 10.1 to 10.4 of these Front Sheets.
Regulation:	F2	Building fabric
Comment:		The U values shown in sections 3.1 and 3.2 of Detail Sheet 4 should be used to show compliance with this Regulation for the Ins ^u tator Factory Assembled Insulated Rooflights.

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: 9 *Strength and stability* (9.1) of these Front Sheets; 2 *Delivery and site handling* of Detail Sheets 2, 3 and 4; 5 *Installation* (5.2) of Detail Sheets 2 and 4; 4 *Strength and stability* of Detail Sheet 3 and 6 *Installation* (6.2) of Detail Sheet 3.

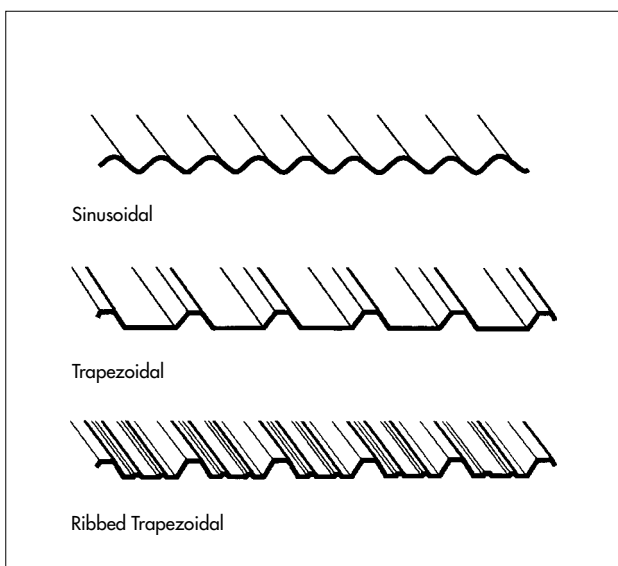
Design Data

5 General

5.1 Ins^utator In-plane GRP Rooflights are normally used in conjunction with roofing systems utilising profiled sheet materials. Rooflights are at least double skinned with an internal transparent honeycomb insulating core element to reduce heat loss and minimize condensation. These can be site assembled or factory manufactured units.

5.2 All sheets are manufactured in sinusoidal, trapezoidal, or ribbed trapezoidal formats to match most fibre-cement, aluminium, and steel profiles. Flat sheet can also be supplied (see Figure 1).

Figure 1 Various formats of Ins^utator in-plane panels



5.3 Sheets are supplied in lengths to suit customer requirements. Widths conform to those of the metal profile sheets to be matched.

5.4 StepSafe and Contour sheets are supplied in a natural translucent finish as standard.

5.5 Standard fixings and flashing accessories are available from the Certificate holder's nominated stockists. These are not covered by this Certificate.

Primary fixings (not covered by this Certificate)

5.6 Primary fixings should have an adequate strength to resist the design load, imposed load and wind loading and maintain weathertightness. Also, where required by the cladding and support design, to provide adequate lateral restraint to substructure elements such as purlins and spacers. In addition, they may be required to accommodate some thermal movement in the direction of the profiles. This can be achieved by oversizing fixing holes, by elastic displacement, or purlins and spacers. Primary fixings are divided into two groups, rigid fixings and non-rigid fixings.

5.7 It is essential that the watertightness of fixings with fasteners penetrating the sheeting should remain effective when the sheeting is subjected to the maximum inward imposed loading including wind. Under such loads, the sheeting and any insulating substrate will compress and thereby tend to loosen the seal in the fastener, increasing the risk of water penetration. It is therefore important to ensure that the sheeting, substrate, and fastener including sealing washer, can provide adequate performance under these conditions.

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5.8 Additional security can be obtained by the use of fasteners, which secure the sheeting against inward movement as well as against outward loads.

5.9 Primary fixings should be positioned along and secured to the lines of purlins, sheeting rails or spacers. End laps in profiled sheeting should be arranged to occur over purlin, sheeting rail or spacer lines and secured by the same primary fixings.

5.10 Along the purlin, sheeting rail or spacer lines, the primary fixings should be spaced so as to maintain a tight end lap, resist the wind suction loads on the cladding and fasteners, in accordance with the manufacturer's instructions and avoid vibration of the sheeting.

5.11 Fasteners for primary fixings should preferably be fixed through the troughs. Crown fixings are sometimes used but, because of their longer lengths, they are at greater risk of not being inserted perpendicularly to the crown and thus, may adversely affect the effectiveness of the seal. There is also a greater risk of the profile being distorted in case of the overtightening to match the shape of the purlin or sheeting rail.

Secondary fixings (not covered by this Certificate)

5.12 The main function of secondary fixings is to maintain a tight lap and seal, but they are also required to transfer concentrated load to adjacent sheets.

5.13 When required, fasteners for secondary fixings, or stitch fasteners should be positioned at side laps on the crown for roof cladding, depending on the profile. The fastener and method of installation should be able to accommodate and compress a seal in the lap joint where a seal is used. The spacing of stitch fasteners depends on the thickness and the presence, or otherwise, of a sealant in the joint, but should generally be not more than 450 mm apart.

5.14 When fixing into steel or non-metallic materials, all fixings should be of stainless steel. When fixing into or through aluminium, the Certificate holder recommends obtaining specialist advice from either the fastener supplier or manufacturer.

6 Weathertightness

6.1 To achieve weathertightness it is essential that the joints and fittings are correctly installed as described in the manufacturer's literature.



6.2 Tests confirm that the rooflights will adequately resist the passage of moisture to

the inside of the building and so meet the requirements of:

England and Wales

Approved Document C4, Section 5.1

Scotland

Regulation 17, Standard G3.1

Northern Ireland

Regulation C4.

6.3 The products are impervious to water and, when used in the systems described, will give a weathertight roofing capable of accepting minor structural movements without damage.

7 Resistance to wind loading



The rooflights are designed to have adequate resistance to wind loads calculated in accordance with BS 6399-2 : 1995.

8 Resistance to snow loading



The rooflights are designed to support a distributed load of 1.5 kNm⁻². The magnitude of the actual snow load imposed will depend upon a number of factors, such as height above sea level, geographical location, roof arrangement, type and configuration of rooflights. Therefore, it is recommended that BS 6399-3 : 1988 is used to calculate actual snow load when the rooflight is used in situations where a load greater than 1.5 kNm⁻² can be expected.

9 Strength and stability

9.1 The GRP rooflight material has a good resistance to impact from soft bodies, such as a person slipping on the roof. Tests on typical rooflight samples showed that an impactor bag with an impact energy of 530J gave a category B non-fragile rating according to document ACR(M)001 : 2000.

9.2 The GRP rooflight material has a good resistance to impact from hard bodies, such as hailstones, or impacts due to vandalism. Tests on typical rooflight samples showed that an impact energy of 5J caused no damage when applied at various points on the rooflights.

10 Properties in relation to fire



10.1 The sheet products are a thermo set material and available in grades SAB3, SAA1 and SAA0. Fire rating identification is by means of coloured thread inserted into the product during manufacture.

Table 1 Identification thread colours according to fire rating

	BS 476-3	BS 476-7	Identification thread
SAA0	AA ⁽¹⁾	Class 1	Blue
SAA1	AA ⁽¹⁾	Class 1	Green
SAB3	AB ⁽²⁾	Class 3	Red

(1) AA — Specimens which have not been penetrated by fire within one hour and which there is no spread of flame.

(2) AB — Specimens which have not been penetrated by fire within one hour and which there is not more than 533 mm spread of flame.

10.2 The GRP SAA0 sheets tested in accordance with BS 476-6 : 1989 have an index of performance not exceeding 12 and a sub-index not exceeding 6. Therefore, they can be regarded as a Class 0 material in terms of the Building Regulations 2000 (as amended) (England and Wales), The Building Standards (Scotland) Regulations 1990 (as amended) and The Building Regulations (Northern Ireland) 2000.

10.3 Guidance on the instructions for use of these products is given in the national Building Regulations:

England and Wales

Approved Document B, Tables 11 and 18

Scotland

Standards D7.1 and D9.1

Northern Ireland

Technical Booklet E, Tables 2.2 and 4.8.

10.4 The product must not be used where the original roof surface is used as an escape route in case of a fire, or is below the level of an existing fire escape.

Bibliography

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

BS 476-6 : 1989 *Fire tests on building materials and structures — Method of test for fire propagation for products*

BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

BS 6399-2 : 1995 *Loading for buildings — Code of practice for wind loads*

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

ACR(M)001 : 2000 *Test For Fragility of Roofing Assemblies*

Conditions of Certification

11 Conditions

11.1 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) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (d) is copyright of the BBA.

11.2 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, shall be construed as references to such publication in the form in which it was current at the date of this Certificate.

11.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabricating process(es) thereof:

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

(b) continue to be checked by the BBA or its agents; and

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

11.4 In granting this Certificate, the BBA makes no representation as to:

- (a) the presence or absence of any patent 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 nature of individual installations of the product, including methods and workmanship.

11.5 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.



In the opinion of the British Board of Agrément, Insulator In-plane GRP Rooflights are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 03/3996 is accordingly awarded to Hambleside Danelaw Limited.

On behalf of the British Board of Agrément

Date of issue: 31st March 2003

Chief Executive

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British Board of Agrément

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For technical or additional information,
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front page).
For information about the Agrément
Certificate, including validity and
scope, tel: Hotline 01923 665400,
or check the BBA website.



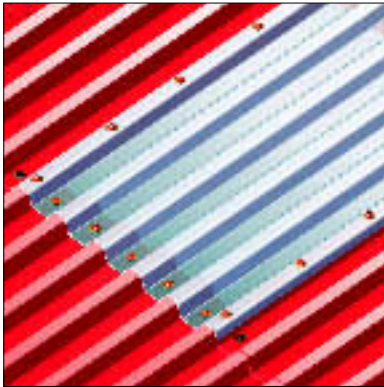
Hambleside Danelaw Limited

Certificate No 03/3996

CONTOUR INSULATOR IN-PLANE GRP
ROOFLIGHTS

DETAIL SHEET 2

Product



• THIS DETAIL SHEET REFERS TO CONTOUR INSULATOR⁽¹⁾ IN-PLANE GRP ROOFLIGHTS, CONSISTING OF A FACTORY-PRODUCED, GLASS-FIBRE REINFORCED POLYESTER RESIN, PROFILED SHEET, FEATURING AN INTERNAL TRANSPARENT HONEYCOMB INSULATING CORE ELEMENT. THE ROOFLIGHT UNITS ARE MECHANICALLY FIXED AND JOINTED ON SITE.

- The rooflights are for use on pitched roofs of profiled sheet and are designed to admit controlled daylight into non-domestic and commercial buildings.
- It is essential that the rooflights are installed and used in accordance with the relevant clauses of the Certificate holder's instructions.

(1) Registered trademark.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the system's position regarding the Building Regulations, general information relating to the system, and the Conditions of Certification.

Technical Specification

1 Description

1.1 The Contour Insulator In-plane GRP Rooflights profiled sheeting is manufactured on a continuous process and complies with BS 4154-1 : 1985 using thermosetting polyester resins, containing curing agents, light stabilisers and glass-fibre rovings or glass-fibre mat.

1.2 Surface protection is provided as standard to the weather sheets by Melinex 389 film for enhanced UV protection.

1.3 The insulation of the rooflights is enhanced by means of an internal transparent honeycomb core, featuring a capping sheet to curtail the movement of air within the honeycomb.

1.4 The rooflights are mechanically fixed to the roof construction using fastener types as recommended by the Certificate holder.

1.5 The GRP is available in four standard product glass weights, 1.83 kgm⁻², 2.44 kgm⁻², 3.06 kgm⁻² and 3.66 kgm⁻² and with three grades of fire retardancy.

1.6 Ancillary items, not covered by this Certificate, but required for use with the system include:

Sealing tape — a butyl sealant tape for creating a waterproof seal.

1.7 The raw materials are subject to a quality control system.

2 Delivery and site handling

2.1 Rooflight products are generally supplied on pallets. The GRP sheets should be stored on flat clean battens at 1 metre centres. If stored in outside conditions, the sheets should be protected from the weather by covering with waterproof covers. Sheets stored outside without protection could be damaged, and entrapped water will cause the sheets to discolour in prolonged sunlight. The sheets should be checked regularly whilst stored to ensure that moisture has not penetrated the protective cover.

2.2 The honeycomb core and cap assembly is supplied in cartons. The cartons should not be opened on site until the insulating material is required for use. Insulating material removed from the carton should be stored flat and care taken to protect the honeycomb from damage.

Design Data

3 Thermal properties

The thermal properties of site-assembled rooflights are outside the scope of this Detail Sheet, due to the variety of configurations possible in use. However, guidance is available from the Certificate holder, including test data from a European accredited laboratory, although the results fall outside the scope of this Detail Sheet due to the test methods used.

4 Durability

4.1 On the basis of previous knowledge of the constituent materials and accelerated laboratory tests, the GRP material component of the system can be expected to perform satisfactorily for a period of at least 25 years.

4.2 Some slight colour change of the GRP material due to prolonged exposure to UV radiation, may occur over the life of the product but this should not adversely effect the transmission of light in most applications.

Installation

5 General

5.1 Application must be carried out in strict accordance with the relevant clauses of the Certificate holder's instructions and this Certificate (see Figures 1, 2 and 3).

5.2 The product should not be laid in high winds as it is particularly hazardous to handle rooflights in windy conditions.

Figure 1 Fixing detail for site-assembled rooflights (across slope)

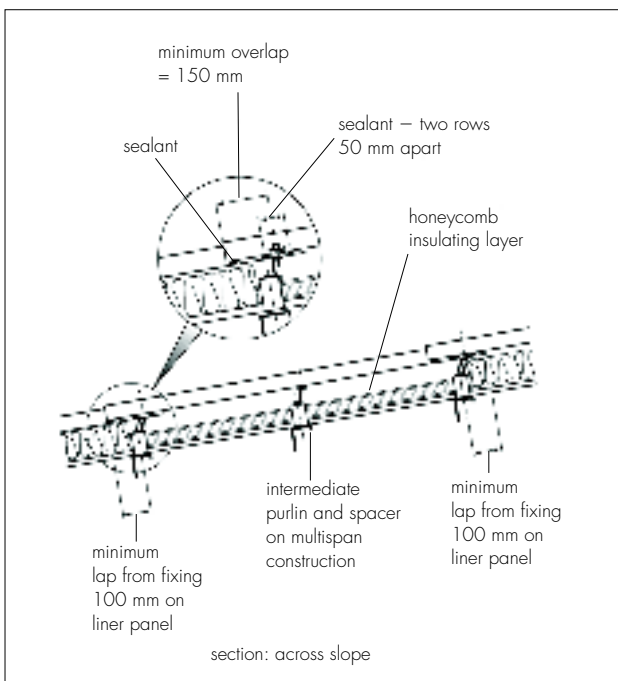


Figure 2 Fixing detail for site-assembled rooflights — side laps, underlap/overlap

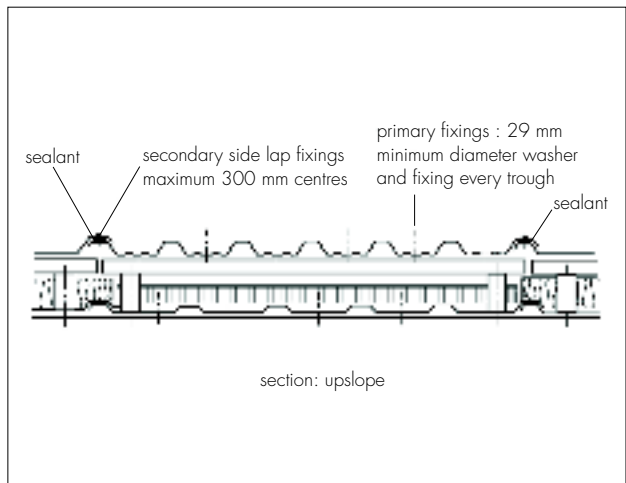
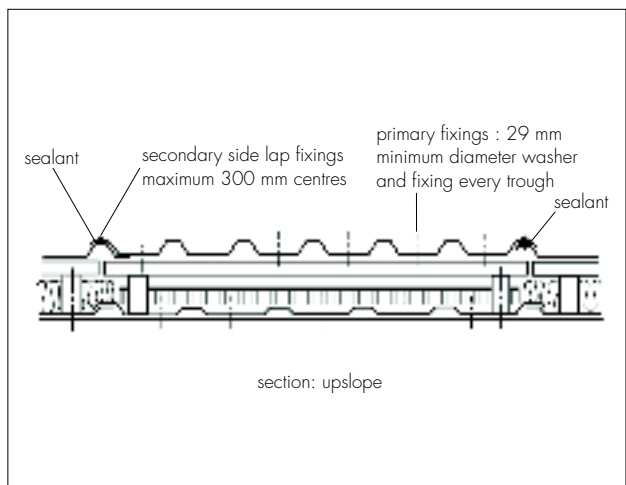


Figure 3 Fixing detail for site-assembled rooflights — side laps, overlap/overlap



5.3 The GRP sheets have different properties to fibre cement, steel and aluminium sheets and they do not necessarily have the same span capabilities (see Table 1).

Table 1 Guide to the recommended maximum span in metres between purlins for Contour top sheet

Depth of profile (mm)	Panel weights (kgm ⁻²)	
	1.83	2.44+
Purlin centres (m)		
15 to 20	1.25	1.50
20 to 25	1.50	1.75
25 to 30	1.60	1.85
30 to 35	1.80	2.05
Over 35	2.00	2.25

6 Procedure

6.1 The product should be fastened to the steelwork structure in every trough of the profile using self-drilling and self-tapping fixings with minimum 29 mm self-sealing washers. Profile configurations with wide troughs will need two fixings per trough. Fixings are generally recommended to be manufactured in stainless steel.

6.2 Side laps should be stitched at maximum 300 mm centres and should be sealed with one run of 6 mm by 5 mm cross-linked sealant (butyl type) or equivalent.

6.3 Head and tail laps should be sealed using two strips of 6 mm by 5 mm, cross-linked sealant (butyl type) 50 mm apart and either side of the line fasteners with an additional strip of sealant 6 mm by 5 mm or 8 mm diameter, 10 mm from the exposed edge of the sheet at both head and tail. Alternatively, one strip of 18 mm by 4 mm U-section sealant, placed centrally along the line of fasteners, with additional strips of 8 mm diameter sealant, placed 10 mm from the edge of the sheet laps to both sides of the main sealant strip, may be used.

6.4 The honeycomb core should be laid into position on top of the liner panel and is designed to take up any fluctuations in the internal measurements of the rooflights.

Technical Investigations

The following is a summary of the technical investigations carried out on Contour Ins^ulator In-plane GRP Rooflights.

7 Tests

7.1 Samples of the product and components of the system were obtained from the manufacturer for the purpose of testing. Tests performed by the BBA and other UKAS accredited laboratories on the GRP rooflight material, which give the typical results for the materials, are summarised in Table 2.

Table 2 Physical properties — general

Test (units)	Method ⁽¹⁾	Mean results	
		1.83 kgm ⁻² sheet	2.44 kgm ⁻² sheet
Density (gcm ⁻³)	BS 2872-6 : 620A	1.5	—
Hard body impact (5 joules)	MOAT No 53	pass	—
Fixings pull-through (max load N)	BBA internal test specification T1/O7 ⁽²⁾	835	874
control UV aged ⁽³⁾		570	—
Light transmittance ⁽⁴⁾ (T)	DIN 5036-3	0.58 ± 0.04	—
Resin : glass ratio (% resin)	BS 2782-10 : 1006	69.8	72.1

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) BBA Internal Test Specification T1/O7 *Method for the determination of the effects of nailing and the resistance to nail pull-through fitted with a 16 mm washer*.

(3) UV aged 250 light hours in accordance with BS EN ISO 4892-3 : 2000 using QUV 313 lamps at a cycle of 4 hours UV at 50°C and 4 hours condensation at 50°C.

(4) Contour 2.44 kgm⁻²/1.83 kgm⁻² liner 80 mm honeycomb.

7.2 Tests on the resistance to snow loading and point loading were carried out, and found to be satisfactory.

7.3 A resistance to staining test was carried out using a number of staining agents, the results of which are summarised in Table 3.

Table 3 Resistance to staining

Stain ⁽¹⁾	Cleaning method	Result
Wild berries	detergent solution	no stain
Bitumen	scraped/white spirit	no stain
Water-based paint	scraped	no stain
Spirit-based paint	scraped	no stain
Charcoal	detergent solution	no stain
Cigarette butt	detergent solution	no stain
Chlorophyll	detergent solution	no stain
Silicone sealant	cut off with knife	thin layer remaining
Mortar/lime mix	detergent solution	no stain

(1) Stain was applied for one week.

7.4 Tests for soft body impact (fragility of roofing assemblies) to ACR(M)001 : 2000 were carried out on Contour 1.83 kgm⁻² top sheet and achieved a fragility rating of Category B non-fragile assembly. Higher weight Contour sheets will achieve at least Category B non-fragile assembly.

8 Investigations

8.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

8.2 Installation was examined in the preparation of test specimens to establish the practicability of the materials used.

8.3 An assessment was made of indicative fire data to BS 476-3 : 1958 and BS 476-7 : 1997.

Bibliography

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

BS 476-6 : 1989 *Fire tests on building materials and structures — Method of test for fire propagation for products*

BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

BS 2782-6 : Methods 620A to 620D : 1991 *Methods of testing plastics — Dimensional properties — Determination of density and relative density of non-cellular plastics*

BS 2782-10 : Method 1006 : 1978 *Methods of testing plastics — Glass reinforced plastics — Determination of volatile matter and resin content of synthetic resin impregnated textile glass fabric*

BS 4154-1 : 1985 *Corrugated translucent sheets made from thermo setting polyester resin (glass fibre reinforced) — Specification for material and performance requirements*

BS EN ISO 4892-3 : 2000 *Plastics — Methods of exposure of laboratory light sources — Fluorescent UV lamps*

DIN 5036-3 : 1979 *Radiometric and photometric properties of materials — Methods of measurements for photometric and spectral radiometric characteristics*

MOAT No 53 : 1989 *UEAtc guide for the Agrément of continuous strip rooflights*

ACR(M)001 : 2000 *Test for fragility of roofing assemblies [second edition]*



On behalf of the British Board of Agrément

Date of issue: 31st March 2003

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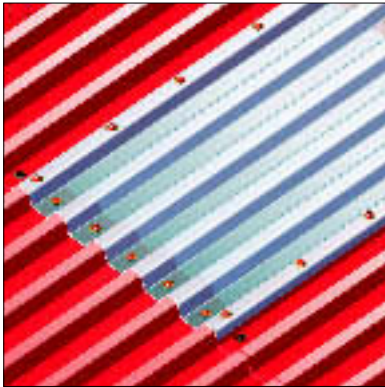
Chief Executive



Hambleside Danelaw Limited

STEPSAFE INSULATOR GRP ADVANCED POLYESTER COMPOSITE (APC) IN-PLANE ROOFLIGHTS

Product



- THIS DETAIL SHEET REFERS TO STEPSAFE INSULATOR⁽¹⁾ GRP ADVANCED POLYESTER COMPOSITE (APC)⁽¹⁾ IN-PLANE ROOFLIGHTS, CONSISTING OF A FACTORY-PRODUCED, GLASS-FIBRE REINFORCED POLYESTER RESIN PROFILED SHEET, FEATURING AN INTERNAL TRANSPARENT HONEYCOMB INSULATING CORE ELEMENT. THE ROOFLIGHT UNITS ARE MECHANICALLY FIXED AND JOINTED ON SITE.
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- It is essential that the rooflights are installed and used in accordance with the relevant clauses of the Certificate holder's instructions.

(1) Registered trademark.

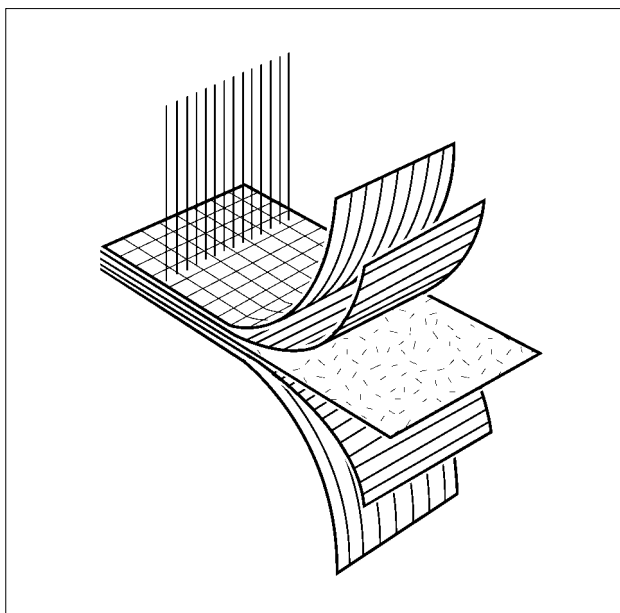
This Detail Sheet must be read in conjunction with the Front Sheets, which give the system's position regarding the Building Regulations, general information relating to the system, and the Conditions of Certification, respectively.

Technical Specification

1 Description

1.1 The StepSafe Insulator GRP Advanced Polyester Composite (APC) In-plane Rooflights consist of polyester profiled sheet, utilising multi-axial reinforcing fibres, which are stitched together with a light polyester thread. The multi-axial composite sections are specifically designed for strength (see Figure 1).

Figure 1 StepSafe is an advanced polyester composite profile sheet, based on multi-axial technology



1.2 Surface protection is provided as standard to the weather sheets by Melinex 389 film for enhanced UV protection.

1.3 The insulation of the rooflight is enhanced by means of an internal transparent honeycomb core, featuring a capping sheet to curtail the movement of air within the honeycomb.

1.4 The rooflights are mechanically fixed to the roof construction using fastener types as recommended by the Certificate holder.

1.5 The GRP is available in two standard product glass weights, 2.22 kgm⁻² and 3.97 kgm⁻² and with three grades of fire retardancy. The 3.97 kgm⁻² glass weight is standard. The 2.22 kgm⁻² is a lighter grade primarily used for liner panel assemblies and has not been assessed within the scope of this Certificate.

1.6 Ancillary items, not covered by this Detail Sheet, but required for use with the system include: Sealing tape — a butyl sealant tape for creating a weatherproof seal.

1.7 The raw materials are subject to a quality control system.

2 Delivery and site handling

2.1 Rooflight products are generally supplied on pallets. The GRP sheets should be stored on flat, clean battens at 1 metre centres. If stored in outside conditions the sheets should be protected from the weather by covering with waterproof covers. Sheets stored outside without protection

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could be damaged, and entrapped water will cause the sheets to discolour in prolonged sunlight. The sheets should be checked regularly whilst stored to ensure that moisture has not penetrated the protective cover.

2.2 The honeycomb core and cap assembly is supplied in cartons. The cartons should not be opened on site until the insulating material is required for use. Insulating material removed from the carton should be stored flat and care taken to protect the honeycomb from damage.

Design Data

3 Thermal properties

The thermal properties of site-assembled StepSafe Ins^ulator GRP Advanced Polyester Composite (APC) In-plane Rooflights are outside the scope of this Detail Sheet, due to the variety of configurations possible in use. However, guidance is available from the Certificate holder, including test data from an European accredited laboratory, although the results fall outside the scope of this Detail Sheet due to the test methods used.

4 Strength and stability



The rooflights are designed to support an imposed load of 1.8 kN when correctly installed. Although StepSafe is designed to support the accidental load of a falling person, it is not recommended that these rooflights are walked on and reasonable care should be taken to ensure damage to the rooflight, sealant and fixings is not sustained.

5 Durability



5.1 On the basis of previous knowledge of the constituent materials and accelerated laboratory tests, the GRP material component of the system can be expected to perform satisfactorily for a period of at least 30 years.

5.2 Some slight colour change of the GRP material may occur over the life of the product but this should not adversely effect the transmission of light.

Installation

6 General

6.1 Application must be carried out in strict accordance with the relevant clauses of the Certificate holder's instructions and this Certificate (see Figures 2, 3 and 4).

Figure 2 Fixing detail for site-assembled rooflights (across slope)

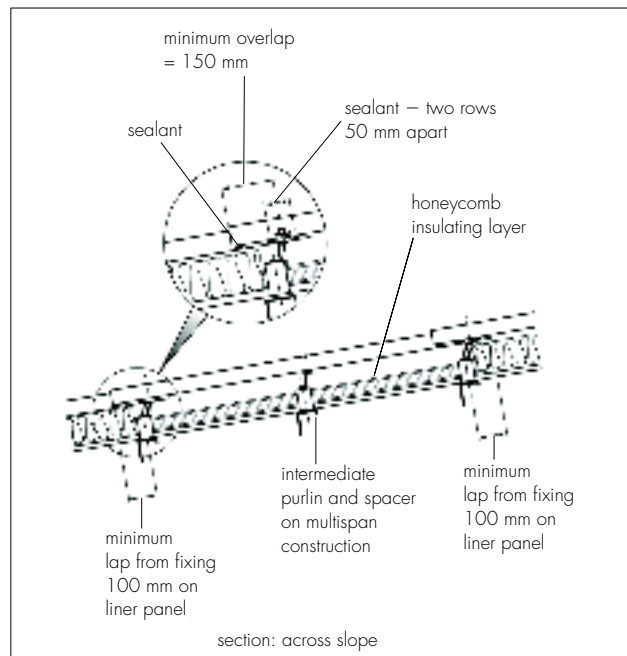


Figure 3 Fixing detail for site-assembled rooflights — side laps, underlap/overlap

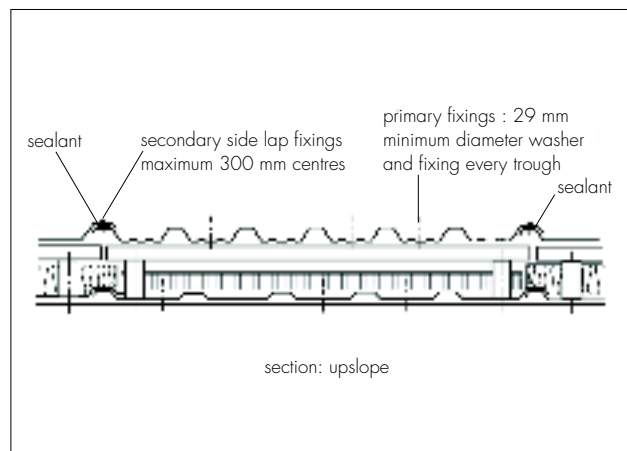
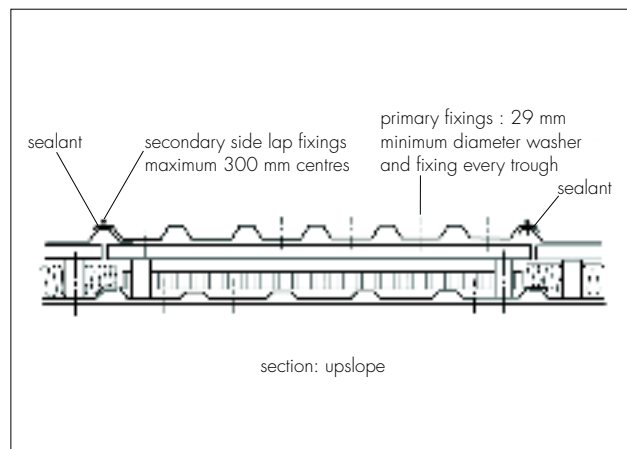


Figure 4 Fixing detail for site-assembled rooflights — side laps, overlap/overlap



6.2 The system should not be laid in high winds as it is particularly hazardous to handle rooflights in windy conditions.

6.3 The APC sheets have different properties to fibre cement, steel and aluminium sheets and they do not necessarily have the same span capabilities (see Table 1).

Table 1 Guide to the recommended maximum span in metres between purlins for StepSafe top sheets

Depth of profile (mm)	Panel weight 3.97 kgm ⁻²
	Purlin centres (m)
15 to 20	1.60
20 to 25	2.40
25 to 30	2.80
30 to 35	2.90
Over 35	3.00

7 Procedure

7.1 The product should be fastened to the steelwork structure in every trough of the profile using self-drilling and self-tapping fixings with minimum 29 mm diameter self-sealing washers. Profile configurations with wide troughs will need two fixings per trough. Fixings are generally recommended to be manufactured in stainless steel.

7.2 Side laps should be stitched at maximum 300 mm centres and should be sealed with one run of 6 mm by 5 mm cross-linked sealant (butyl type) or equivalent.

7.3 Head and tail laps should be sealed using two strips of 6 mm by 5 mm, cross-linked sealant (butyl type) 50 mm apart and either side of the line fasteners with an additional strip of sealant 6 mm by 5 mm or 8 mm diameter, 10 mm from the exposed edge of the sheet at both head and tail. Alternatively, one strip of 18 mm by 4 mm U-section sealant, placed centrally along the line of fasteners, with additional strips of 8 mm diameter sealant, placed 10 mm from the edge of the sheet laps to both sides of the main sealant strip, may be used.

7.4 The honeycomb core should be laid into position on top of the liner panel and is designed to take up any fluctuations in the internal measurements of the rooflights.

Technical Investigations

The following is a summary of the technical investigations carried out on StepSafe Ins^ulator GRP Advanced Polyester Composite (APC) In-plane Rooflights.

8 Tests

8.1 Samples of the product and components of the system were obtained from the manufacturer for the purpose of testing. Tests performed by the BBA and other UKAS accredited laboratories on

the APC rooflights material, are summarised in Table 2.

Table 2 Physical properties — general

Test (units)	Method ⁽¹⁾	Mean results
Density (gcm ⁻³)	BS 2872-6 : 620A	1.7
Hard body impact (5 joules)	MOAT No 53	pass
Fixings pull-through (max load N) control	BBA internal test specification T1/O7 ⁽²⁾	2183
Light transmittance ⁽³⁾ (τ)	DIN 5036-3	0.36 ± 0.04
Resin : glass ratio (% resin)	BS 2782-10 : 1006	48.3

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) BBA Internal Test Specification T1/O7 *Method for the determination of the effects of nailing and the resistance to nail pull-through fitted with a 16 mm washer*.

(3) StepSafe 3.97 kgm⁻² top/1.83 kgm⁻² liner 80 mm honeycomb.

8.2 Tests on the resistance to snow loading and point loading were carried out, and found to be satisfactory.

8.3 A resistance to staining test was carried out using a number of staining agents, the results of which are summarised in Table 3.

Table 3 Resistance to staining

Stain ⁽¹⁾	Cleaning method	Result
Wild berries	detergent solution	no stain
Bitumen	scraped/white spirit	no stain
Water-based paint	scraped	no stain
Spirit-based paint	scraped	no stain
Charcoal	detergent solution	no stain
Cigarette butt	detergent solution	no stain
Chlorophyll	detergent solution	no stain
Silicone sealant	cut off with knife	thin layer remaining
Mortar/lime mix	detergent solution	no stain

(1) Stain was applied for one week.

8.4 Tests for soft body impact (fragility of roofing assemblies) to ACR(M)001 : 2000 were not tested on this product, but results are expected to achieve at least Category B non-fragile assembly.

9 Investigations

9.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

9.2 Installation was examined in the preparation of test specimens to establish the practicability of the materials used.

9.3 An examination was made of indicative fire data to BS 476-3 : 1958 and BS 476-7 : 1997 and an assessment made.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*
BS 476-6 : 1989 *Fire tests on building materials and structures — Method of test for fire propagation for products*
BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

BS 2782-6 : Methods 620A to 620D : 1991 *Methods of testing plastics — Dimensional properties — Determination of density and relative density of non-cellular plastics*
BS 2782-10 : Method 1006 : 1978 *Methods of testing plastics — Glass reinforced plastics — Determination of volatile matter and resin content of synthetic resin impregnated textile glass fabric*

DIN 5036-3 : 1979 *Radiometric and photometric properties of materials — Methods of measurements for photometric and spectral radiometric characteristics*

MOAT No 53 : 1989 *UEAtc guide for the Agrément of continuous strip rooflights*

ACR(M)001 : 2000 *Test for fragility of roofing assemblies [second edition]*



On behalf of the British Board of Agrément

Date of issue: 31st March 2003

Chief Executive



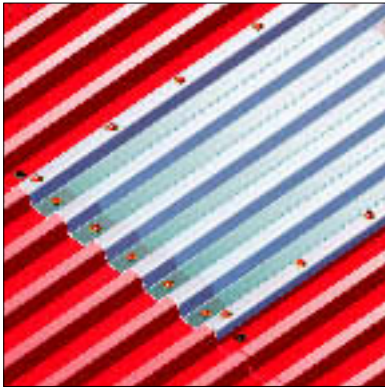
Hambleside Danelaw Limited

Certificate No 03/3996

FACTORY ASSEMBLED INSULATOR ROOFLIGHTS (FAIRS)

DETAIL SHEET 4

Product



- THIS DETAIL SHEET REFERS TO FACTORY ASSEMBLED INSULATOR⁽¹⁾ ROOFLIGHTS (FAIRS), CONSISTING OF A FACTORY-PRODUCED GLASS-FIBRE REINFORCED POLYESTER RESIN, CONTOURED SHEET, MECHANICALLY FIXED, AND JOINTED IN HOUSE TO MATCH MOST COMPOSITE PANEL SYSTEMS.

- The rooflights are for use on pitched roofs of profiled sheet and are designed to admit controlled daylight into non-domestic and commercial buildings.

- It is essential that the rooflights are installed and used in accordance with the relevant clauses of the Certificate holder's instructions.

(1) Registered trademark.

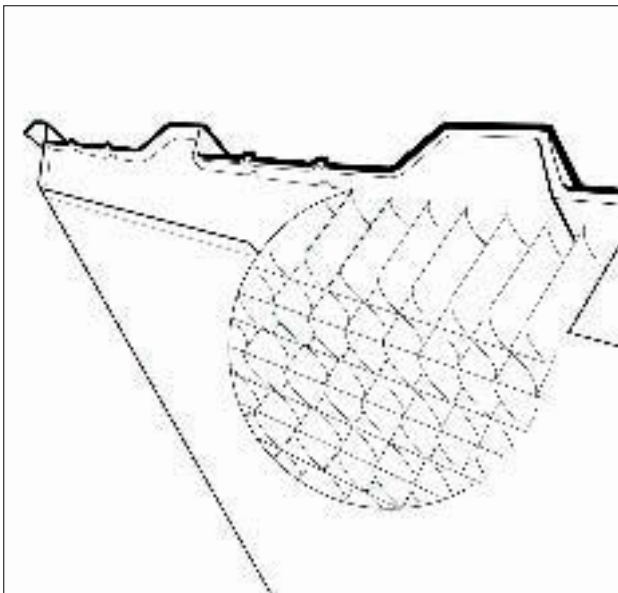
This Detail Sheet must be read in conjunction with the Front Sheets, which give the system's position regarding the Building Regulations, general information relating to the system, and the Conditions of Certification, respectively.

Technical Specification

1 Description

1.1 Factory Assembled Insulator Rooflights (FAIRS) are normally used in conjunction with composite panels (see Figure 1).

Figure 1 Illustration of FAIRS rooflight showing honeycomb insulation core



1.2 The system comprises two skins of translucent GRP sheet separated by closed-cell foam fillers, the external sheet to conform to the roof sheet profile, made from Contour material (Detail Sheet 2) or StepSafe APC material (Detail Sheet 3) and a

separate inner liner sheet to meet the profile requirements imposed by the lining material.

1.3 Flat or profiled liners with an upstand to form a box are bonded to the underside of the external sheet. The cavity created may contain either a third translucent sheet or a transparent honeycomb insulation material for improved thermal performance.

1.4 The rooflights are mechanically fixed to the roof construction using fastener types as recommended by the Certificate holder. These are not covered by this Detail Sheet.

1.5 Ancillary items, not covered by this Detail Sheet, but required for use with the system include: Sealing tape — a butyl sealant tape for creating a weatherproof seal.

1.6 The raw materials are subject to a quality control system.

2 Delivery and site handling

2.1 Both StepSafe and Contour FAIRS should be stacked horizontally on a continuous, non-abrasive, flat, dry surface, or on 100 mm timber bearers, spaced at intervals not exceeding 1 metre. The stack height should also not exceed 1 metre. Different length FAIRS should not be placed on top of each other.

2.2 Appropriate care must be taken at all times when handling, storing and installing FAIRS, with particular attention being given to the individual edges of the product.

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2.3 It is particularly hazardous to handle rooflights in windy conditions. FAIRS in excess of 3 metres long must be carried by more than one person. They should be carried edge up and must not be dropped, bent, twisted, picked up by the ends or walked upon.

2.4 If stored in outside conditions the panels should be protected from the weather by covering with waterproof covers. Panels stored outside without protection could be damaged, and entrapped water will cause the sheets to discolour in prolonged sunlight. The panels should be checked regularly whilst stored to ensure that moisture has not penetrated the protective cover.

Design Data

3 Thermal properties



3.1 Tests were carried out for thermal transmittance using a Guarded Hot Box. When horizontal, the thermal transmittance⁽¹⁾ (U value) of a 1000 mm wide by 2100 mm long, FAIR GRP with 12 mm honeycomb insulation layer, is $1.8 \text{ Wm}^{-2}\text{K}^{-1}$ and that of a FAIR GRP with 80 mm honeycomb insulation layer is $1.0 \text{ Wm}^{-2}\text{K}^{-1}$. Other sized rooflights within each range will have similar performances. The thermal transmittance of the rooflights in other orientations will be lower.

(1) Measured in accordance with BS 874-3.1 : 1987 and corrected for standard surface resistance.

3.2 Calculations show that double-skinned rooflights without a honeycomb inner layer are likely to achieve an indicative U value of $3.3 \text{ Wm}^{-2}\text{K}^{-1}$.

4 Durability



4.1 On the basis of previous knowledge of the constituent materials and accelerated laboratory tests, the GRP material component of the system can be expected to perform satisfactorily for a period of at least 30 years for a StepSafe APC top sheet and 25 years for a Contour GRP top sheet.

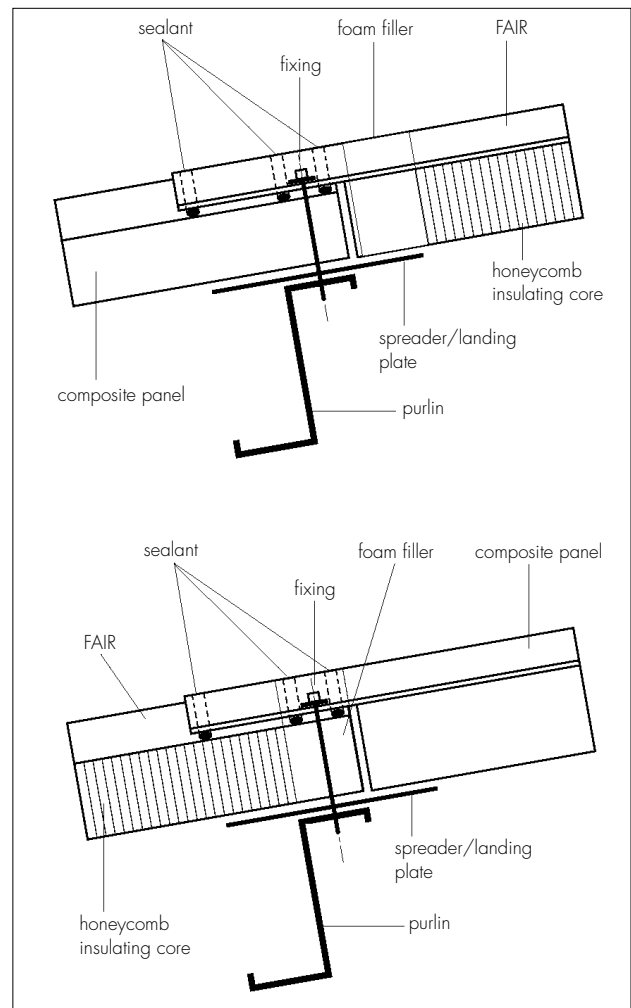
4.2 Some slight colour change of the GRP material may occur over the life of the product, but this should not adversely effect the transmission of light.

Installation

5 General

5.1 Application must be carried out in strict accordance with the relevant clauses of the Certificate holder's instructions and this Certificate (see Figure 2).

Figure 2 Fixing detail for factory-assembled rooflights



5.2 The product should not be laid in high winds as it is particularly hazardous to handle rooflights in windy conditions.

5.3 StepSafe and Contour sheets have recommended maximum spans in metres between purlins, as detailed in Table 1.

Table 1 Guides to the recommended maximum span in metres between purlins for Contour and StepSafe top sheets

Depth of profile (mm)	Contour		StepSafe
	1.83 ⁽¹⁾	2.44 ⁽¹⁾	3.97 ⁽¹⁾
Purlin centres in metres			
15 to 20	1.25	1.50	1.60
20 to 25	1.50	1.75	2.40
25 to 30	1.60	1.85	2.80
30 to 35	1.80	2.05	2.90
over 35	2.00	2.25	3.00

(1) Panel weights in kgm^{-3} .

5.4 Although FAIRS are more rigid than single-skin applications, recommended purlin centres should not be exceeded, as any excessive deflection could strain or weaken bonding joints.

5.5 Where there is a head or tail lap condition it is recommended that the use of a landing/spreader plate, which should be a minimum of 100 mm

wide, be used. The thickness should be the same as the purlin section already in place. This applies where it is rooflight to rooflight, metal to rooflight and rooflight to metal.

6 Procedure

6.1 The product should be fastened to the steelwork structure in every trough of the profile using self-drilling and self-tapping fixings with minimum 29 mm self-sealing washers. Profile configurations with wide troughs will need two fixings per trough. Fixings are recommended to be manufactured in stainless steel.

6.2 Side laps should be stitched at maximum 300 mm centres and should be sealed with one run of 6 mm by 5 mm cross-linked sealant (butyl type) or equivalent.

6.3 Head and tail laps should be sealed using two strips of 6 mm by 5 mm cross-linked sealant (butyl type) 50 mm apart and either side of the line fasteners, with an additional strip of sealant 6 mm by 5 mm or 8 mm diameter, 10 mm from the exposed edge of the sheet at both the head and tail.

Technical Investigations

The following is a summary of the technical investigations carried out on Factory Assembled Insulator Rooflights (FAIRS).

7 Tests

7.1 Samples of the product, and components of the system, were obtained from the manufacturer for the purpose of testing. Tests carried out on the GRP top sheet give typical results for the material and are summarised in Table 3.

Table 2 Physical properties — general

Test (units)	Method ⁽¹⁾	Mean results	
		Contour top sheet	StepSafe top sheet
Density (gcm ⁻³)	BS 2872-6 : 620A	1.5	1.7
Hard body impact (5 joules)	MOAT No 53	pass	pass
Fixings pull-through (max load N) control	BBA internal test specification T1/07	874 ⁽²⁾	2183 ⁽³⁾
Light transmittance (T)	DIN 5036-3	0.58 ⁽⁴⁾ ± 0.04	0.57 ⁽⁵⁾ ± 0.04
Resin : glass ratio (% resin)	BS 2782-10 : 1006		
1.83 kgm ⁻² liner		69.8	—
2.44 kgm ⁻² sheet		72.1	—
4.05 kgm ⁻² sheet		—	48.3

(1) The test documents are detailed in the *Bibliography*. Numbers in the table refer to sections/parts of the various documents.

(2) Contour 2.44 kgm⁻² top sheet.

(3) StepSafe 3.97 kgm⁻² top sheet.

(4) Contour 2.44 kgm⁻²/1.83 kgm⁻² liner 80 mm honeycomb.

(5) StepSafe top 2.2 kgm⁻²/1.83 kgm⁻² liner 80 mm honeycomb.

7.2 Tests on the resistance to thermal shock (wet/heat cycling) were carried out, and found to be satisfactory.

7.3 A resistance to staining test was carried out on Contour and StepSafe top sheets using a number of staining agents, the results of which are summarised in Table 3.

Table 3 Resistance to staining

Stain ⁽¹⁾	Cleaning method	Result
Wild berries	detergent solution	no stain
Bitumen	scraped/white spirit	no stain
Water-based paint	scraped	no stain
Spirit-based paint	scraped	no stain
Charcoal	detergent solution	no stain
Cigarette butt	detergent solution	no stain
Chlorophyll	detergent solution	no stain
Silicone sealant	cut off with knife	thin layer remaining
Mortar/lime mix	detergent solution	no stain

(1) Stain was applied for one week.

7.4 Tests were carried out for thermal transmittance using a Guarded Hot Box.

8 Investigations

8.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

8.2 Installation was examined in the preparation of test specimens to establish the practicability of the materials used.

8.3 An examination was made of indicative fire data to BS 476-3 : 1958 and BS 476-7 : 1997 and an assessment made.

8.4 Tests for soft body impact (fragility of roofing assemblies) to ACR(M)001 : 2000 were not tested on FAIRS, but results are expected to achieve at least Category B non-fragile assembly.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*
BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

BS 874-3.1 : 1987 *Methods for determining thermal insulating properties — Tests for thermal transmittance and conductance — Guarded hot-box method*

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BS EN ISO 4892-3 : 2000 *Plastics — Methods of exposure of laboratory light sources — Fluorescent UV lamps*

DIN 5036-3 : 1979 *Radiometric and photometric properties of materials — Methods of measurements for photometric and spectral radiometric characteristics*

MOAT No 53 : 1989 *UEAtc guide for the Agrément of continuous strip rooflights*

ACR(M)001 : 2000 *Test for fragility of roofing assemblies [second edition]*



On behalf of the British Board of Agrément

Date of issue: 31st March 2003

Chief Executive