

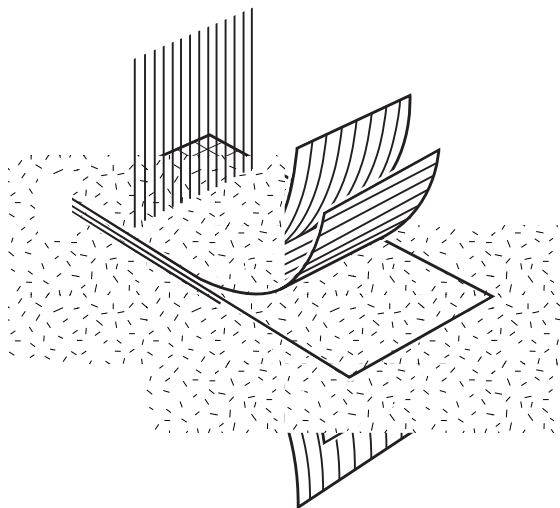
StepSafe Rooflights

An advanced polyester composite profile sheet based on multi-axial technology.

HSE testing certification category – Category B in both built-up and single skin applications.

StepSafe is a very special product, the Company set out to design and engineer a product which offered a radical alternative to the traditional GRP profiled sheeting that had been available for over 40 years. New products and new technology enabled Hambleside Danelaw Limited to introduce StepSafe.

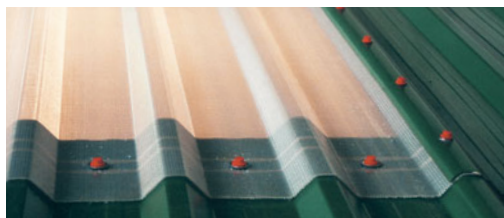
StepSafe is a polyester based product utilising multi-axial reinforcing fibres, which are stitched together with a light polyester thread. The result is an immensely strong product with excellent tensile and flexural strength and moduli. StepSafe also requires less resin during manufacture than typical GRP rooflights which gives a higher fibre fraction. The multi-axial composite sections are specifically designed for strength.



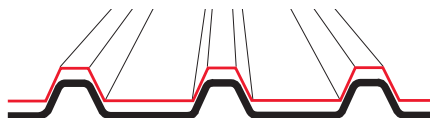
Because of these design features, StepSafe requires less weight for the same strength as other typical GRP rooflights and gives both improved impact performance and improved resistance to fatigue. The most obvious difference in appearance is that StepSafe achieves this standard of performance from a nominal product thickness of only 2 mm, 4.05 kg/m² and 1.1 mm, 2.22 kg/m². Because the profile thickness is in fact only slightly thicker than traditional Category C rated GRP rooflights, StepSafe provides a much sharper profile definition allowing it to match more accurately the metal profile sheeting than the GRP 'thick' safe products.

Consequently, StepSafe is easier to handle on site, no special fixings are required, no change to fixing specifications is needed, no special adhesives or sealant tapes are required, nor are special tools. As there are no differences in assembling StepSafe rooflights either on site or as factory assembled units, the section in this guide on installation covers all our product groups. See Section 9.

Traditional GRP profiled sheets, which are manufactured using glass fibre rovings, or mat, can only achieve a similar performance to StepSafe if they are produced in a much thicker cross section. In some cases this can result in a profile cross section as thick as 4 mm, against the StepSafe weather sheet nominal 2 mm, manufactured in APC. This results in greater product weight, creating handling and assembly difficulties on site and serves no real purpose from the safety point of view.



The multi-axial technology used in the manufacture of StepSafe allows us to create an ultra safe rooflight that is thinner with infinitely better profile definition (see above). This alleviates the problems associated with thicker 'safe' rooflights where their increased thickness means that as the space at the rib becomes tighter the gap in the trough becomes greater (see below).



Because StepSafe is manufactured from an advanced polyester composite (APC), it is resistant to tearing at the fixing points during impact.

StepSafe is available not only as a top sheet panel but also the same production processes are used to produce a safe liner panel. StepSafe Liner panels are manufactured with a light-weight advanced composite construction, but with changes to the production methods the final result is a sheet with very similar tensile and flexural strength performances as its heavier StepSafe top sheet profiles, but with a nominal thickness of 1.1 mm. This makes the StepSafe liner range unique to the industry and produces a product that can safely be used in Lining out situations.

All StepSafe Liner panels when used in a built up system are classified as Category B.

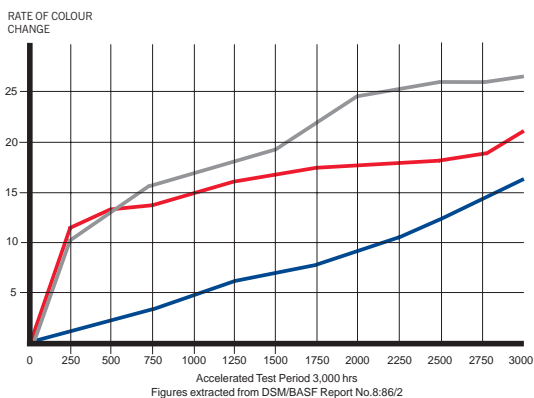
StepSafe Rooflights

StepSafe standard top sheet products are manufactured using Melinex film 389, which is specifically designed to be UV resistant. This surface film is produced by one of the largest Companies in the world, and has a long history of use in GRP rooflight and cladding production. This film grade provides a performance better than the typical gel coat surface protection found on some traditional GRP sheets.

StepSafe is manufactured on a continual process and complies with BS 4154 using thermosetting polyester resins containing curing agents, light stabilisers and reinforcing multi-axial composite fabrics.

QUV Delta E Colour Change Values

- Melinex 389
- Melinex 301
- Gel Coat typical thickness on GRP profiled sheet



High-grade UV resistant resins are also used during the manufacturing process.

For details of our Platinum finish; please contact our sales office for further information.

Fire Performance

StepSafe products are available in grades SAB 3, SAA 1 and SAA 0. With a higher ratio of glass to resin, much higher than traditional GRP rooflights, the fire performance is enhanced. Fire rating identification is by means of coloured thread inserted into the product during manufacture.

	BS 476 : Part 3 : 1958	BS 476 : Part 7 : 1997	Identification thread
SAA 0	AA	Class 1	Blue
SAA 1	AA	Class 1	Green
SAB 3	AB	Class 3	Red

StepSafe SAA 0 sheets tested in accordance with BS 476: part 6: 1989 'Fire propagation test for materials' have an index of performance (i) not exceeding 12 and a sub index (ii) not exceeding 6.

By definition under part E15 Building Regulations 1976, StepSafe grade SAA 0 sheets are designated Class 0.

Where StepSafe is being used in a double skin rooflight application, the bottom sheet must meet fire retardance class 1 BS 476 Part 7 requirements. StepSafe 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.

StepSafe Rooflights

Effect of Chemicals

Certain acids, alkalis, and solutions of water soluble gases may in general attack StepSafe as well as other traditional GRP sheets. For further information, please contact our sales office.

Liquids Water Absorption

0.3% after 24 hours at 20°C.

Biological

Resistant to attack by micro organisms, fungi, larvae, insects, and mildew. Wash with mild detergents to remove deposits.

Thermal Transmittance ('U' Value of design purposes)

Single glazing 5.7 w/m²°C
Double glazing 2.8 w/m²°C based on a recommended air space of 30 mm.

Thermal Movement

Coefficient of linear expansion:
22 × 10⁻⁸ m/m per °C.

Operating Temperature

Temperature range over which sheets may be used in construction is from –20°C to +80°C. Advanced polyester composite sheets do not become brittle at low temperatures. Some discolouration may occur at temperatures above 65°C.

Compatibility

No chemical reaction with other established constructional materials.

StepSafe can be drilled or cut using normal hand or power tools.

Purlin Centres

Purlin centres should not exceed 1800mm. Where StepSafe rooflights are to be used where the purlin centres are greater than 1800mm, the specification should be checked with our sales office in order to ensure compliance with HSE guidelines. For further information on purlins please see installation and fixing details in Section 9.

Single Span Applications

Wherever possible single span rooflight applications should be avoided.

StepSafe Advanced Polyester Composite Sheeting v GRP Classified Safe Lights

	Unit of measurement	StepSafe Rooflights		Other 'safe' rooflights
		TOP SHEET	LINER	
Flexural Strength (ASTM D790 Method 1)	MPa (N/mm ²)	366	296	252 to 308
Flexural Modulus (ASTM D790 Method 1)	GPa (kN/mm ²)	9.88	8.86	6.94 to 9.32
Tensile Strength (BS2782 Part 10 Method 1003)	MPa (N/mm ²)	152.8	230	93.7 to 113.2
Tensile Modulus (BS2782 Part 10 Method 1003)	GPa (kN/mm ²)	8.66	12.9	6.99 to 8.26
Elongation at Failure (BS2782 Part 10 Method 1003)	(%)	1.71	1.94	1.52 to 1.57
Light Transmission (ASTM D1003)	(%)	57.0	66.5	45.4 to 68.4
Nominal Thickness	(mm)	2.00	1.1	2.00 to 3.00
Average Barcol Hardness (BS2782 Part 10 Method 1001)		55.5	48	46.5 to 51.4

Table courtesy of Rapra Technology Limited

StepSafe Rooflights

StepSafe Advanced Polyester Composite Profiled Sheet – Service Life Guarantee

StepSafe is guaranteed to have a service life of 30 years when used in Northern European Union Countries, providing it was correctly stored, handled, installed and maintained in accordance with the instructions contained within this manual. For full guarantee terms and conditions see page 1.7.

For non-fragility guarantee please see page 2.4.

StepSafe under HSE Testing

At the Company's test centre in Daventry, a purpose built test rig (RAP/HDI/0400) manufactured to meet the industry standard, was used to test a selection of StepSafe profiles.

An illustration of the test rig is shown on page 2.3.

StepSafe Advanced Polyester Composite top sheets and liner panel were subjected to a series of tests to comply with the HSE guidelines. All products were taken from standard weight and thickness production samples.

Fixings

5 (number) primary fixings dependant upon the profile and fixed in every trough with a minimum 29mm washer were used.

The side laps were sealed with a 9 mm × 3 mm cross linked Butyl type sealant with sidelap stitches at 300 mm centres.

The head and tail laps were a minimum of 150 mm long and sealed with one row 18-4v cross linked sealant, or alternatively two rows of 9 mm × 3 mm Butyl type sealant.

The sheets were fixed on the purlins at 1800 mm centres.

The drop tests were conducted in accordance with the agreed industry testing procedures, ACR [M]001 : 2000, based on two separate drops of an impactor weighing 45 kilos. After each drop, the impactor was left on the sheet for in excess of five minutes. There was no further deterioration of the product and there was no tearing at the fixings or significant signs of any damage.

The StepSafe rooflight built-up system passed with an HSE Category B. StepSafe when used in a single skin application would be classified as Category B.

Photographs and video footage were taken of the tests. Present during the testing were



Measuring the height of 1.2 metres for the first drop in the test sequence on StepSafe.



A 45 kg bag freefalls from a height of 1.2 metres before impacting on StepSafe in the second drop of the test sequence.



StepSafe after two drops from a height of 1.2 metres.

representatives of the HSE, Rapra Technology Limited and independent consultants.

Conclusion

StepSafe is a safe rooflight able to withstand the weight of a person if inadvertently used as a walkway. However, we do not recommend that anybody is encouraged to walk on a rooflight for the reasons detailed on page 2.2.