# Hambleside Danelaw Rooflights

ZENON

LOW CARBON DAYLIGHT SOLUTIONS

ISSUE 2

ZENON

## Low carbon daylight solutions for your metal building design

Hambleside Danelaw have been manufacturing rooflight solutions in the UK for 40 years. We are market leaders in developing environmentally conscious solutions to improve building energy performance and reduce the carbon footprint through the efficient and effective use of natural daylight. Our in-plane Glass Reinforced Polyester [GRP] rooflights for the metal building envelope have been installed on projects such as B&Q, Wickes, Tesco distribution warehouses and Rolls Royce factories to name just a few.

ZENON



# ZENON

## Passing the Test

Our BBA certified range of Zenon rooflights are manufactured and CE marked in accordance with BS EN1013:2012+A1:2014 to match all typical steel, aluminium and fibre cement profiles. We take our responsibility as a manufacturer very seriously and therefore all our products are rigorously tested to ensure compliance with regulations and best practice, such as fire and non-fragility. Our UK GRP production facility is BS EN ISO 9001:2015 quality certified and operates using a renewable energy source.

## Setting the Standard

We are committed to a continuous carbon reduction programme, achieving a 78% reduction in the last 5 years. We confidently quote light, thermal and solar transmission values to help our clients specify the most appropriate rooflight system for their building.

## Leading the Way

We have developed some unique products within our range, designed specifically to overcome specification issues. The solutions include our unique Insulator core which delivers improved light transmission, along with a more natural and enhanced diffusion of daylight.

## Lowering Carbon

The Zenon Evolution range provides a stronger rooflight whilst using less resin in production therefore making it the only low carbon in-plane rooflight option available on the market.

## Lighting the Way

Hambleside Danelaw are long standing  members of NARM, the National Association of Rooflight Manufacturers. Further details about compliance and the benefits of natural daylight are available on their website **www.narm.org.uk.**

bsi. ISO 9001 Quality Management FM23063 · ISO 14001 Environmental Management EMS500154 · OHSAS 18001 Occupational Health and Safety Management OHS532271

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE No 03/3996

narm

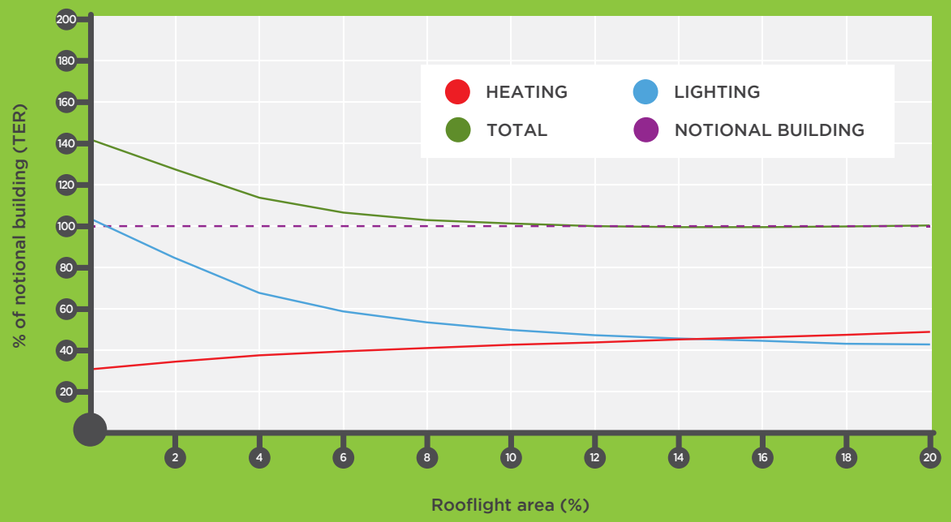
FOR A SMALLER CARBON FOOTPRINT USE MORE ROOFLIGHTS

# Why include natural daylight in your design?

There are many well-known scientifically proven benefits. Buildings which provide high levels of natural light generally have more positive working environments than those which are dependent upon artificial light. It is known that people respond better to working in natural light conditions, as the eye and brain functions work better, resulting in improved concentration and overall performance. Plus, of course, less dependency on artificial light significantly reduces energy consumption and running costs as well as impacting positively on the buildings overall carbon footprint. Thermally efficient insulated rooflights can further reduce heat loss and energy costs. These benefits, and the effectiveness of rooflights as a contributor, are acknowledged in the Building Regulations Approved Document Part L. It recommends that industrial and commercial building structures should have a rooflight area of 10% to 20%.

**ZENON TECHNICAL MANUAL**
Please refer for further information.

This graph demonstrates the reduction in carbon emissions of a typical notional building as the rooflight area is increased to the optimum 16% to 18% and used in conjunction with a fully automated lighting control system.




Source: SBEM results - $CO_2$ emissions for the Notional Building at varying rooflight area; graph 1, NARM NTD06: Designing with Rooflights [2014]



# Key specification considerations

Rolls Royce

**LIGHT TRANSMISSION [L - VALUE]**
Light that has travelled through a medium without being absorbed or reflected.

**SOLAR GAIN [g-VALUE]**
Total solar heat gain includes directly transmitted solar heat and absorbed solar radiation, which is then reradiated, conducted, or convected into the space.

**THERMAL PERFORMANCE [U-VALUE]**
A measure of the flow of heat through an insulating or building material: the lower the U-value, the better the insulating ability.

**EMBODIED CARBON**
The carbon released during the resource extraction, manufacture and fabrication of a product, its use, maintenance and final disposal including transport and packaging at all stages.

# Non-Fragility

The terms ‘fragile’ and ‘non-fragile’ describe the tested, proven ability of a finished roof assembly to resist the impact of a person falling onto it then to support their weight. The test is strictly prescribed in document ACR[M]001.

There is no margin for error or misunderstanding because someone’s life may depend on it.

A correctly installed new roof structure which includes in-plane Hambleside Danelaw Zenon rooflights passes the non-fragility test. In fact, Zenon Evolution significantly outperformed it, resisting impact after impact.

The whole Zenon rooflight range has been subjected to this rigorous test programme and is classed as non-fragile in accordance with the National Association of Rooflight Manufacturers [NARM] Technical Document NTD03.

**ZENON TECHNICAL MANUAL**
Please refer for further information.

A number of factors will impact on the period of non-fragility which will be achieved by a roofing assembly. Manufacturers can only indicate the expected period of non-fragility.

Further guidance is available from NARM and MCRMA.



# Why specify GRP rooflights?

- Thermo set material - doesn’t sag, melt or lose its shape.
- Low expansion coefficient, making it the most compatible rooflight material for all cladding systems.
- Impervious to plasticiser migration damage from Plastisols. No barrier tape needed.
- Achieves fire ratings up to S.AA and Class 0 when tested in accordance with BS476.
- Long service life, almost double that of some other rooflight materials.
- Excellent resistance to most forms of chemical degradation and attack.
- Efficient use of daylight entering the building, diffusing it to give an even spread of light. This reduces light and shade contrast and internal glare.

## Product Guarantees

Zenon Pro and Zenon Evolution carry a service life guarantee of 25 and 30 years depending on weight.

Service life is defined in BS 7543:2015.

These guarantees cover durability, serviceability and structural integrity of the sheet material.

25 YEAR GUARANTEE

30 YEAR GUARANTEE

## ZENON PRO

Ideal for typical industrial, commercial or agricultural buildings.

Hitachi Rail County Durham

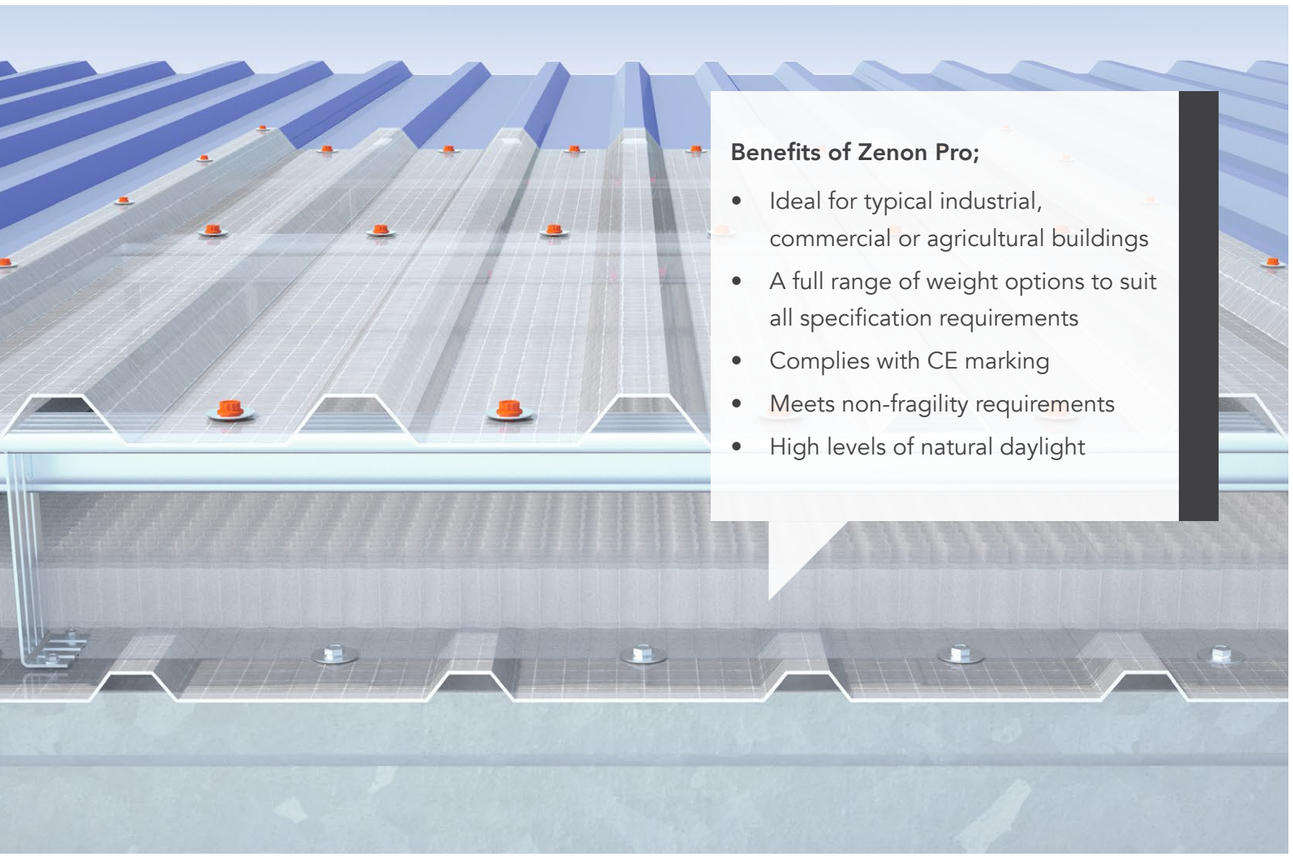
## ZENON EVOLUTION

Ideal for environmentally conscious industrial and commercial buildings or where superior strength is demanded.


B&Q Merthyr Tydfil

ZENON PRO

Tesco Distribution Centre



**Benefits of Zenon Pro;**

- Ideal for typical industrial, commercial or agricultural buildings
- A full range of weight options to suit all specification requirements
- Complies with CE marking
- Meets non-fragility requirements
- High levels of natural daylight



# PRO

**IDEAL FOR TYPICAL INDUSTRIAL, COMMERCIAL OR AGRICULTURAL BUILDINGS**

Zenon Pro is the new brand name for our tried and tested range of traditional GRP rooflight sheets. The natural translucent in-plane rooflights are profiled to match the building envelope cladding system and are available in over 1000 profiles to suit new build and refurbishment projects. They are suitable for installing in single skin and double skin assemblies and can be insulated with either polycarbonate or our unique Insulator core for triple skin applications. Zenon Pro rooflights are compatible with both site-assembled and composite panel cladding systems.

This range is CE marked and available in all sheet weights defined in the UK Annex to BS EN1013:2012+A1:2014.

# EVOLUTION

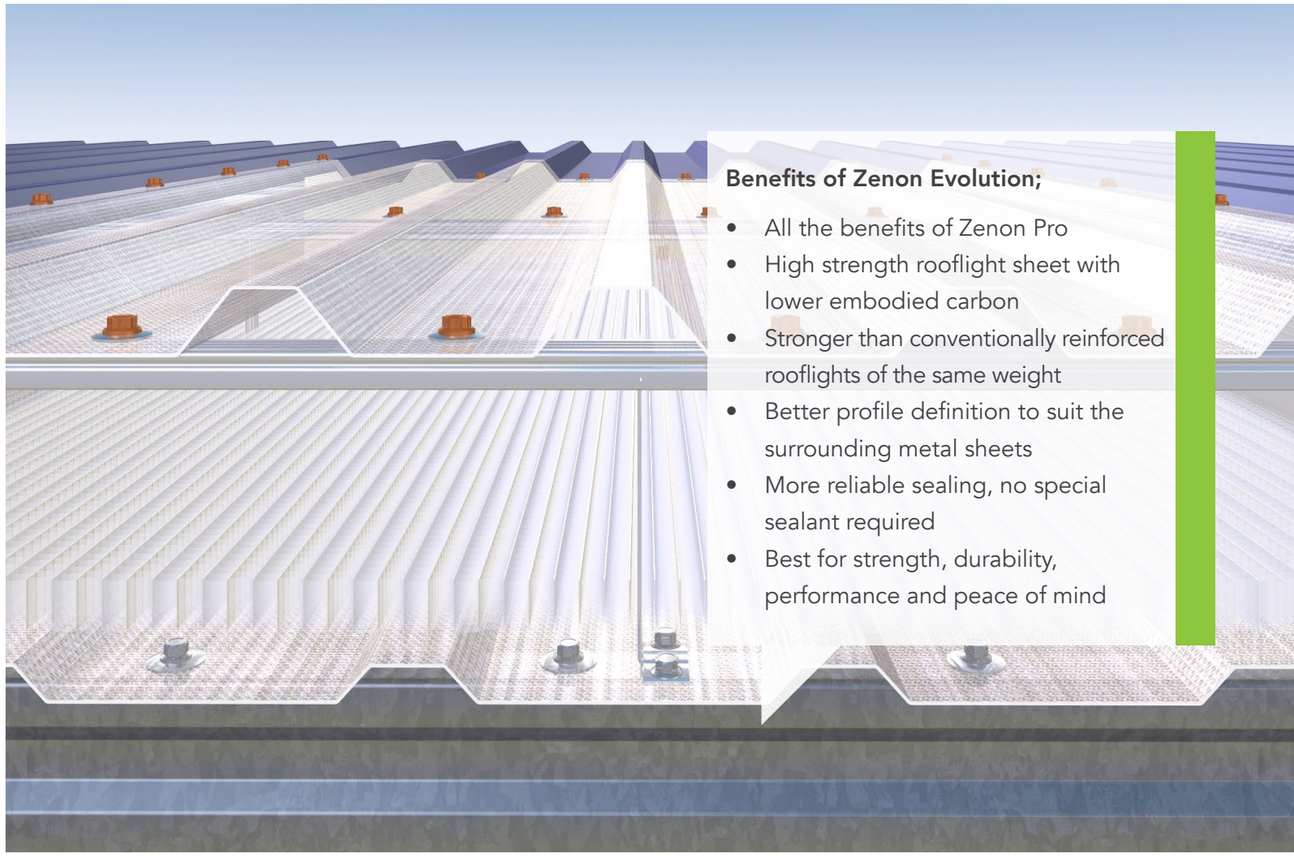
**IDEAL FOR ENVIRONMENTALLY CONSCIOUS INDUSTRIAL AND COMMERCIAL BUILDINGS OR WHERE SUPERIOR STRENGTH IS DEMANDED**

Zenon Evolution, the truly low carbon rooflight, offers the best solution for your environmentally conscious industrial or commercial building. Featuring innovative high performance glass reinforcement we are able to reduce the amount of resin required in the manufacturing process, yet produce a GRP rooflight sheet stronger than the traditional equivalent. Accordingly, Zenon Evolution is produced in two weights. Both weights deliver a non-fragility which equals or betters that of significantly heavier conventionally reinforced products. Both use less resin in manufacture and are thinner, lighter and with less embodied carbon.

Zenon Evolution sheets offer significant carbon reduction saving in comparison to their Zenon Pro equivalent. A slight trade-off in terms of light transmission is more than offset by the improvement in thermal performance using the Insulator core, which can deliver a reduction in U-value up to 40% with improved light transmission compared to polycarbonate insulation layers.

B&Q Bridgend

ZENON EVOLUTION



**Benefits of Zenon Evolution;**

- All the benefits of Zenon Pro
- High strength rooflight sheet with lower embodied carbon
- Stronger than conventionally reinforced rooflights of the same weight
- Better profile definition to suit the surrounding metal sheets
- More reliable sealing, no special sealant required
- Best for strength, durability, performance and peace of mind

# Insulation Options

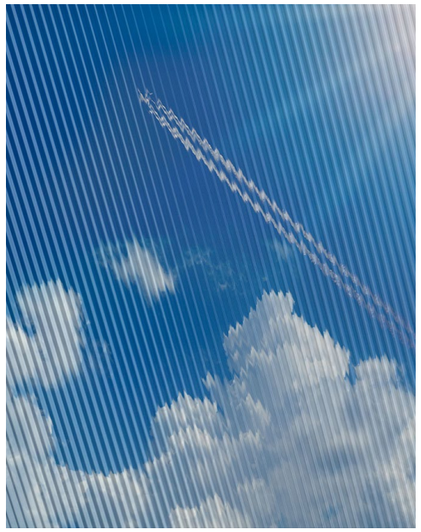
The most common insulant for rooflights is currently polycarbonate. We supply both 4mm and 10mm polycarbonate sheets which meet Building Regulations and improve the thermal performance of a double skin rooflight assembly.

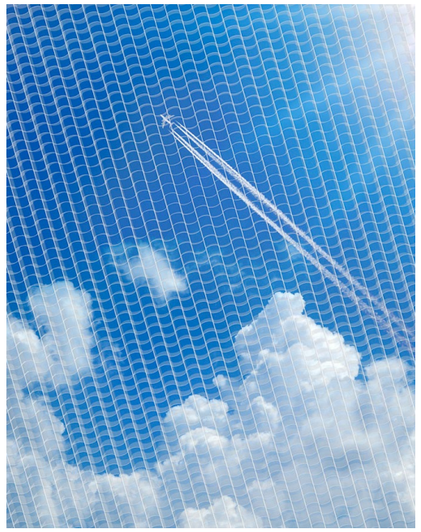
However, we have developed a unique honeycomb type structure, Insulator, which delivers;

- excellent light transmission
- improved thermal performance
- low carbon footprint for your building due to excellent U-value performance
- sustainable materials - compostable at the end of service life

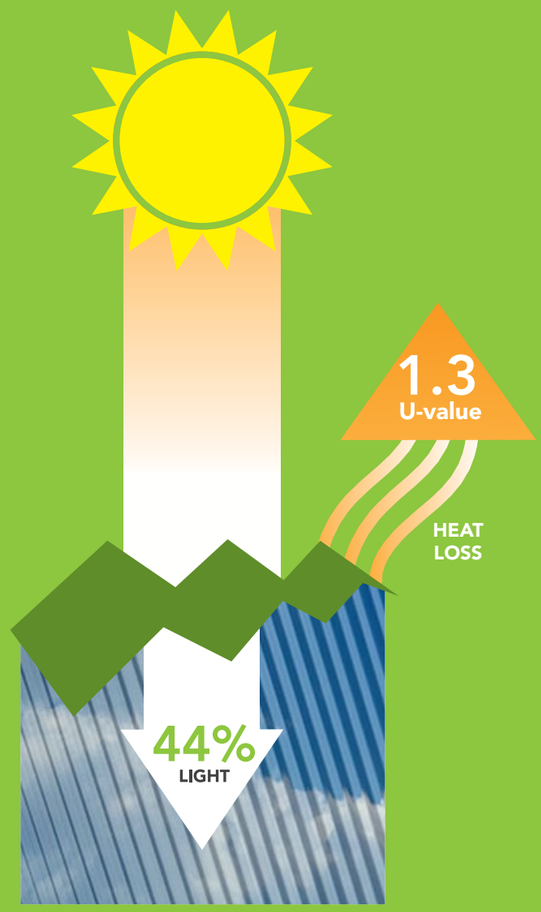
**ZENON TECHNICAL MANUAL**
Please refer for further information.

## Polycarbonate **vs** Insulator

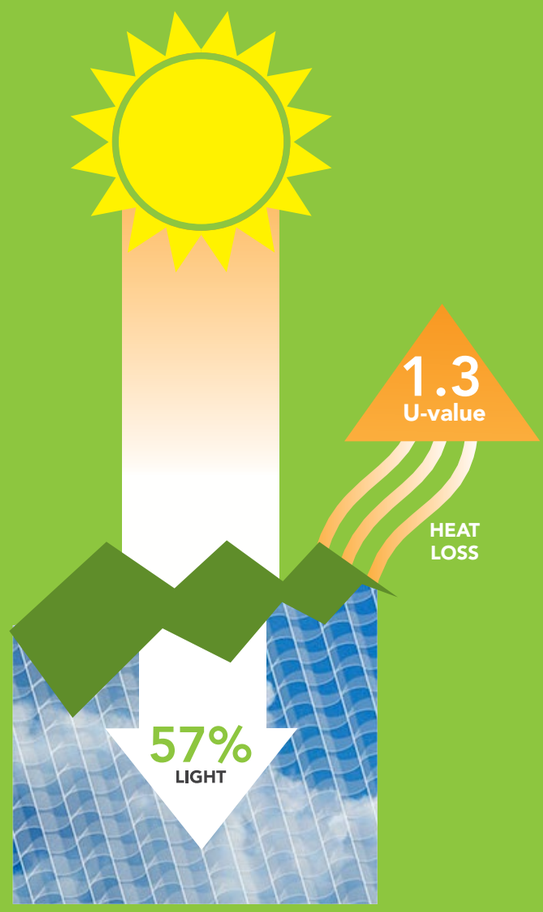




Insulator, in comparison to polycarbonate insulation, offers better light transmission. The example below looks at a typical 1.8kg/m$^2$ over 2.4kg/m$^2$ Zenon Pro assembly and shows 30% improvement in light transmission for the same U-value.




10MM POLYCARBONATE




20MM INSULATOR

# Site Assembled Rooflights

Zenon site assembled rooflights can combine Zenon Pro and Zenon Evolution weather sheet and liner panel configurations to suit the building requirements. Manufactured to match all commonly available metal cladding profiles for both new build and refurbishment projects, the various sheet weights can be mixed and matched to meet the best performance criteria for your building design. Where insulated assemblies are required to meet Building Regulations and to improve building energy performance, our unique Insulator core or polycarbonate options can be selected.

All our insulated rooflight assemblies achieve U-values below the Building Regulations Part L notional building value of 1.8W/m²K. All our assembly combinations meet, or more often exceed, the required non-fragility classification as defined in NARM Technical Document NTD03 in conjunction with ACR[M]001. Each sheet can be manufactured to the required fire grade. Uninsulated rooflight assemblies are available for agricultural building applications where Building Regulation requirements may not be applicable.

## Configurations

The options shown [right] demonstrate the effect that our different insulation choices have on building performance for the average Zenon Pro and Zenon Evolution assemblies. For more specific performance data based on your building design requirements, please contact our Technical Department by email on **techelp@hambleside-danelaw.co.uk** or call **01327 701920.**

ZENON

PERFORMANCE IMPROVEMENT

| 40mm INSULATOR | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| | Zenon Pro | | | |
| | 56 | 1.2 | 56 | 18.4 |
| | Zenon Evolution | | | |
| | 46 | 1.2 | 47 | 15.3 |

| 20mm INSULATOR | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| | Zenon Pro | | | |
| | 56 | 1.3 | 56 | 18.3 |
| | Zenon Evolution | | | |
| | 46 | 1.3 | 47 | 15.2 |

| 10mm POLYCARBONATE | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| | Zenon Pro | | | |
| | 43 | 1.3 | 44 | 23.4 |
| | Zenon Evolution | | | |
| | 35 | 1.3 | 36 | 20.3 |

| 4mm POLYCARBONATE | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| | Zenon Pro | | | |
| | 53 | 1.7 | 52 | 21.0 |
| | Zenon Evolution | | | |
| | 45 | 1.7 | 43 | 17.9 |

Typical figures for comparison purposes only, based on physical testing by NPL. See Technical Manual for more details.

KEY LIGHT TRANSMISSION THERMAL PERFORMANCE SOLAR GAIN EMBODIED CARBON

# Composite Panel Rooflights [FAIRs]

Zenon in-plane composite panel rooflights, also referred to as factory assembled insulated rooflights (FAIRs), can comprise of Zenon Pro and Zenon Evolution weather sheet and liner panel configurations to suit the building requirements. Where insulated assemblies are required to meet Building Regulations and to improve building performance, the unique Insulator core or polycarbonate options can be selected.

All our insulated composite panel rooflights achieve U-values which out-perform the Building Regulations Part L notional building value of 1.8W/m²K.

## Configurations

The options shown [right] demonstrate the effect that our different insulation options have on building performance for the average Zenon Pro and Zenon Evolution FAIRS assemblies. For more specific performance data based on your building design requirements, please contact our Technical Department by email on **techelp@hambleside-danelaw.co.uk** or call **01327 701920.**

ZENON

PERFORMANCE IMPROVEMENT

| 40mm INSULATOR | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| Zenon Pro | 61 | 1.1 | 61 | 17.1 |
| Zenon Evolution | 50 | 1.1 | 50 | 14 |

| 20mm INSULATOR | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| Zenon Pro | 61 | 1.2 | 61 | 17.0 |
| Zenon Evolution | 50 | 1.2 | 50 | 13.9 |

| 10mm POLYCARBONATE | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| Zenon Pro | 44 | 1.2 | 44 | 22.1 |
| Zenon Evolution | 36 | 1.2 | 36 | 19.0 |

| 4mm POLYCARBONATE | % | W/m²K | % | kg $CO_2$e/m² |
|---|---|---|---|---|
| Zenon Pro | 53 | 1.5 | 53 | 19.7 |
| Zenon Evolution | 44 | 1.5 | 43 | 16.6 |

Typical figures for comparison purposes only, based on physical testing by NPL. See Technical Manual for more details.

KEY LIGHT TRANSMISSION THERMAL PERFORMANCE SOLAR GAIN EMBODIED CARBON

# Barrel Vault Rooflights

Kerb mounted barrel vault rooflights are popular where continuous runs of rooflight openings are required in flat, low pitched, curved and standing seam or secret fix roofing systems,  or where in-plane or individual domed or pyramid type rooflights are not suitable or adequate to provide sufficient light transmission.

Hambleside Danelaw manufactures two cost effective, robust and shatter resistant Glass Reinforced Polyester (GRP) barrel vault rooflight systems; Zenon Arc and Zenon Curve. Both systems provide excellent light transmission with good levels of diffused light distribution to the building interior, and both incorporate Zenon Shield - a purpose-designed UV-stabilised surface film for enhanced protection and durability.

All Zenon barrel vault rooflights are manufactured and CE marked in accordance with BS EN 14963:2006 and tested for non-fragility in accordance with the Advisory Committee for Roofsafety document ACR[M]001 offering expected periods of non-fragility up to 25 years subject to all other elements of the assembly or roof construction retaining their integrity for the same period.

## Zenon Arc

Barrel vault rooflights  that are supplied as pre-assembled double skin modular rooflight units with an option to incorporate the Insulator™ system for improved thermal performance and optimum light transmission for fast, simple, labour-saving installation.

They are constructed from either Zenon Pro or Zenon Evolution GRP sheets, depending upon the performance specification, durability and non-fragility periods required, to provide two daylight opening width options of 1000mm and 1200mm.

## Zenon Curve

Supplied as individual pre-curved self-supporting rooflight sheets available for daylight openings or support systems up to 4 metres wide and at a fixed radius of 3150mm. The system is available in natural translucent or opal tinted GRP and at a nominal weight of 2.4kg/m².

Curve suits any length of construction or opening, and is easily assembled and installed in single, double or triple skin configurations depending upon the thermal performance required, or in combination with flat profiled liners and insulation layers in built-up self-supporting metal sheet roofing systems.



# References

For further information on the topics covered in this brochure please refer to the Zenon Technical Manual. This can be downloaded free via our website.

| | |
|---|---|
| BS OHSAS 18001: 2007 | Occupational health and safety management system. |
| BS EN ISO 9001: 2015 | Quality management. |
| BS EN ISO 14001: 2015 | Environmental management system. Requirements with guidance for use. |
| BS 476-3: 2004 | Fire tests on building materials and structures. Classification and method of test for external fire exposure to roofs. |
| BS 476-6:1989+A1:2009 | 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 EN 1013:2012+ A1:2014 | Light transmitting single skin profiled plastics sheets for internal and external roofs, walls and ceilings. Requirements and test methods. |
| UK National Annex to BS EN 1013 | Classification method for GRP profiled sheets in accordance with BS EN 1013. |
| BS 7543: 2015 | Guide to durability of buildings and building elements, products and components. |
| BS EN ISO 14963:2006 | Roof coverings. Continuous rooflights of plastics with or without upstands. Classification, requirements and test methods. |
| www.nfrc.co.uk | National Federation of Roofing Contractors. |
| www.mcrma.co.uk | Metal Cladding and Roofing Manufacturers Association website. |
| www.narm.org.uk | National Association of Rooflight Manufacturers website. |
| NARM NTD01 | Natural Daylight Design Through Rooflighting. |
| NARM NTD03 | Application of ACR[M]001 ‘Test for Non-Fragility of Profiled Sheeting Roofing. Assemblies’ to GRP Profiled Rooflight Sheeting. |
| NARM NTD06 | Designing with Rooflights. |
| ACR[M]001: 2014 | Test For non-fragility of large element roofing assemblies. Fifth edition. |

# Zenon, a comprehensive range of low carbon rooflights for the metal building envelope from Hambleside Danelaw

**Hambleside Danelaw Rooflights**

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