ZENON®

Low Carbon GRP Daylight Solutions

Hambleside Danelaw
Building Products
40+ YEARS OF ROOFING INNOVATION

Contents

More Daylight.

Less Energy.

ZENON®

Hambleside Danelaw have been manufacturing rooflight solutions in the UK since 1976.

We are market leaders in developing environmentally conscious solutions to improve the energy performance of industrial and commercial buildings. We produce rooflights with low embodied carbon, as well as offering rooflight systems which are thermally efficient and insulated to meet building requirements.

Our Glass Reinforced Polyester (GRP) rooflights have been installed on a wide variety of projects such as B&Q, Wickes, Tesco distribution warehouses and Rolls Royce factories to name just a few.

All of Hambleside Danelaw's products are manufactured to BS EN ISO 9001 Quality and ISO 14001 Environmental standards whilst operating to ISO 45001 Occupational Health and Safety standard.

Contributing to BREEAM

BREEAM, referring to Building Research Establishment Environmental Assessment Method, is a sustainability assessment and certification scheme for the built environment which assesses, encourages and rewards environmental, social and economic sustainability. Established in 1990, BREEAM is now being applied in over 78 countries and builds confidence and value by providing an asset with independent certification that demonstrates the wider benefits to individuals, businesses, society and the environment.

With the built environment contributing 40% of the UK's carbon footprint, the importance of new buildings achieving the highest possible BREEAM rating has never been greater.

BREEAM encourages continuous performance improvement and innovation by setting and assessing against a broad range of scientifically rigorous requirements that go beyond current regulations and practice.

A building can be classed as Outstanding with a score greater than or equal to 85%, Excellent at 70%, Very good at 55%, Good at 45%, Pass at 30%, and Unclassified if less than 30%. BREEAM supports innovation within the planning, development and construction stages of the building design, and credits can be awarded for this innovation.

How the score is determined

A BREEAM assessment uses recognised measures of performance, set against the established benchmarks, to evaluate a building's specification, design, construction and use. Credits are awarded across ten categories based on the outcomes of the building assessed. The credits are then combined to provide a single score which allows buildings to be classed as previously mentioned.

The categories of BREEAM are Energy, Health and Wellbeing, Innovation, Land Use, Materials, Management, Pollution, Transport, Waste, and Water. These categories are divided down into a set of assessment criteria, each with an aim, target, and benchmark. Once this benchmark is attained, the assessor can award credits to develop a category score.

Once the development has been assessed across all of the categories then the final performance rating can be established through the total of the category scores. Zenon rooflights can contribute to three of the categories mentioned above.

BREEAM Categories and Scores

Zenon and BREEAM

Hambleside Danelaw are the first UK manufacturer of GRP rooflights to achieve an EPD for their products. Specifying Zenon rooflights in the building design can contribute 1.5 points towards the overall BREEAM rating under the category of Material, Criterion Mat 02.

Further points are available in the three highest weighted categories of Material, Energy and Health & Wellbeing.

Materials

The Materials category centres around construction product efficiency, environmental impact, responsible sourcing, and product durability. Materials is the third highest weighted category and considers the impact of the construction product's whole life cycle. Zenon Evolution rooflights have a lower embodied carbon content and are more durable, delivering longer non-fragility periods than traditionally reinforced rooflights of equivalent weight. Our rooflights contribute 1.5 points in Mat 02 as products with an Environmental Product Declaration (EPD).

Energy

Correctly specified and installed Zenon rooflights can significantly reduce the building's interior lighting energy consumption. The cost of energy required to light a building even when using energy efficient LED systems is far greater than the heat lost through rooflights. The Energy category of BREEAM (which has the highest weighting), and Ene 01 in particular, encourages the design of energy efficient buildings with energy performance above national building regulations.

Health and Wellbeing

Natural daylight has been proven to have a beneficial impact on the health and wellbeing of employees and building users. Hea 1 requires that buildings provide occupants with conditions that facilitate good visual comfort by avoiding glare, as well as achieving good practice daylight factors and appropriate lux levels. Zenon rooflights, which are translucent as opposed to transparent, provide very good levels of uniformly distributed natural daylight, with no areas of glare or shadow.

Content produced with help from the BREEAM document **UK New Construction, Non-domestic Buildings (United Kingdom) Technical Manual SD5078: BREEAM UK New Construction 2018 2.0**

Natural Daylight Benefits

Intensive research into the benefits of natural daylight compared to artificial lighting concludes that buildings with high levels of natural daylight results in a workforce that is "literally more successful than those more reliant on artificial light" (NARM).

Zenon rooflights are designed to let daylight in, meaning that buildings with rooflights installed correctly are likely to need less artificial lighting during the day, reducing energy costs. For any building, there is an optimum target percentage of rooflights which will deliver peak level of natural daylight into a building, making the optimum in energy usage and costs.

As members of NARM (National Association of Rooflight Manufacturers), Hambleside Danelaw are committed to raising the profile of natural daylight, and we're not the only ones to understand the advantages.

Embodied Carbon

Embodied carbon refers to the CO_2e (carbon dioxide equivalent) or greenhouse gas (GHG) emissions associated with the resource extraction, manufacture, installation, maintenance, and the end-of-life of a building product. This is different to the operational carbon which is the CO_2e produced during the time where the product is in use.

Zenon Evolution rooflights have significantly less cradle-to-grave embodied carbon compared to a traditional rooflight with the same performance over the lifetime of a standard building. This makes it the best choice when specifying eco-conscious rooflights.

In addition, Hambleside Danelaw's unique Zenon Insulator features a honeycomb core which is made from cellulose acetate, a recycled wood pulp product.

When compared to traditional multi-layer polycarbonate insulants, Zenon Insulator can significantly reduce embodied carbon, and perhaps even more importantly, it is compostable at the end of its service life.

Made to Order

Manufactured specifically for your projects at our state of the art facility in Daventry, Zenon Rooflights are available in a comprehensive range of weights and profile shapes.

We can supply the vast majority of built-up and composite systems in configurations that can both meet and exceed the requirements for thermal performance, non-fragility and durability. From distribution centres, storage facilities, stores and more, Zenon rooflights can be manufactured and transported to any site in the UK.

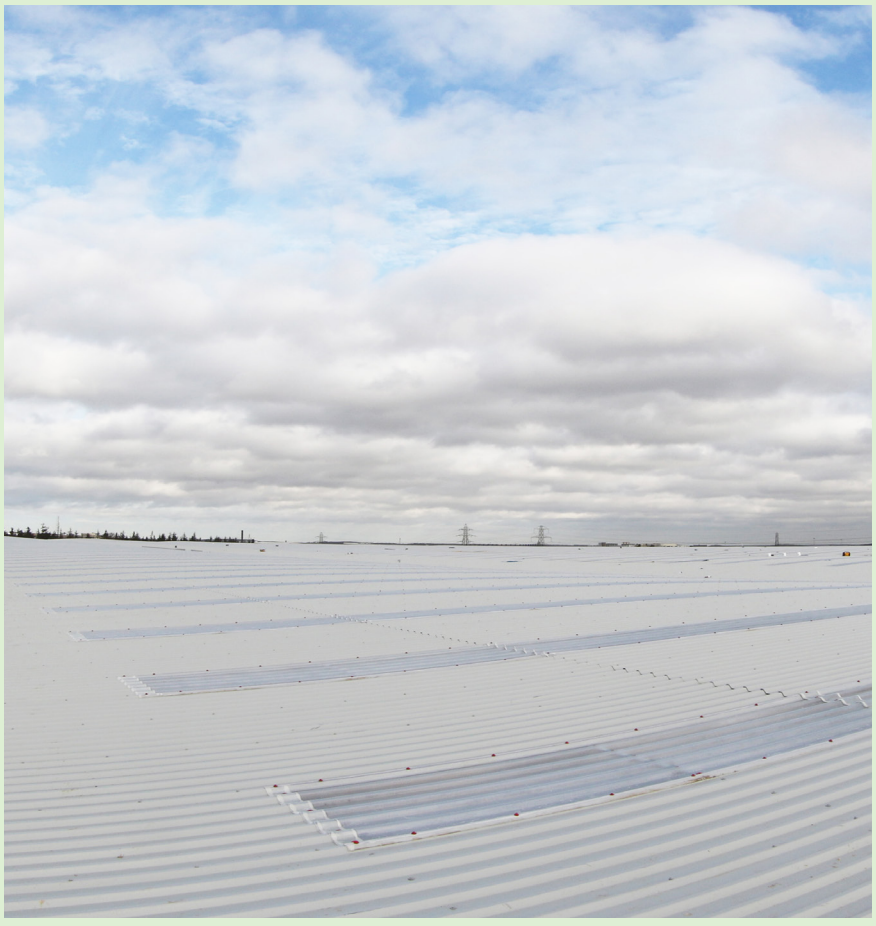
Non-Fragility

Prior to 2000, there was no clear direction on how manufacturers could demonstrate that their products met the requirements for non-fragility. However, with the publication of ACR[M]001 by the Advisory Committee for Roofsafety, that all changed.

Today, it is expected that rooflights conform to industry standards for non-fragility, as outlined by ACR[M]001: Test for Non-Fragility of Large Element Roofing Assemblies. This document states that a representative roofing assembly should be tested to demonstrate its ability to withstand the impact of a person falling onto it, and then supporting their weight. This is to increase safety on site and prevent loss of life or serious injury through falling through the roof assembly.

Once fully fixed in accordance with our recommendations Zenon rooflights meet this requirement as part of a complete assembly, with Zenon Evolution withstanding impacts of more than twice the force needed to pass the test.

GRP rooflights should never be walked on, irrespective of non-fragility.



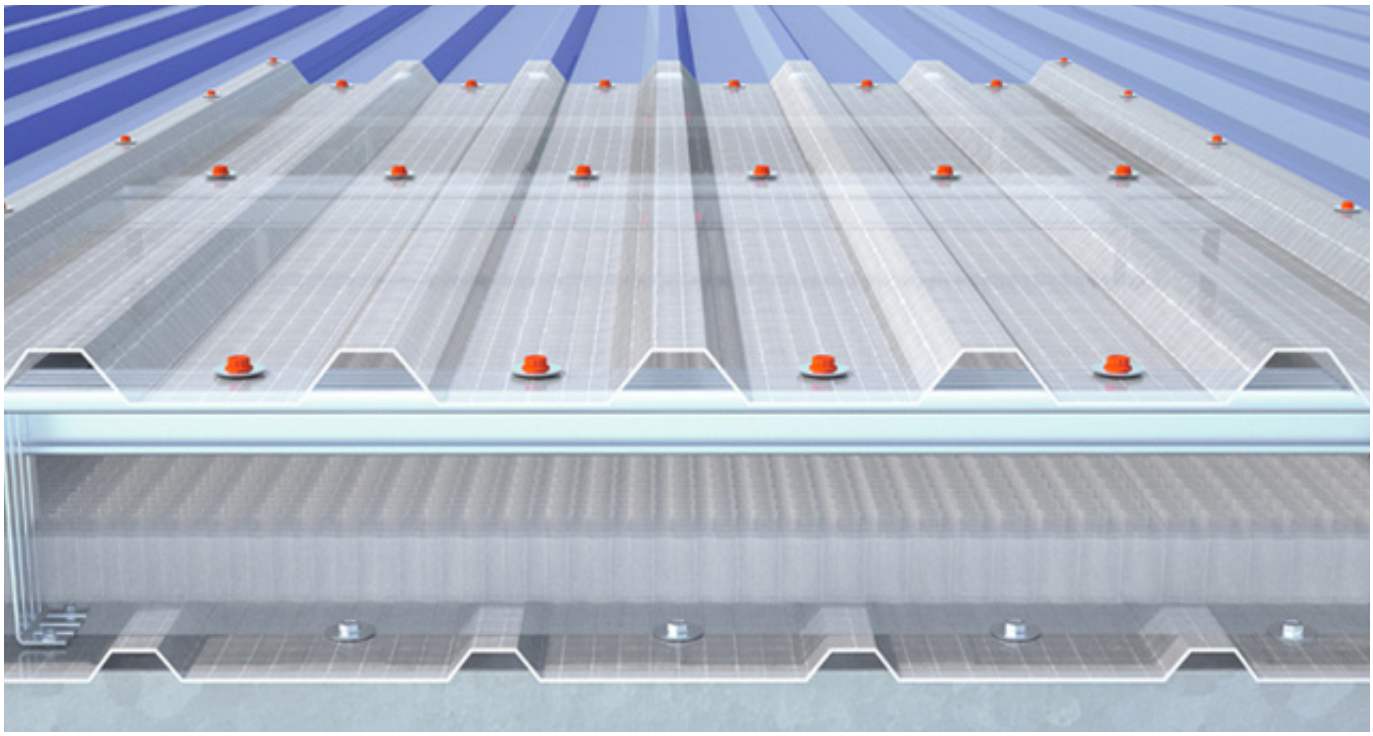
Zenon Pro

Zenon Pro is Hambleside Danelaw's tried and tested range of traditionally reinforced GRP rooflights. Manufactured at our state of the art facility in Daventry, the rooflights are CE and UKCA marked and are profiled to match the building envelope cladding system. With hundreds of profiles available, our Zenon Pro rooflights can be used in new-builds and refurbishment projects.

Made to order, our rooflights can be used in single, double or triple skin assemblies, with a choice between polycarbonate, or Hambleside Danelaw's unique Zenon Insulator for the intermediate insulation layer.

Zenon Pro rooflights are available in all sheet weights defined in the UK Annex to BS EN 1013.

Hambleside Danelaw are members of NARM (National Association of Rooflight Manufacturers) and are passionate advocates of the beneficial impact natural daylight can have in the working environment, and on energy use and the reduction of CO_2 consumption throughout the life of the building



Zenon Evolution

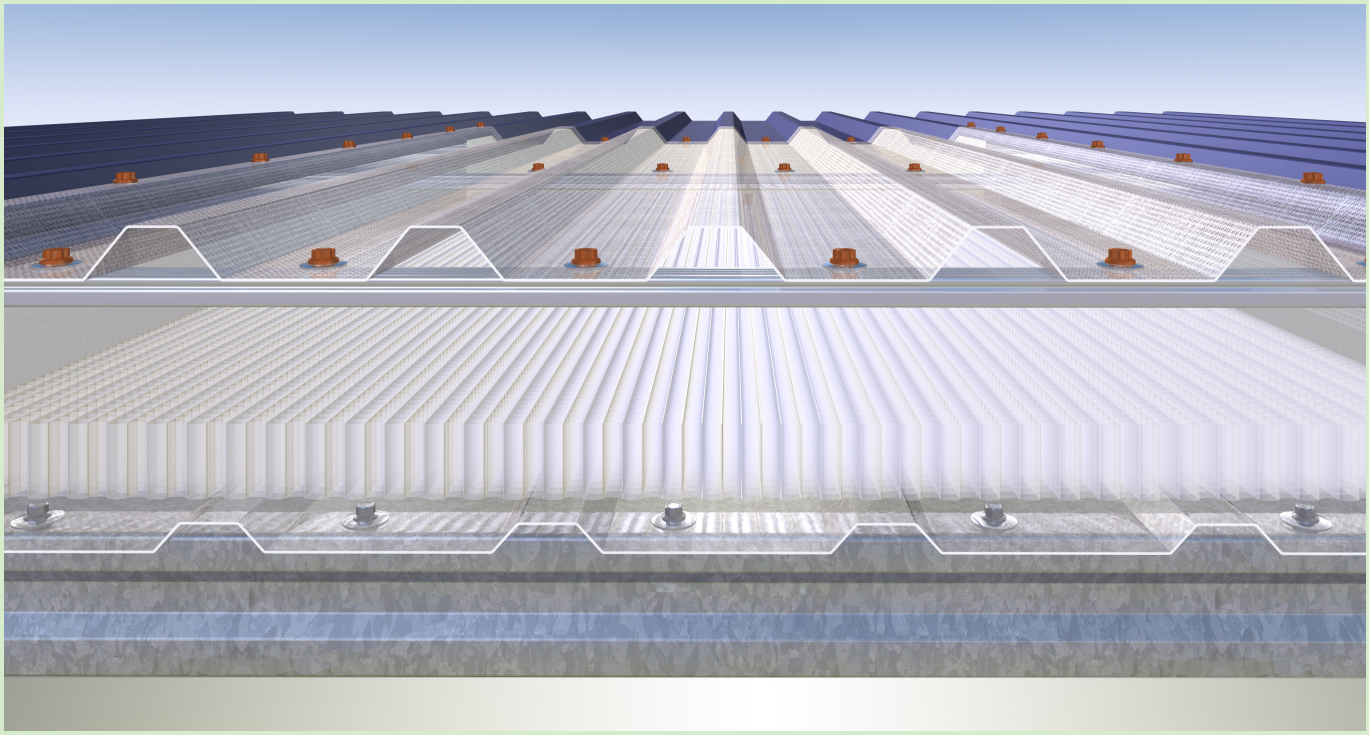
Zenon Evolution is a brand of rooflight from Hambleside Danelaw that is both durable and strong, all while having a lower embodied carbon content than traditionally reinforced rooflights. Zenon Evolution's use of advanced manufacturing reinforcement technology results in a product that exceeds the requirements for the industry standard non-fragility testing, withstanding impacts of more than twice the force needed to pass the test.

Continuous strands of woven glass filaments provide the product with very high tensile strength and resistance to tearing, acting like a safety net. The manufacturing process uses less resin than other market equivalents, offering the best solution for your environmentally conscious industrial, agricultural or commercial building.

With all the benefits of Zenon Pro, Zenon Evolution is a high strength GRP rooflight with low embodied carbon. Due to the lower resin to glass ratio, the rooflight is thinner, allowing for better profile definition and more effective lap detail to suit the surrounding metal sheeting.

The reduction of resin also means Zenon Evolution is significantly lighter than other products with the same non-fragility performance, while still being as durable and impact resistant.

Embodied carbon in the finished Zenon Evolution rooflight range is significantly lower than traditionally reinforced alternatives of equivalent strength.

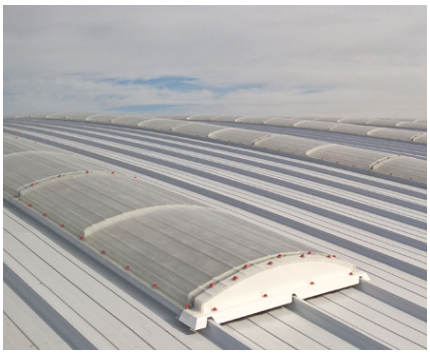


Barrel Vault Systems

Hambleside Danelaw manufacture two types of barrel vault rooflight, Zenon Arc and Zenon Curve.

Barrel vault rooflights are typically used on flat, low-pitched, curved and standing seam, or secret fix roofing systems where the pitch of the roof is below the minimum recommendation for in-plane rooflights.

Both the Zenon Arc and Zenon Curve are designed for installation onto kerbs or upstands in flat, plane or curved roof structures. They can also be installed along ridgelines.



Zenon Arc

Zenon Curve

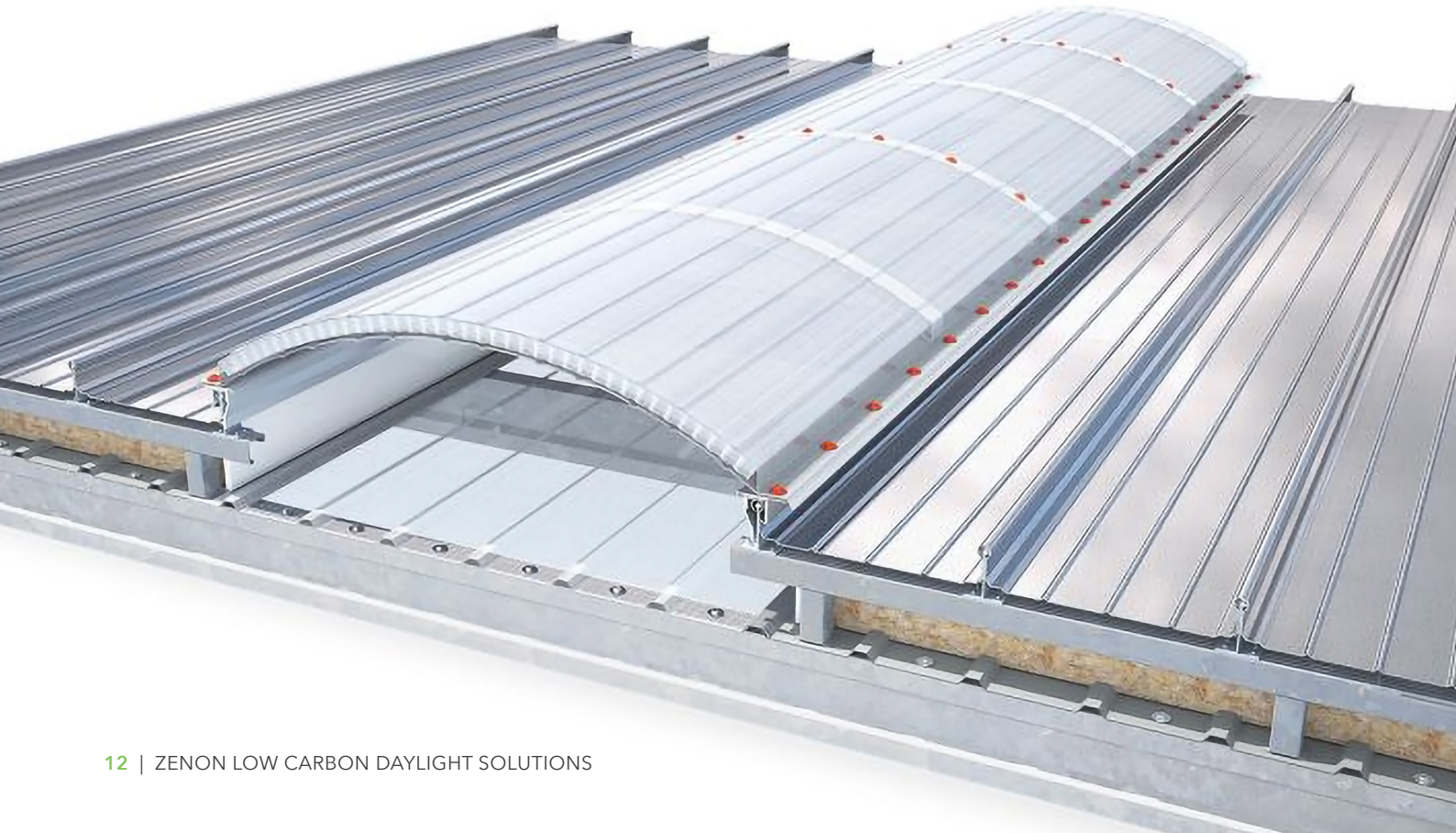
Zenon Arc

Zenon Arc is a modular factory-assembled rooflight which can be insulated with Hambleside Danelaw's Zenon Insulator. They have opening width options of 1000mm and 1200mm.

Zenon Curve

Zenon Curve is site-assembled and has opening width options of 1000mm to 4000mm in 100mm increments. They can be provided in single, double or triple skin configurations.

Both systems can be used with separate in-plane liners and suit new build and refurbishment projects. They also meet the requirements for non-fragility, as tested using the industry standard ACR[M]001.



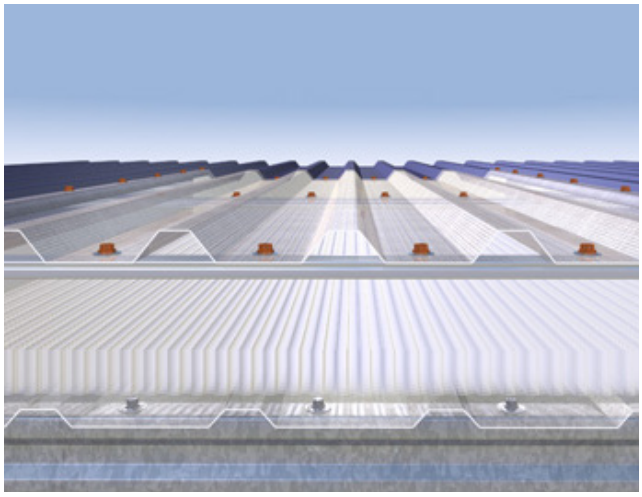
Site Assembled and Composite Systems

Site assembly allows a choice of rooflight weight combinations and insulation options. These are chosen to suit the installation method and the necessary key performance characteristics of the design of the building.

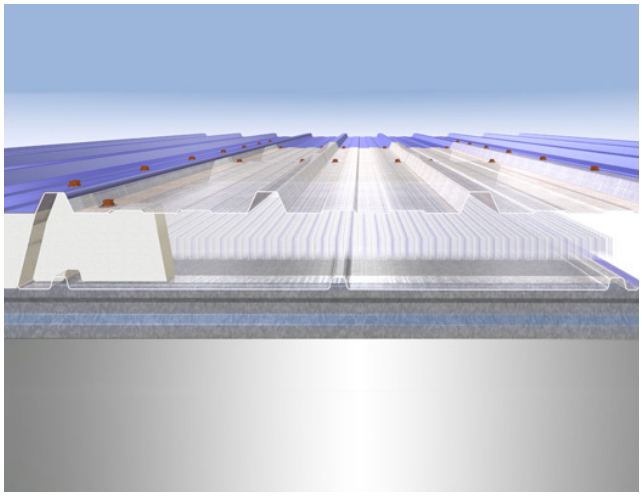
Composite rooflight systems, also known as Factory Assembled Insulated Rooflights (FAIRs), are assembled in the factory and delivered to site ready to be installed as complete rooflight panels, designed to match the profile of the metal composite cladding system. Hambleside Danelaw manufacture rooflights to suit all commonly available composite cladding systems.

Our composite systems are made with Zenon Pro and Zenon Evolution rooflights and can be manufactured to include different insulation layers for improved U-Values, depending on the building requirements. The composite systems also feature unique ZSL50 thermal side strips for enhanced continuity of the roof insulation, reducing the cold between the insulated composite panel and rooflight panel and reducing the risk of condensation forming.

All Zenon rooflights are protected by Zenon Shield, a highly durable UV protective surface film, delivering extended service life duration.



Zenon for Site-Assembled Systems



Zenon for Composite Panel Systems (FAIRs)

Insulation Options

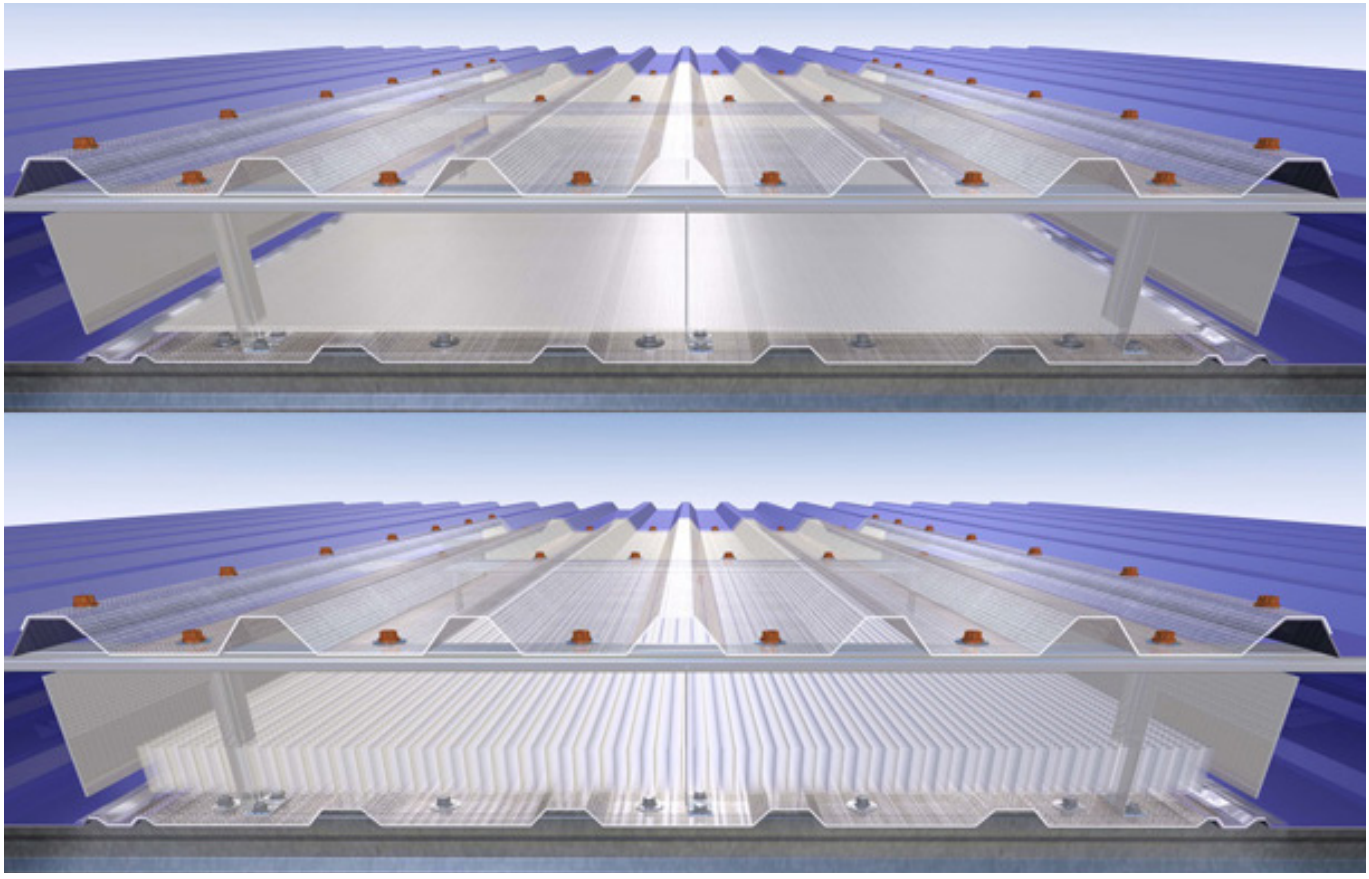
When choosing the best rooflight configuration, a key detail to consider is what insulation to have in the rooflights to ensure thermal efficiency. The insulation also needs to be considered in relation to the impact that layer has on daylight transmission.

Zenon rooflights have a number of insulation options, able to meet all project specific requirements. The most common and simple insulant options used in rooflights is structured polycarbonate supplied as 4mm twin-wall or 10mm multi-wall sheets to improve the thermal performance of a rooflight assembly and meet all Building Regulations requirements.

Zenon Insulator

We also produce the Zenon Insulator which forms a transparent 'honeycomb' cell structure perpendicular to the plane of the rooflight, for excellent daylight transmission.

Unlike horizontal structured layers, the 'honeycomb' cells direct any surface light reflectance into the building through the rooflight with minimal impact on the overall light transmission. The cell structure is of a lightweight high-gloss material designed to maximise reflectance and minimise absorptance to best effect, creating a 'lens' type effect. This, combined with the glass fibres in the GRP rooflight which act as natural diffusers causing light to bounce through the rooflight, provides a better, wider spread of diffused light.



Fire Performance

Zenon rooflights are manufactured from a composite 'thermoset' material resulting in the ability to withstand high temperatures without melting or distortion. This is inherently different to 'thermoplastic' rooflight materials that soften and melt when exposed to increased temperatures.

A rooflight liner should achieve either Class 1 to BS 476-7 or ClassC-s3; d2 to EN13501-1 (the requirements which apply to the inner skin of the of the whole ceiling.

A rooflight outer skin should achieve either AC to BS 476-3; or BROOF(t4) to EN13501-5 (the requirements which apply to the outer skin of the whole roof).

Zenon Pro and Zenon Evolution sheets are available with internal fire grade classifications from Class 3 to Class 0 in accordance with BS476-6 and BS476- 7, and external fire grade classifications up to S.AA in accordance with BS476-3 to accommodate all UK Building Regulation requirements for exposure to fire.

The fire rating of all Hambleside Danelaw GRP rooflight sheets is printed on each rooflight; in addition, a coloured thread is incorporated to identify the fire rating:

- **Red:** identifies sheets which are rated AB to BS 476-3:2004 and Class 3 to BS 476-7:1997
- **Green:** identifies sheets which are rated AA to BS 476-3:2004, and Class 1 to BS 476-7:1997
- **Blue:** identifies sheets that are rated Class 0 to BS 476- 6:1989+A1:2009

Check our website for the latest information on Zenon rooflights.

Zenon for Refurbishment

Replacing rooflights can be a cost-effective method to improve working conditions, extend the life of a building and allow it to become more energy efficient.

In cases where rooflights have been installed for many years, and especially where no maintenance or cleaning has taken place, there may be heavy ingrained surface contamination that may not all be able to be removed through cleaning. Replacing these will have a significant and noticeable effect on the internal daylighting effects, reducing the need for supplementary artificial lighting and prolong the life of the roof.

Previously, 'conventional wisdom' held that the expected amount of rooflight area was 10% of the roof space. It is now recognised that optimum rooflight area could be as high as 20% depending on the project. This means that in buildings that have dim or unlit areas, increasing the rooflight area would allow for a reduced need for artificial lighting and an increase of diffused light in the building.

Zenon have detailed the key considerations for rooflight refurbishment, which can be found in our 'Rooflight Refurbishment Brochure'. Take a look at that for more information. Alternatively get in touch with our team on 01327 701 920.

Zenon Project Gallery

Project: B&Q Store
Location: Merthyr Tydfil
Product: Zenon Curve & Evolution Liner

Project: Cornerstone Distribution Centre
Location: Warrington
Product: Zenon Arc & Pro Liner

Project: Manufacturing Facility Refurbishment
Location: Bournemouth
Product: Zenon Evolution FAIRs

Project: Inspirepac
Location: Wetherby
Product: Zenon Pro site-assembled Triple Skin

Project: Hitachi Rail
Location: Newton Aycliffe
Product: Zenon Pro site-assembled Triple Skin

Project: Rolls Royce Advanced Blade Casting Facility
Location: Rotherham
Product: Zenon Curve & Evolution Liner

Gaining the knowledge

We understand that specifying rooflights can often be a challenge as there are many factors to take into consideration and there is no 'one size fits all' approach (or no single optimum specification) for the rooflights to deliver the optimum specification for your project. . We are committed to providing you with the highest level of information so you can make informed choices that you can be confident will provide the ideal solution for your project. We have a wide range of literature, CPD seminars and the Zenon Performance Calculator. We are also on hand to offer any technical advice you need.

To contact us just email: techelp@hambleside-danelaw.co.uk

CPD Seminars

Our CPD seminars 'Low Carbon GRP Daylight Solutions for the Metal Building Envelope' and 'Understanding Rooflights Level 1 – NBS and Other Specification Requirements', have been designated as 'core curriculum' by RIBA when delivered to members 'in house'.

The Zenon Performance Calculator

The Zenon Performance Calculator allows the user to select different components within an in-plane rooflight assembly to demonstrate the effects different rooflight configurations have on the rooflight's performance in respect of light transmittance, solar transmittance, U-value and embodied carbon dioxide (CO_2e)*.

Find our perfomance calculator on our website.

*All values are typical

White Paper: Sustainability from Natural Daylight in the Built Environment

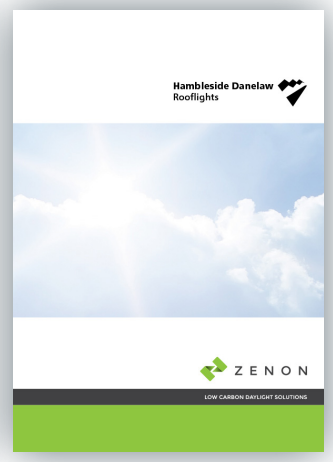
The construction industry currently influences 47% of annual global $C0_2$ emissions. This makes it more important than ever to be working towards Net Zero.

Hambleside Danelaw have always made it a priority to reduce the impact we have on the environment, with Zenon Evolution GRP rooflights having lower embodied carbon that similar alternative products.

In a world where we need more than ever to build with the environment in mind, Hambleside Danelaw have written a White Paper that discusses how natural daylight can impact sustainability in the built environment. This White Paper aims to offer a broad context of sustainability in the construction industry, while highlighting the benefits of natural daylight delivered through GRP rooflights.

To request a copy of our White Paper, please get in touch with us at: marketing@hambleside-danelaw.co.uk.

ZENON®



Further Information

To download more Zenon documentation including Guides; Datasheets; Guarantees & Standards; BBA Certificates; DOPs and EPDs please visit:

www.hambleside-danelaw.co.uk/downloads/

bsi
ISO 9001 Quality Management Systems CERTIFIED FM 23063
ISO 14001 Environmental Management CERTIFIED EMS 500154
ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 532271

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Zenon_Brochure_June2021

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