



Z E N O N[®]

ROOFLIGHT REFURBISHMENT GUIDE

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The Case for Refurbishment

Refurbishment offers building owners a means of improving the appearance, value and performance of the existing building.

Refurbishment in many cases is proposed when either the building is changing its use/ownership or problems arise associated with the existing buildings envelope such as damage or leakage. This is not always the case, which is highlighted later in this brochure. Though it is important to point out, issues with the building itself, if addressed before it becomes irreparable can be part of a planned maintenance or repair programme.

The most common reasons for refurbishment:

- Aesthetic appearance of the building
- To increase the property's asset value
- Improve working environment by utilising natural daylight for the building occupants
- To improve thermal efficiency and reduce energy costs of the building
- To repair damage such as leaking components and continuous costly maintenance of roof issues

Associated risks may include:

- Removal and disposal of hazardous material
- Potential for work to cease to continue during refurbishment
- Protection of the workforce and surrounding buildings

To minimise these risks it is essential that:

- A thorough survey of the building is carried out by a qualified individual
- A vigorous health and safety plan is developed
- Employing specialist contractors

The client should consider, when taking an economic stand point, the long-term life cycle costs of the building, compared to the rate for materials needed for refurbishment and the installation cost. Remembering to factor in potential savings from improved energy performance.

The principle categories in roof refurbishment for the industrial (non-domestic) building is re-sheeting, overcladding and the replacement of rooflights. All of these can include the process of replacing the rooflights, increasing the rooflight area or adding rooflights if they were not present initially.

Things to consider before choosing the suitable refurbishment options:

Before choosing the most fitting refurbishment option, it is important for the client to consider all the factors associated with that choice. This will help plan and manage risks. These factors may include:

- What does the client hope to achieve? - The main reason for refurbishment
- Regulatory requirements
- Time-scale and budget requirements
- Occupancy of the building during refurbishment
- Health and safety considerations - including safe access and internal protection for the occupants and contractors, particularly if the building is going to stay in use
- What is the condition of the existing building envelope?
- Can hazardous materials be left undisturbed?

The case for rooflight replacement:

- The internal and external safety of people accessing the building
- Health and wellbeing of the occupants in the building
- Improved light distribution
- Savings in energy costs;
 - Reducing reliance on artificial lighting
 - Where insulation upgrades to the building are not practical or possible





Re-sheeting, Overcladding and Rooflight Replacement

Re-sheeting requires either the full removal of the existing building envelope and replacing with a complete new system or the removal of the outer skin in a site assembled application and then replaced.

Overcladding, however, the existing building envelope is left in place and is used as a base layer for the installation of the new cladding system.

Alongside these two refurbishment options there are cases where the need is to just replace the rooflights. The choice between re-sheeting, overcladding and rooflight replacement will depend on the individual project requirements and circumstances.

Outlined below are some refurbishment considerations:

	ADVANTAGES	DISADVANTAGES
RE-SHEETING	<ul style="list-style-type: none"> • Potential to improve the internal working environment for occupants • Hazardous building material if present can be removed • Easier to modify rooflight layout and increase rooflight area • Potential to improve air-tightness and thermal performance • Improved appearance internally and externally • Opportunity to alter the building configuration • Opportunity to increase the rooflight area 	<ul style="list-style-type: none"> • The need for internal protection of goods and personnel, should be accounted for during the installation phase of re-sheeting if occupied • The cost of disposing hazardous materials if present • A higher level of disturbance to occupants and operational processes if occupied • Generally the most expensive choice for refurbishment • The building's contents will be exposed to all weather conditions
OVERCLADDING	<ul style="list-style-type: none"> • Usually it is less expensive to overclad as a refurbishment option • Insulation can be upgraded • Minimal disturbance to building operation and occupants • Reduced need for internal protection during installation • Faster installation than re-sheeting option 	<ul style="list-style-type: none"> • Over cladding relies on the integrity of the existing building/structure • The building owner will need to maintain a log of hazardous material within the structure, such as asbestos • The cost of the removal of asbestos containing material will need to be allowed for at the building's end of life • Upgrading internal appearance and rooflight layout is more difficult
ROOFLIGHT REPLACEMENT	<ul style="list-style-type: none"> • This can be a cost efficient way to improve occupants working environment particularly if there is a small area of rooflights or aging has caused damage and discolouration • It can improve the energy efficiency of the building, by using less artificial light • Generally less invasive compared to other refurbishment options • Can be used instead of the other refurbishment options if an issue lies with the original rooflight 	<ul style="list-style-type: none"> • This option is only viable if the rooflights are the reason for any issues and/or improvements to the building • The process of replacing rooflights to a fragile roof can be problematic, an initial survey would need to check the integrity of the building • Replacing rooflights might be less cost effective if replacement sheeting is also required • Extra care of the surrounding roof would be required for rooflight replacement only

In every case, a thorough structural and hazardous material survey needs to be undertaken prior to work being carried out to establish the most appropriate refurbishment solution.

THE CASE FOR INCREASING A BUILDING'S ROOFLIGHT AREA

Improving Daylighting and Lighting Controls on Existing Non-Domestic Buildings

An independent report by Elmhurst Energy analysed three types of existing non-domestic buildings examining the 'effects of increasing the quality of daylighting and increasing the efficiency of electric lighting on both running costs and carbon emissions'. The analysis reviewed an industrial building, a retail building and a school and the report details the available savings overall, alongside the savings achieved by each measured independently.

In all three examples, the effect on improving daylighting with a combination of more efficient modern rooflights, and fitted to an appropriate percentage of the floor area, offered greater savings in conjunction with the existing lighting system. In comparison to improving the efficiency of the electric lighting system in conjunction with the existing rooflights. The greatest savings were achieved with a combination of all the variables.



Maintenance and Damage Repair FAQs

I have a newly installed composite panel rooflight that has been damaged by other trades or persons unknown. Removal and replacement of the whole panel is expensive and disruptive to the newly installed roof. What else can I do?

One consideration, depending on the extent and location of the damage, is to remove the fasteners, thoroughly clean the surface and install a new single layer of matching rooflight profile over the top. The fasteners should be inserted in a new location or over-sized options used in the same hole, and the full perimeter of the additional layer sealed to the existing rooflight to prevent the ingress of water and contaminants.

Do you supply a GRP rooflight repair kit?

No. Please see Q&A below.

How do I repair a rooflight that has been damaged?

Generally, and to maintain the non-fragility status of a rooflight, any damaged rooflights should be replaced. The need to ensure that the non-fragile status is maintained means that repair kits can no longer be used effectively. Hambleside Danelaw publish separate guidance on assessing and dealing with rooflight damage.

Is it not better to clean and coat the rooflights with a glaze rather than attempt to replace them?

This approach can extend the life of the rooflights and reduce the frequency of cleaning old rooflights to maintain good levels of light transmission. However the total cost associated with these works and the lack of any guarantee on the applied coating generally means that it is much more cost effective to replace them with a new product carrying a guarantee on service life.

We have a customer that complains of the building being too hot in the summer months. Can I paint over the rooflights?

Solar over-heating can be worsened by the inclusion of large areas of rooflights, however the heat from the sun is also likely to be passing through the rest of the roof and wall cladding and contributing to this and adding to any internal heat gains. For most of the year, the heat from the sun passing through the rooflights is a good thing and can significantly reduce the heating required.

Rooflights that have been covered over cannot usually be easily uncovered and recovered to suit the changes in weather, and any coating applied to the rooflight may only have a short effective period. The preparation and application also risks damage to the rooflights and foreshortening their service life. A better approach is to consider improving the ventilation provision to the building.



Safety FAQs

Is it better to fit protective safety systems over the top of old rooflights?

The UK GRP rooflight industry generally does not support the use of these products as they significantly reduce that important free resource of daylight and make effective inspection and cleaning difficult or impossible.

They can increase the risk of fastener and abrasion damage to the rooflight surface during installation and can result in leaks developing. More particularly, there are concerns over the lack of the untested long-term performance and inspection/certification criteria that is applicable to safety lines, anchor points etc.

How can I tell when a rooflight has become fragile?

Since the publication of the first edition of the Advisory Committee for Roof Safety's (ACR) Red Book, ACR[M]001, rooflights supplied by members of the Rooflight Association (RA, formerly NARM) have been designed and tested for long periods of non-fragility, subject to specification, but many other factors can impact on this.

It is often likely to be the case that this is not possible to identify by means of inspection only how strong and non-fragile a rooflight might be, and if in doubt, the whole of the roof including the rooflights should be treated with caution. It is possible that an old rooflight can still be structurally very strong, but deterioration of sealants and the corrosion and/or loosening of fasteners in the metal or fibre cement sheeting together with the corrosion of unseen internal components can result in unsafe roof assemblies.

When refurbishing a roof, do I have to use the strongest and safest rooflights possible?

No. There are different options of weights and types of rooflight available that will all be safe, but if the roof might already be fragile, especially in the case of fibre cement sheeting, the classification of the rooflight can be regarded as no better or safer than the worst part of the roof.

What is the highest non-fragility rating for a rooflight?

The test and classification for non-fragility is detailed in a the ACR[M]001 'Red Book'. Broadly speaking, the highest classification for most roof assemblies will be Class B. It is a classification for the whole roof assembly irrespective of the presence of a rooflight, so a rooflight cannot have a better classification than the roof it is fitted into.

Class A is only achievable if no element of the roof assembly is damaged during the ACR test - something that is generally only possible with roof constructions designed to resist high impact loadings such as those with concrete decks and rooflights designed for floor type loadings. For more information on this subject, check out the 'Non-Fragility' section of our technical manual.

Watch our High Impact Tests on YouTube



Replacement - Design Considerations FAQs

Can I just replace the outer skin of composite panel rooflights?

No. These rooflights are supplied as a pre-assembled panel. To remove the outer skin, the whole panel would require removal.

Is it a good solution for single skin rooflight applications to install specially manufactured rooflights with double or triple skin panels that fit between purlins?

This method can certainly improve light transmission and reduce heat loss and condensation, however there will still be significant cold-bridging on the purlin where the rooflight remains single skin. The localised condensation may, at certain times of the year and depending upon building use, lead to dripping of the condensate.

The customer would like the rooflight area to be increased. Is this possible?

Where the building may only contain small areas of rooflights, such as the old 'rule of thumb' 10%, in most situations increasing the rooflight area can reduce the need for artificial lighting, particularly if there are areas that are gloomy and not well lit.

Do I need to improve the thermal performance of new rooflights compared to the existing ones?

As a general rule, rooflights that are being replaced due to damage need only be replaced to the same standard of the damaged rooflight.

Where a series of rooflights are being refurbished to improve their performance and the daylighting within the building, then they should be upgraded to comply with current Building Regulations minimum standards wherever practicable. The requirement should also take into account the cost of the actual work and expected payback period and whole project cost.

Dependent upon the scale of the work, the cost involved, and the expected payback period; In many cases, some improvement to the thermal performance can be quite simple, straightforward and cost effective to be of benefit the building anyway.

What options are there to reduce the heat loss through the rooflights without noticeably reducing the light transmission?

Most solutions involve increasing the layers within the rooflight cavity, but every layer reduces the light transmission. The Zenon Insulator product works in a different way and traps air in small transparent cells. This significantly reduces the convection currents carrying heat through the rooflight without adding more and more layers.

Replacement - Design Considerations FAQs (continued)

When the rooflights need to comply with Building Regulations, what should the maximum U-value be?

Building Regulations Approved Document L Volume 2 (2021 edition for use in England) that covers buildings other than dwellings now requires rooflights to have a maximum U-value of $2.2\text{W}/\text{m}^2\text{K}$ when calculated or tested in the horizontal plane. Previously under Approved Document L2B (2013), the requirement for the thermal performance of rooflights was taken in the vertical plane. Then the guidance given in BR443 provided for a $+0.3\text{W}/\text{m}^2\text{K}$ adjustment to a rooflight giving a $2.5\text{W}/\text{m}^2\text{K}$ maximum value when used horizontally. Hambleside Danelaw quote all U-values in the horizontal plane unless otherwise required.

Building Regulations Approved Document L Volume 2 (2022 edition for use in Wales) that covers buildings other than dwellings requires rooflights to have a maximum U-value of $2.2\text{W}/\text{m}^2\text{K}$ when calculated or tested in the horizontal plane.

Building Standards Non-domestic Technical Handbook (2023 edition for use in Scotland) requires rooflights to have a maximum U-value of $2.2\text{W}/\text{m}^2\text{K}$ when calculated or tested in the horizontal plane.

Will increasing the rooflight area not increase the cost of heating the building?

In a typical industrial shed building with high bay sodium lighting, the energy consumption of the artificial lighting is often around four times that of the energy lost through the reduced insulation values caused by the increased rooflight area. Even with low energy LED lighting systems, this often only reduces to three times the cost. It is usually more cost effective to save on lighting cost rather than heating costs



Replacement - Specification FAQs

What information do you require for a rooflights order?

For in-plane rooflights to match new metal sheeting or composite panels, or where the profile is known, you need only state the manufacturer, profile and lengths needed, plus box depths and filler positions for composite panels. Don't forget to allow for the minimum recommended end lap distances.

How can we identify what the metal profile is?

Sheet profiles can be identified by measuring key dimensions - cover width, pitch (distance from one corrugation to the next), depth of profile, crown and trough widths etc. Because many profiles have a similar shape and appearance to others, the dimensions should be measured accurately and to the nearest 1mm as possible. We carry over 600 profiles in our range and can assist with profile identification.

Can Hambleside Danelaw provide me with the correct specification of rooflights for my refurbishment project?

There are many permutations and combinations of rooflight specification available to suit all needs and different criteria. The Hambleside Danelaw Technical Manual provides comprehensive guidance on the performance expectations for different combinations of rooflights. However, we are not building designers and so the final decision on rooflight specification must be decided by the contractor carrying out the work.



Post Refurbishment FAQs

We have refurbished the cladding of a building and now the occupier is experiencing more condensation in the rooflights. Why is this?

It is possible that when an over-cladding system has been installed and significant improvements to the insulation made, the internal air temperatures become significantly higher and for much longer. These higher temperatures allow the air to contain much higher levels of moisture which in turn may pass through the tiniest of holes or breaks in the sealant between sheets and then condense in the roof build up where it can only be seen in the rooflight cavity.

Sometimes when a building changes its use from one function to another, and the occupants are using processes or equipment that give off more heat than the original building use, condensation issue may arise that were previously not present.

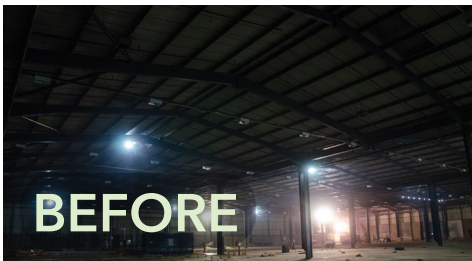


Refurbishment type:
Rooflight replacement

Product:
Zenon in-plane composite panel with Zenon Evolution outer sheet

Refurbishment type:
Rooflight replacement

Product:
Zenon Arc barrel vault rooflight with Zenon Pro outer sheet



Refurbishment type:
Roof refurbishment introducing new rooflights

Product:
Built-up system overclad with Zenon Pro and Evolution

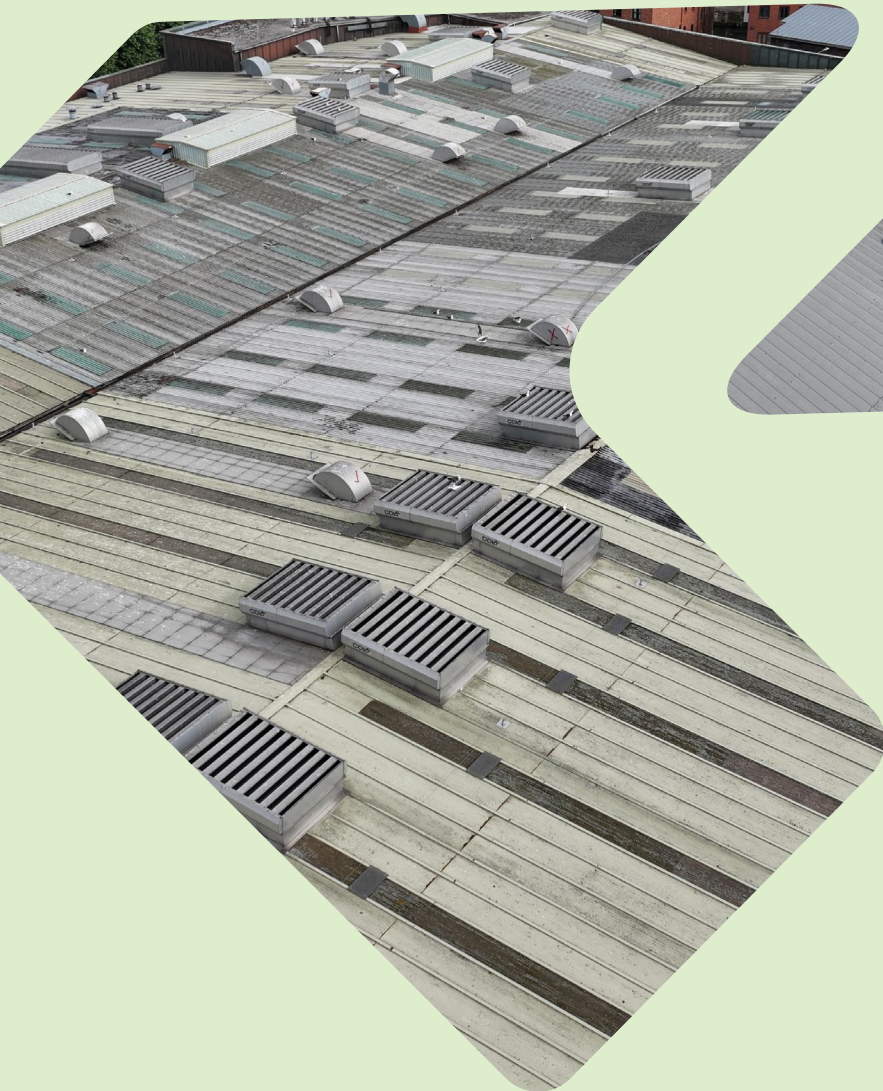
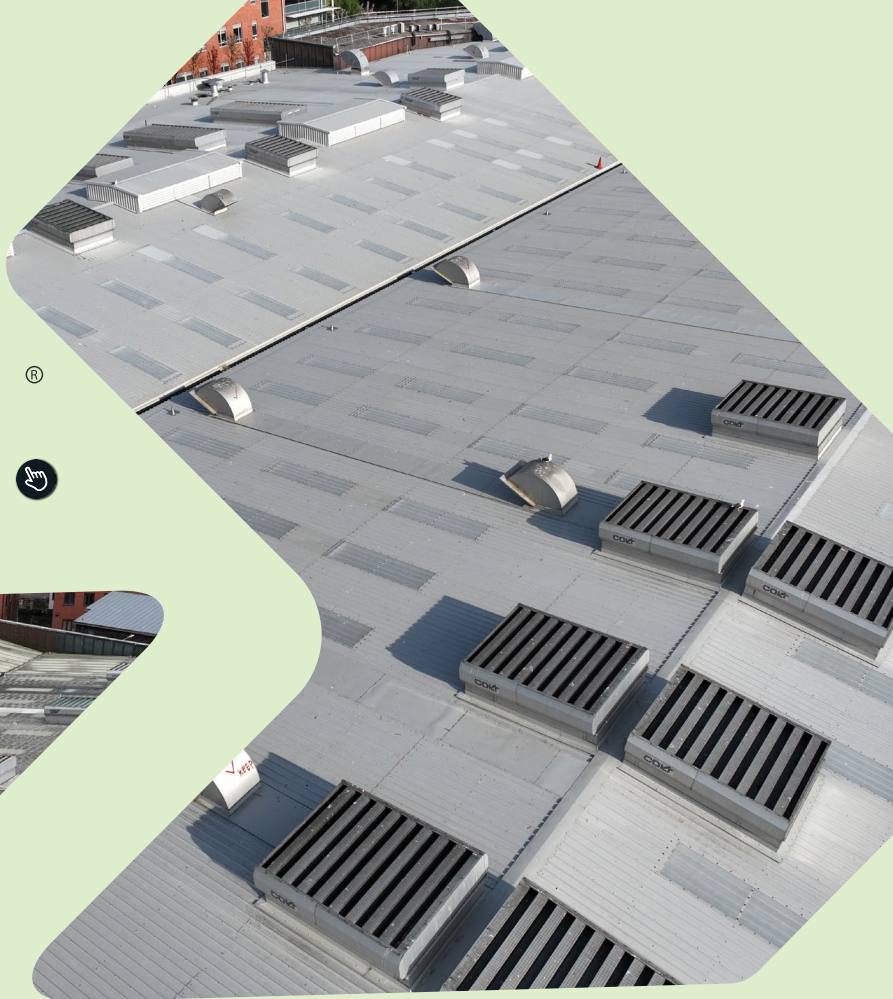
Refurbishment type:
Rooflight replacement

Product:
Zenon Arc barrel vault rooflight with Zenon Pro outer sheet





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**Hambleside Danelaw
Building Products**



Hambleside Danelaw Ltd has a continuing product development programme. In accordance with our policy for continuous improvement we reserve the right, should the need arise, to amend product specifications without prior notice.

Zenon is a product of Hambleside Danelaw Limited

For further support on refurbishment and rooflight damage or to find out more about our Zenon rooflight products please contact us using any of the following methods.

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