EUROLUX

EXPLORING ROOFLIGHTS

KEY ASPECTS, TYPES AND PRODUCT REQUIREMENTS

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1. INTRODUCTION

Daylight is a free and invaluable natural resource for human beings, and rooflights provide an exceptional means of accessing it.

Rooflights, due to their size and strategic placement, are uniquely capable of delivering abundant natural light into large spaces, ensuring even distribution and enhancing both visual and thermal comfort indoors.

The integration of rooflights into building design has been recognised as a best practice for improving occupant well-being, fostering energy savings, and reducing reliance on electric lighting and mechanical ventilation systems.

Modern rooflights, featuring advanced materials, effective insulation, and solar protection, support thermal energy efficiency while allowing natural ventilation to combat climate change and indoor overheating[1].

This document delves into the key aspects of rooflights, examining their types, materials, shapes, and compliance requirements. By understanding these elements, designers and specifiers can optimise daylighting strategies and achieve energy-efficient, aesthetically pleasing spaces.

[1] Eurolux paper: Rooflights' Contribution to Building Energy Performance

2. KEY ASPECTS OF ROOFLIGHTS

Rooflights come in a wide array of materials, types, and shapes to choose from.

Each option, as well as their combinations, offers unique advantages tailored to specific applications, enabling architects and builders to meet precise project requirements effectively.

2.1. ROOFLIGHT MATERIALS

When selecting materials for rooflights, factors such as U-value, acoustics, light transmittance, diffusion, weight, and impact resistance must be considered during the design and selection process.

Balancing these factors ensures the chosen product meets the specific needs of the building project—whether optimising thermal efficiency, enhancing sound insulation, maximising daylight, achieving uniform light diffusion, managing structural loads or providing impact protection.

Selecting the right material is crucial to achieving optimal performance and functionality while complementing the overall design aesthetic.

Beyond aesthetics and functionality, modern building design prioritises energy efficiency and sustainability. Modern design software enables the integration of environmental performance data into the overall assessment of a building's environmental impact.

The new Construction Products Regulation 2024/3110 mandates the declaration of environmental performance for construction products through new standards, which will be introduced over the next decade, and will be incorporated into the building assessment schemes.

2.2. TYPES OF ROOFLIGHTS

Rooflights come in various types, each designed to fulfil specific functional and aesthetic needs in industrial, commercial, and public buildings such as schools, hospitals, libraries, conference halls, exhibition centres, and sports facilities.

They can be broadly categorised into two main types: **individual rooflights** and **continuous rooflights**.

Individual rooflights. Credit: Lamilux

Individual rooflights (regulated under European Standard EN 1873) are standalone units strategically positioned across the roof to deliver daylight to specific areas of a building. These units can often be opened or closed individually, making them ideal for targeted natural lighting or natural ventilation needs.

Continuous rooflights. Credit: Lamilux

Continuous rooflights (regulated under European Standard EN 14963) extend across larger sections or even the entire length of a roof. They provide a seamless, unbroken expanse of illumination, flooding large interior spaces with natural light. These rooflights are commonly used when the design prioritises maximising daylight across expansive interiors, creating a more open and visually connected environment.

1. **Fixed Rooflights**

Credit: Lamilux

Fixed rooflights are stationary, non-opening units designed to maximise daylight entry. They are ideal for spaces where natural ventilation is not a priority but abundant natural light is essential.

These rooflights can be constructed from various materials, such as glass or polycarbonate, and come in diverse shapes to complement the building's design.

2. **Opening Rooflights**

Credit: Kingspan Light + Air

Opening rooflights can be opened and closed manually or via automated systems, providing both natural light and ventilation.

Advanced automated systems may include sensors to monitor environmental factors like temperature, humidity, CO_2 levels, or indoor air quality, adjusting ventilation automatically for optimal comfort. Additionally, remote control functionality enhances user convenience and flexibility.

3. Tubular Rooflights

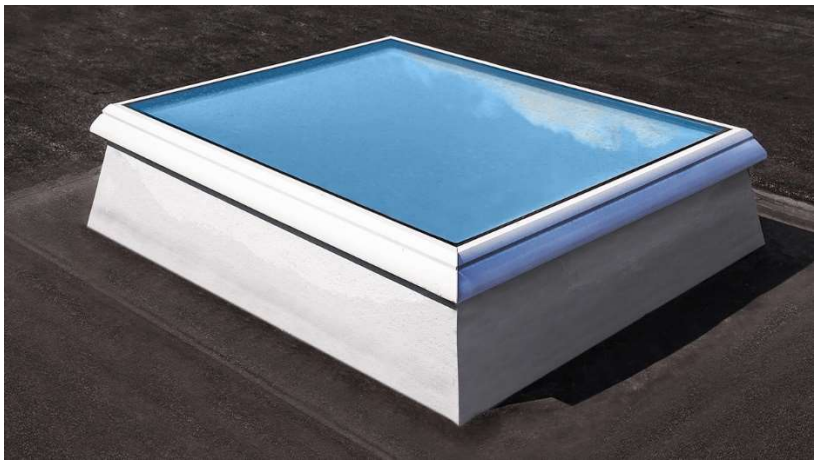
Credit: Velux USA

Tubular rooflights feature a compact, roof-mounted dome that captures daylight and channels it through a reflective tube into the interior below. They are particularly effective for introducing daylight into spaces far from the building's perimeter.

2.3. SHAPES OF ROOFLIGHTS

Rooflights come in various shapes and configurations to suit different architectural styles and functional requirements.

1. Flat Rooflights



Credit: Lamilux Skylights

Flat rooflights have a minimalist design and are typically used in modern and contemporary buildings. Flat rooflights can be either fixed or openable, depending on the desired functionality.

2. **Dome Rooflights**

Credit: Kingspan Light + Air

Dome rooflights are characterised by their rounded, dome-like shape. They are commonly used in commercial and industrial buildings, and are known for their durability and ability to withstand harsh weather conditions.

3. **Pyramid Rooflights**

Credit: Lamilux

Pyramid rooflights feature a pyramidal or triangular design. Due to their capacity to add unique architectural functionalities, these rooflights are often used in public spaces like atriums.

4. **Multi-Faceted Rooflights**

Credit: Kingspan Light + Air

Multi-faceted rooflights feature multiple faces or facets that capture light from different angles. This design enhances light diffusion and distribution, making them suitable for large interior spaces like shopping malls and exhibition halls.

5. **Sloped Rooflights**

Credit: Kingspan Light + Air

Sloped rooflights are designed to match the pitch or slope of the roof, blending with the building's architecture while maintaining the roof's aesthetic integrity.

3. PRODUCT REQUIREMENTS

Two European standards play a crucial role to legally place rooflights in the European market: EN 1873, which covers individual rooflights, and EN 14963, which applies to continuous rooflights.

These harmonised European standards address a wide range of essential performance requirements, including material composition, mechanical properties, fire resistance, load-bearing capacities under dynamic and static conditions, air permeability, thermal transmittance, and watertightness.

The CE marking and the Declaration of Performance (DoP) associated with compliance supports the product selection process for specifiers, architects, and construction professionals, offering assurance that the product meets all relevant regulatory requirements.

The **Eurolux Quickguide 01** and **Eurolux Quickguide 02** are additional resources for understanding the Declaration of Performance (DoP) for individual and continuous rooflights.

4. SUMMARY

Rooflights are a cost-effective solution for integrating daylight into non-residential buildings, including commercial, healthcare, educational, and industrial buildings.

With a wide range of types, materials, and shapes to choose from, rooflights provide architects and builders the flexibility to create well-lit and visually appealing spaces that prioritise humans, while providing functionality and reducing the operational energy bills.

Rooflights are indispensable in creating sustainable, energy-efficient buildings that prioritise human well-being. By understanding the types, materials, and regulatory requirements, architects and designers can incorporate rooflights to achieve both functional and aesthetic goals. As building technologies evolve, rooflights continue to play a transformative role in shaping the future of architectural design.

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