# Choosing the right material and colour

*Rooflighting material must allow light through; satisfy all durability, thermal, safety and fire requirements; and work well with the roof material and/or the glazing system being used.*

## Choosing the right material

The most widely used rooflight materials are glass-reinforced polyester (GRP, or fibreglass), safety glass, polycarbonate (PC) and, to a lesser extent, PVC.

### SAFETY GLASS

Glass has excellent fire properties, good impact performance, very high light transmission and provides the benchmark against which the optical clarity of all other glazing media is commonly compared. It is widely acknowledged as having a very long life span with no discolouration from UV degradation, and laminated versions provide a good level of reduction in UV transmission.

Glass is often used for atria in shopping centres and flat, glazed rooflights are currently in fashion, although glass can also be curved for use in barrel vault rooflights or supplied with various coatings, interlayers and surface treatments to provide coloured or textured surfaces that offer diffused glazing, solar control and total UV protection to areas beneath the glazing.

### GLASS-REINFORCED POLYESTER (GRP)

Also known as fibreglass, GRP remains the most versatile and commonly used profiled glazing material.

GRP offers excellent performance properties and provides high levels of diffused light. In most industrial, sporting and commercial situations, diffused light, which minimises glare and distracting shadows, is preferable.

GRP is produced to match almost all roofing profiles and is ideal for barrel vault design. **MODEK** high-quality GRP sheets incorporate UV-absorbing surface protection that can virtually eliminate long-term discolouration. In a budget-conscious world, GRP is a very cost-effective rooflighting material.

**For more information on GRP see More about MODEK GRP.**

### POLYCARBONATE (PC) AND OTHER THERMOPLASTICS

Polycarbonate is a clear thermoplastic formed under heat and fixed in shape by cooling. It can be recycled by reheating it to a liquid state. When correctly processed and handled, it can provide excellent impact resistance and good resistance to UV and weathering.

Other thermoplastics include **PVC**, which is largely used in DIY and agricultural markets, but rarely in industrial or commercial applications due to its fragility.

Acrylic has good UV resistance and is used in the manufacture of barrel vaults, modular domes and pyramids, although it is limited when it comes to impact strength and fire resistance.

**For more information on polycarbonate (PC), see More about MODEK PC.**

## Choosing the right colour

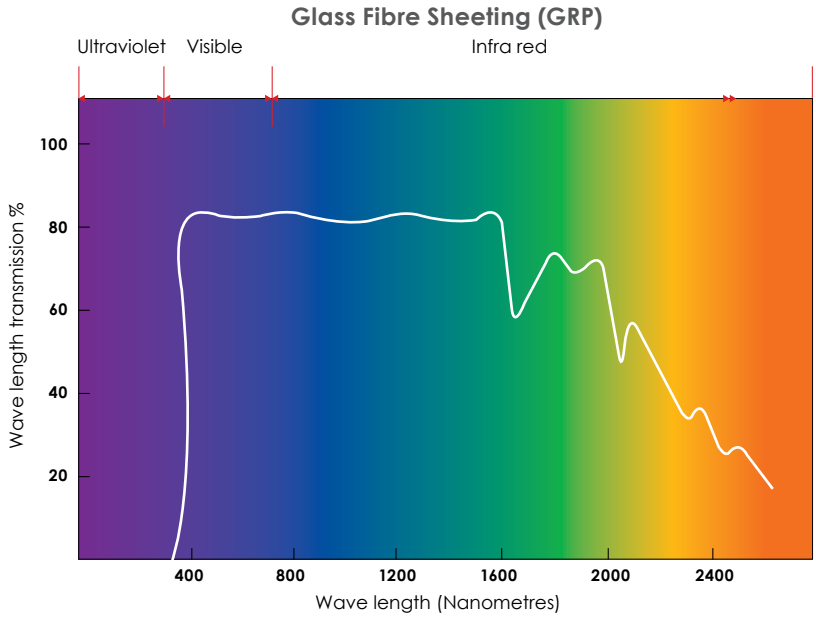
The colour/tint chosen for rooflighting can be used to minimise solar heating.

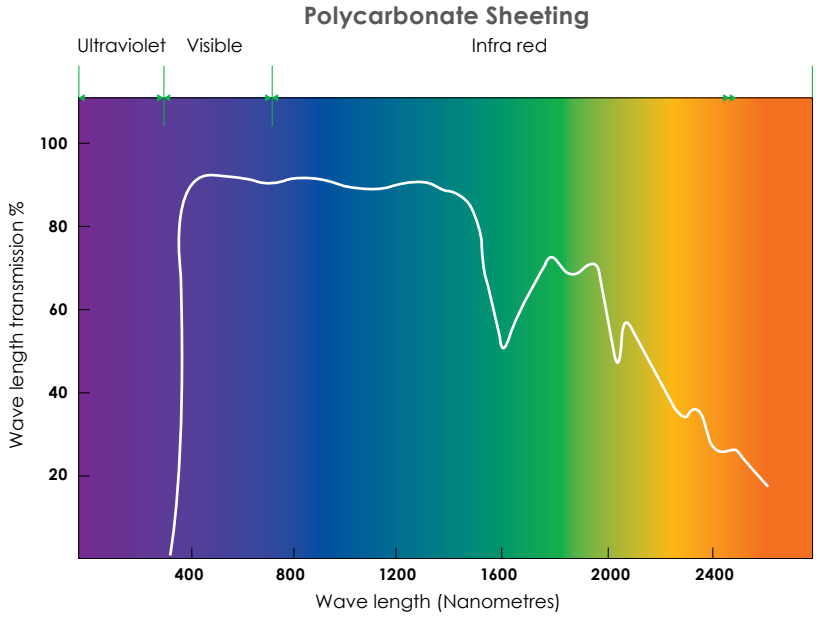
More than 70% of the heating effect of the sun is carried by light that falls between 350 and 800 nanometres – generally, the visible light spectrum.

By changing the wavelengths of light that are transmitted through a material – in other words, by changing the colour of the material – one can effectively alter the levels of solar gain to avoid overheating.

### In summary

- Two materials are most commonly used for rooflighting are glass-reinforced polyester (GRP) and polycarbonate (PC), each with their own strengths and weaknesses.
- Choosing the right colour/tint of rooflighting material can help minimise solar gain and so prevent overheating.




These diagrams depict the transmission of light at various wavelengths (colours) for clear sheets of GRP and polycarbonate. The graphs show that more than 80% of visible shortwave radiation is transmitted through GRP and PC sheets, while harmful UV rays are blocked.
Visible shortwave radiation that is transmitted into a building or room is then absorbed by surfaces inside, turning these surfaces into heat radiators. However, the heat emitted from these "radiators" is long-wave radiation, which is not so readily transmitted through the sheet again.
The result: trapped heat builds up in the room in what is known as the greenhouse effect.

An effective method of combating heat build-up through the greenhouse effect is to have good through ventilation and to use tinted roof sheeting, as outlined in the tables below.

### Glass Fibre Sheeting (GRP)

| Roof Shet Tint | Clear | Blue | Green | Opal 50 |
|---|---|---|---|---|
| Visible Spectrum (380mm - 700m) | | | | |
| % Light Transmission | 85 | 40 | 50 | 50 |
| % Light Reflectance | 15 | 8 | 10 | 48 |
| Solar Energy (350mm - 2100mm) | | | | |
| % Rejected | 16 | 40 | 34 | 42 |
| % Direct Transmission | 83 | 47 | 57 | 57 |
| % Direct Reflectance | 12 | 7 | 8 | 39 |
| % Absorption | 5 | 46 | 35 | 4 |
| % Total Transmission | 84 | 60 | 66 | 58 |
| | | | | |
| Shading Coefficient | 0.97 | 0.69 | 0.76 | 0.67 |

### Polycarbonate Sheeting

| Roof Shet Tint | Clear | Blue | Green | Opal 50 | Bronze | Opal 10 | Heat Stop |
|---|---|---|---|---|---|---|---|
| Visible Spectrum (380mm - 700m) | | | | | | | |
| % Light Transmission | 90 | 65 | 40 | 50 | 40 | 25 | 22 |
| % Light Reflectance | 13 | 10 | 10 | 42 | 8 | 74 | 32 |
| Solar Energy (350mm - 2100mm) | | | | | | | |
| % Rejected | 13 | 26 | 41 | 41 | 40 | 67 | 60 |
| % Direct Transmission | 87 | 68 | 47 | 57 | 47 | 31 | 27 |
| % Direct Reflectance | 11 | 8 | 8 | 31 | 7 | 63 | 27 |
| % Absorption | 3 | 24 | 44 | 9 | 46 | 7 | 46 |
| % Total Transmission | 88 | 74 | 59 | 59 | 60 | 33 | 40 |
| | | | | | | | |
| Shading Coefficient | 1 | 0.86 | 0.68 | 0.68 | 0.69 | 0.37 | 0.46 |

The figures used in the tables are based on ColorQUEST Colorimeter testing. Shading coefficients are used for comparing solar heat transmission properties of different glazing materials to that of clear float glass 3mm to 4mm thick, the glass being given a value of 1. To be used for comparative purposes only.