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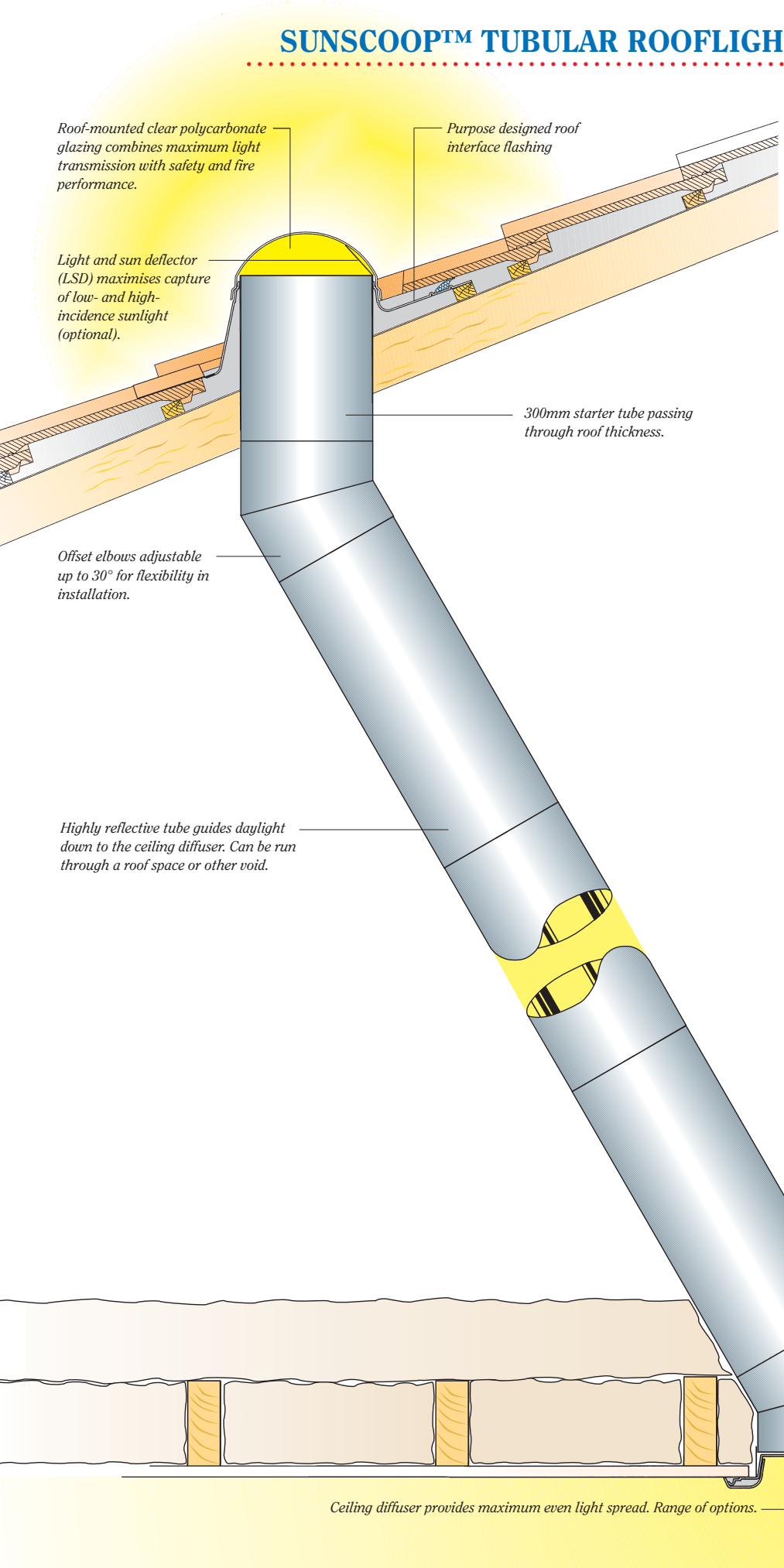
# SUNSCOOP™
## TUBULAR ROOFLIGHTS

# SUNSCOOP™ TUBULAR ROOFLIGHT SYSTEM




Glidevale Sunscoop™ Tubular Rooflight systems are used to bring natural daylight into internal rooms and spaces that have no, or insufficient, windows.

Sunscoop™ Tubular Rooflights consist of a roof-mounted clear polycarbonate dome or skylight connected to a tube with an internal mirrored finish providing optimum specular reflectance. Natural daylight enters the dome or skylight and is reflected down the tube and into the room through a ceiling-mounted diffuser.

# SUNSCOOP™ TUBULAR ROOFLIGHT SYSTEM

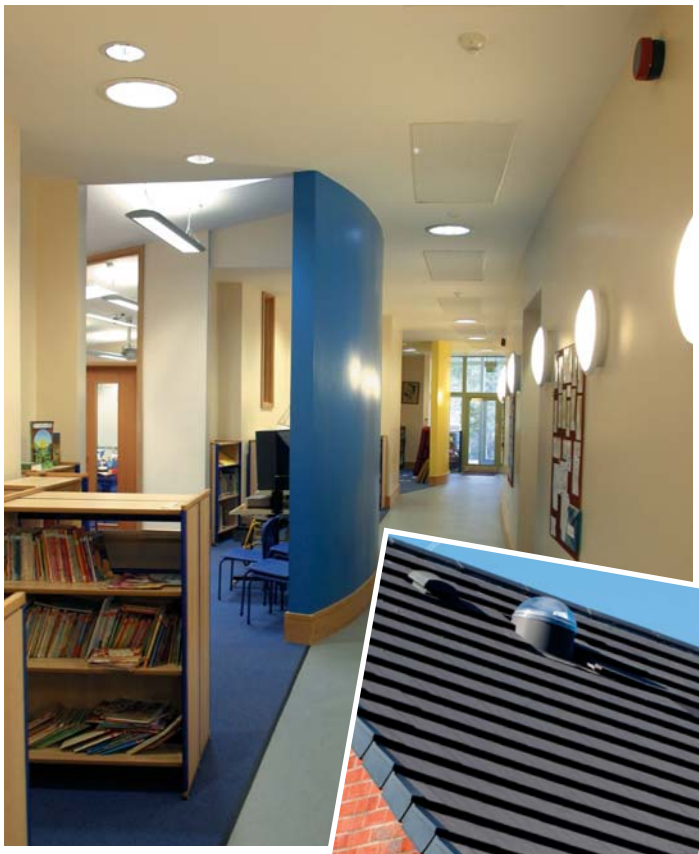
**Proven benefits of natural light**

Scientific studies have shown the positive benefits of natural daylight in a range of applications. For example, it can promote faster recovery of hospital patients and better performance by factory workers and pupils in schools (references available from Glidevale Technical Services).

Glidevale Sunscoop™ Tubular Rooflight systems, used as a complement to artificial lighting, can considerably reduce the annual energy consumption of any building, thereby reducing $CO_2$ emissions. An investment in Glidevale Sunscoop™ Tubular Rooflight systems is an investment in energy conservation.

**Sunscoop™ advantages**

- Highly effective at delivering light into internal and badly-lit spaces.
- System design and performance are backed by an unrivalled programme of research.
- Energy saving - reduces the need for artificial lighting.
- Natural daylight has positive benefits over artificial lighting.
- Wide range of applications - houses, flats, schools, hospitals, commercial and industrial buildings.
- Ideal for bathrooms, stairways, corridors and other dark areas.
- Range of sizes for different requirements.
- Simple and reliable installation.
- Wide range of purpose-designed roof interface flashings to suit most roof coverings.
- Can be used on pitched and flat roofs.
- Adjustable elbows give flexibility of siting.
- Complete system meets the thermal requirements of the latest building regulations.



# TECHNICAL BACKGROUND

*External lux sensor with shade ring for measuring diffused light levels*

*Monitoring of three tubular rooflights simultaneously*

**Perception of light levels**

The sensitivity of human eyes varies according to actual light level. They are highly adaptive to the very wide range of light levels in which we need to function. The difference in light levels between 'bright' daylight and 'dim' light is some 5 orders of magnitude, yet the eye readily adapts and enables humans to see well at both extremes.

As a consequence of this adaptability, actual light levels (measured in lux), are very difficult for humans to relate to.

In order to accurately measure light as sensed by the human eye to determine actual performance of Sunscoop systems, a lux sensor is used, and the light level measured is termed illuminance.

The Table below shows typical light levels in lux under different conditions for both natural and artificial light.

These can be compared with the results of Glidevale Sunscoop systems shown later under the heading System performance on page 6.

**Typical light levels (lux)**

| Condition | Light level (lux) |
|---|---|
| *Natural light* | |
| Clear summer day with direct sunlight | 80 000 - 100 000 |
| Bright cloudy day, no direct sunlight | 30 000 - 50 000 |
| Overcast day, no direct sunlight | 10 000 - 20 000 |
| Twilight | 1 |
| Clear full moonlit night | 0.1 |
| Starlight night | 0.001 |
| *Artificial light* | |
| Candle at 1.0m | 1 |
| Side roads at night | 5 |
| Main roads at night | 15 |
| 60W pearlescent bulb, no shade | 50* |
| 100W pearlescent bulb, no shade | 60* |
| 150W pearlescent bulb, no shade | 160* |

** Actual measurements taken by SILSOE Research Institute at 1.5m below the lamp with a white ceiling above.*

**Sunscoop™ performance monitoring**

*Unique test programme*

The performance of the Glidevale Sunscoop™ Tubular Rooflight system has been firmly established by a unique and extensive programme of testing over a five-month period.

The level and intensity of this research under real conditions has provided Glidevale with ground-breaking knowledge, unparalleled in the tubular rooflight industry.

This exclusive monitoring work provides realistic and reliable data on the Glidevale Sunscoop™, giving a sound practical basis for system design (see Sunscoop™ System Performance).

*The research*

The research programme has been carried out by SILSOE Research Institute (SRI) to quantify the performance of the Glidevale Sunscoop™ Tubular Rooflight system.

The features of this programme were:

- A systematic study of the Sunscoop™ product range
- Extensive measurements over five months in the summer/autumn period.
- Natural light conditions ranging from bright, clear skies to overcast conditions.
- Simultaneous monitoring of three Sunscoop™ systems of different diameters and a range of lengths, mounted close together on a roof.
- Measurements of total, diffuse and direct external light and internal light levels every 12 seconds for each data run.
- Supplementary controlled laboratory measurements under artificial light conditions.

This project provided directly comparable measurements of system performance, enabling the contributions of individual components to be quantified. This is now being extended to investigate further the science of tubular rooflight systems.

*Internal view of different diameter tubular rooflights under test*

# SUNSCOOP™ SYSTEM PERFORMANCE

**Light output monitoring**

The extensive and prolonged monitoring of Glidevale Sunscoop™ systems by SRI under a wide range of conditions provides for the first time realistic and reliable performance data.

The light output from the Sunscoop™ system depends on:

- Diameter and length of tubing, and offset angles if any.
- External sky conditions, and light levels measured in lux.

The distribution of the light in the room depends on:

- Diffuser type.
- Wall, ceiling and floor reflectance.

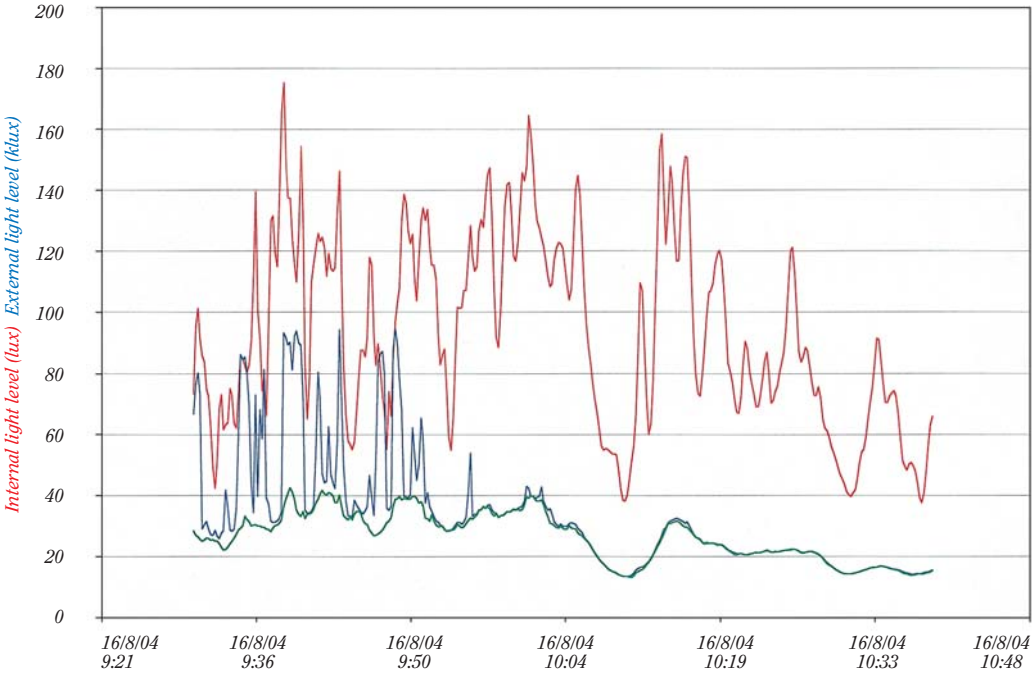
Table A overleaf shows measured light output for a full range of Sunscoop™ systems.

For comparison, Table B overleaf shows measurements of light output of standard electric lamps under the same conditions.

All readings are taken 1.5m below the diffuser, that is at desk level of a typical room with a 2.4m floor-to-ceiling height, and in a blacked-out space with non-reflective walls, floors and ceilings. The figures are therefore conservative measures of light levels likely to be achieved in any practical situation where there is some reflection from walls, floors and ceilings.

A sophisticated computer program is now being developed to accurately predict light levels of Sunscoop™ systems, based directly on the SRI monitoring. For further information please consult Glidevale Technical Services.

*Sunscoop™ light output monitoring: typical example*




*Tube diameter 250mm, SR95 coating, system length 2.7m. Measured 1.5m below Sunscoop™ ceiling diffuser, in a totally black room with no reflected light.*

*Internal light level*
*External light level with sun breaking through clouds*
*External diffuse background light level*

# SUNSCOOP™ SYSTEM PERFORMANCE

*Internal view of different diameter tubular rooflights under test*

**Table A Sunscoop™ light output performance**

Glidevale Sunscoop™ system with SR95 Specular tubing, LSD and standard ceiling diffuser. Other conditions - see text on page 5.

| Tube diameter | System length | External light levels (klux) 100 | 60 | 50 | 40 | 30 | 20 | 10 |
|---|---|---|---|---|---|---|---|---|
| | | Internal light levels (Sunscoop™ light output) (lux) | | | | | | |
| **250mm** | 1.00m | 261 | 196 | 166 | 141 | 89 | 53 | 29 |
| | 1.50m | 240 | 174 | 150 | 132 | 87 | 52 | 28 |
| | 2.00m | 221 | 153 | 135 | 123 | 84 | 50 | 27 |
| | 2.50m | 202 | 135 | 121 | 114 | 81 | 48 | 26 |
| | 3.00m | 186 | 118 | 108 | 105 | 77 | 46 | 25 |
| | 3.50m | 170 | 103 | 96 | 95 | 73 | 44 | 23 |
| | 4.00m | 156 | 90 | 85 | 86 | 67 | 41 | 22 |
| | 4.50m | 144 | 78 | 75 | 76 | 61 | 38 | 20 |
| | 5.00m | 133 | 69 | 66 | 66 | 55 | 34 | 18 |
| | 5.50m | 123 | 61 | 58 | 56 | 48 | 31 | 16 |
| | 6.00m | 114 | 56 | 52 | 46 | 40 | 27 | 14 |
| | 6.50m | 107 | 52 | 46 | 35 | 31 | 23 | 12 |
| | 7.00m | 102 | 50 | 42 | 25 | 22 | 18 | 10 |
| **350mm** | 1.00m | 282 | 276 | 244 | 206 | 134 | 78 | 43 |
| | 1.50m | 280 | 252 | 225 | 200 | 135 | 78 | 43 |
| | 2.00m | 279 | 230 | 207 | 192 | 134 | 77 | 42 |
| | 2.50m | 275 | 209 | 189 | 183 | 132 | 75 | 41 |
| | 3.00m | 268 | 189 | 172 | 173 | 128 | 73 | 40 |
| | 3.50m | 259 | 171 | 156 | 161 | 122 | 70 | 38 |
| | 4.00m | 248 | 154 | 141 | 147 | 115 | 67 | 37 |
| | 4.50m | 233 | 139 | 127 | 132 | 106 | 63 | 34 |
| | 5.00m | 216 | 126 | 113 | 116 | 95 | 58 | 32 |
| | 5.50m | 197 | 113 | 101 | 98 | 82 | 53 | 29 |
| | 6.00m | 175 | 102 | 89 | 78 | 68 | 47 | 26 |
| | 6.50m | 150 | 93 | 78 | 57 | 53 | 41 | 23 |
| | 7.00m | 123 | 85 | 67 | 34 | 35 | 34 | 19 |
| **530mm** | 1.00m | 572 | 435 | 369 | 297 | 201 | 128 | 66 |
| | 1.50m | 540 | 390 | 335 | 284 | 198 | 122 | 64 |
| | 2.00m | 509 | 348 | 304 | 270 | 193 | 116 | 62 |
| | 2.50m | 477 | 311 | 274 | 255 | 186 | 110 | 59 |
| | 3.00m | 446 | 277 | 248 | 238 | 178 | 104 | 56 |
| | 3.50m | 414 | 246 | 223 | 221 | 168 | 98 | 53 |
| | 4.00m | 383 | 220 | 201 | 202 | 157 | 92 | 50 |
| | 4.50m | 352 | 197 | 181 | 182 | 144 | 86 | 47 |
| | 5.00m | 321 | 178 | 163 | 160 | 129 | 79 | 44 |
| | 5.50m | 290 | 162 | 148 | 138 | 113 | 72 | 40 |
| | 6.00m | 259 | 151 | 134 | 114 | 96 | 65 | 36 |
| | 6.50m | 228 | 143 | 124 | 90 | 76 | 58 | 32 |
| | 7.00m | 197 | 139 | 115 | 64 | 55 | 51 | 28 |

**Table B Artificial light levels**

For comparison, measurements of artificial light levels by SRI under the same conditions as for Table A, see above.

Standard electric bulbs: Philips Classictone 240V 1000-hour with pearlescent finish, no shade.

| Bulb | Light level (lux) |
|---|---|
| 60W | 50 |
| 100W | 60 |
| 150W | 160 |

# LAYOUT AND SITING

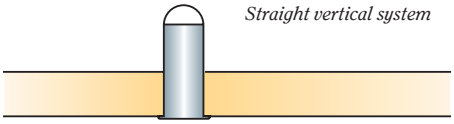
**System layout**

The Sunscoop™ tubing can pass through a roof space or other void.

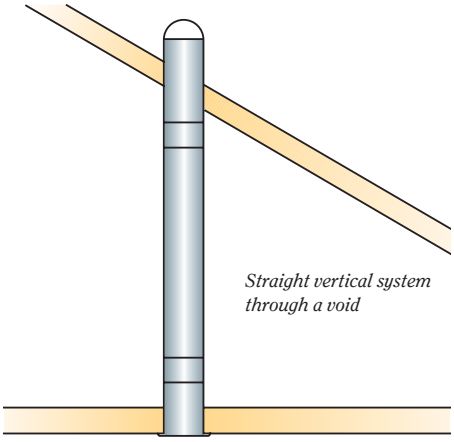
For maximum effectiveness it should be as straight as possible. However, since it is often impractical to site the ceiling diffuser directly below the roof-mounted glazing, the tubing system allows an offset by means of two elbows, one at roof level and one at ceiling level. They are adjustable up to 30° from vertical.

There should be no other bends or offsets in the tubing as monitoring has shown that these will adversely affect performance.

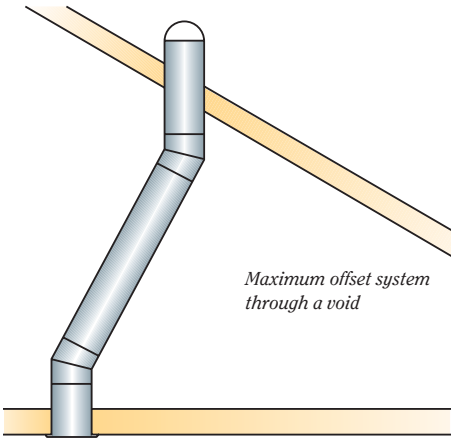
**Typical layouts**



*Straight vertical system*



*Straight vertical system through a void*



*Maximum offset system through a void*

**Siting**

Where possible the roof-mounted glazing should be located on a south-facing slope to gain the maximum amount of daylight under both direct and diffuse conditions.

The light and sun deflector, if specified, should be orientated to face due south.

Factors which need to be considered when siting a Sunscoop™ include:

- Location of the room to be lit and suitable position of the ceiling diffuser.
- Roof space obstructions.
- Proximity of other buildings, trees etc, which may cast shadows at certain times of the day or year.

# SUNSCOOP™ COMPONENTS

**Roof-mounted glazing**
Glidevale Sunscoop™ glazing is manufactured from 3.0mm clear uv-stabilised polycarbonate with 92% light transmission.

This has a 10-year warranty (supported by the polycarbonate manufacturer) against loss of impact strength, excessive yellowing and loss of light transmission.

The warranty also covers any effects of the forming process.

Polycarbonate secondary glazing is also available to maximise insulation levels along with the use of Glidevale tube insulation.

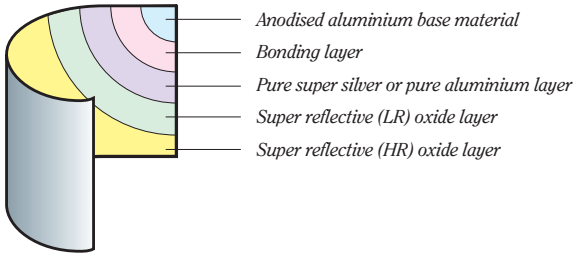
**Light and sun deflector (LSD)**
This unique optional device is fitted under the roof glazing and intercepts direct sunlight that would otherwise miss the top of the system at both low and high incident angles, reflecting it down the tube.

Monitoring has shown that a south-facing LSD can increase the light level at the ceiling diffuser by 20% or more in direct sunlight conditions.

**Tubes and elbows**
Tubes and elbows are anodised aluminium with a multi-layer specular coating which ensures pure white light with no colour shift, even after multiple reflections down the light tube. Two coatings are available:

**SR98 Mirror** incorporates a pure super silver layer and has a total reflectance of 98%.

**SR95 Specular** incorporates a pure aluminium layer and has a total reflectance of 95%.




Both are a multi-layer optical coating system which is atomically bonded to the substrate. Laminated or glued reflective sheets are not used.

Both have a 25-year product warranty which guarantees that the material will not splinter, yellow, darken, peel off, blister, crack or develop any other surface degradation which could reduce overall reflectivity, even after prolonged uv exposure. The finished materials are electrostatically neutral and will not attract airborne dust even during installation.

*Sizes*
Tube diameter: 250mm, 350mm or 530mm.
Starter tube length: 300mm.
Intermediate tube lengths: 600mm. Can be cut as required on site.
Elbow length (straight): 200mm for 250 and 350mm tube, 300mm for 530mm tube.
Elbow adjustment: up to 30°.

# SUNSCOOP™ COMPONENTS

**Integral electric light fitting**
The Sunscoop™ can be supplied with an optional integral electric lighting fitting (2 on 530mm systems) with a 13W or 20W low-energy lamp (equivalent to a 65W or 100W conventional lamp). This avoids the need for an additional light fitting for night-time use.

**Light-attenuating dampers**
Control over the light level entering the room may be required at certain times, for example in conference rooms, lecture theatres, classrooms and hospital wards.

The optional Sunscoop™ motorised light-attenuating damper provides this control; it is actuated from a wall switch, separately available.

**Fire protection collars**
In longer Sunscoop™ systems the tubing may pass through an intermediate floor or ceiling that provides fire separation. As with any ducted system it is important that the tubing does not form a path for fire.

Fire protection collars providing up to 120 minutes fire resistance to BS 476: Part 20: 1987 are available for all diameters of Sunscoop™ tubing.

**Glidevale Tube Insulation**
Specifically designed to contribute to the overall thermal performance of the system, This is a multi-layer air-bubble/foil insulation with a low-emissivity aluminium foil encapsulated in polyethylene on both faces. All exposed tubes and elbows within unheated voids, such as loft spaces, should be lagged with Glidevale tube insulation to reduce heat loss and the risk of condensation within the tube.

*Thermal insulation*
Building Regulations (England and Wales) Approved Documents L1 and L2 require a U-value of 2.2 W/m²K for all rooflights.

Sunscoop™ rooflights meet this requirement when fitted with either a polycarbonate secondary glazing skin and/or tube insulation in unheated spaces.


**Ceiling diffusers**

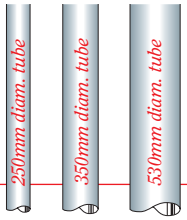
*Circular ceiling diffuser*
The standard recessed ceiling diffuser for all tube sizes, designed to maximise light transmission. Its translucent surface provides privacy and spreads the light efficiently throughout the room.

Manufactured from diffused polycarbonate with white-capped ABS ceiling ring to hide fixings. Also available in chrome or brass finish.

*Skyview diffuser, circular*
Optional for all tube sizes. The innovative Skyview diffuser consists of a grid of fresnel lenses which provides a wider spread of light without excessive losses and enables the sky to be viewed.

*Skyview diffuser, square*
Optional for 530mm tube only. Similar to the circular Skyview but mounted in a 600 x 600mm polycarbonate panel which can be fitted in a suspended ceiling.

# SUNSCOOP™ COMPONENTS




**Roof interface flashings**
A range of dedicated roof flashings is available for different types of pitched and flat roof coverings, as shown below.

| 250mm diam. tube | 350mm diam. tube | 530mm diam. tube | |
|---|---|---|---|
| | | | **Pitched roof flashings** |
| ✓ | ✓ | n/a | Versatile, suits most interlocking roof tiles ● |
| ✓ | n/a | n/a | Plain tile flashing |
| ✓ | ✓ | n/a | Slate soaker |
| ✓ | ✓ | ✓ | Universal Top ● |
| ✓ | ✓ | ✓ | Universal Top with integral skirt ● |
| ✓ | ✓ | ✓ | In-Line/traditional rooflight ● |
| | | | **Flat roof flashings** |
| ✓ | ✓ | ✓ | Universal Top ● |
| ✓ | ✓ | ✓ | Universal Top with integral skirt ● |
| ✓ | ✓ | ✓ | Universal Top with integral PVC-U insulated upstand |

● *Not suitable for single clay pantiles, plain tiles, Forticrete Centurion tiles, Goxhill Gaelic tiles, or interlocking slates - use Universal Top*

● *Requires a site-fabricated upstand.*

● *Suitable for all types of tile and slate roof coverings*

*Appearance*
All flashings are manufactured from ABS and are treated with a uv-stable polymeric resin. Standard colours are red, brown, grey, terracotta and red streak for tiles, and blue/black for slates. Colour matching to specific roof coverings including composite panel and standing seam systems is also available.

To enhance appearance on pitched roofs, the Universal Top is available with an integral skirt which can be colour-matched to the roof covering.

*Health and safety*
The Sunscoop™ glazing and flashings have been impact-tested to EN 1873 Modular Rooflights and may be deemed to be non-fragile for HSG33 Safety in Roofwork.

The Sunscoop™ glazing and flashings have an AA fire rating to BS 476: Part 3: 2004, and can therefore be used on roofs without restriction on number, spacing or position.

***Pitched roof flashings***


*Versatile*


*Plain tile flashing*

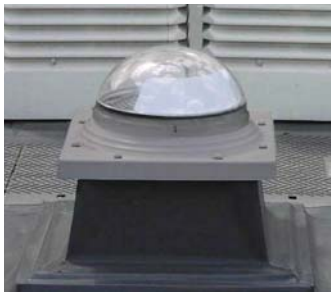

*Slate soaker*


*Universal Top*


*In-Line/traditional rooflight. Traditional shown*

***Flat roof flashings***

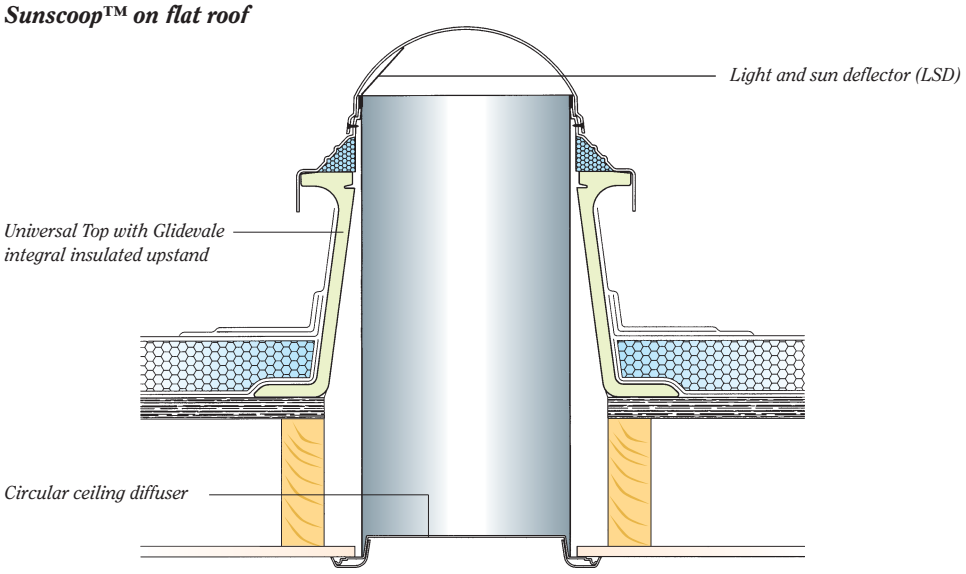

*Universal Top with integral skirt*


*Universal Top with insulated upstand*

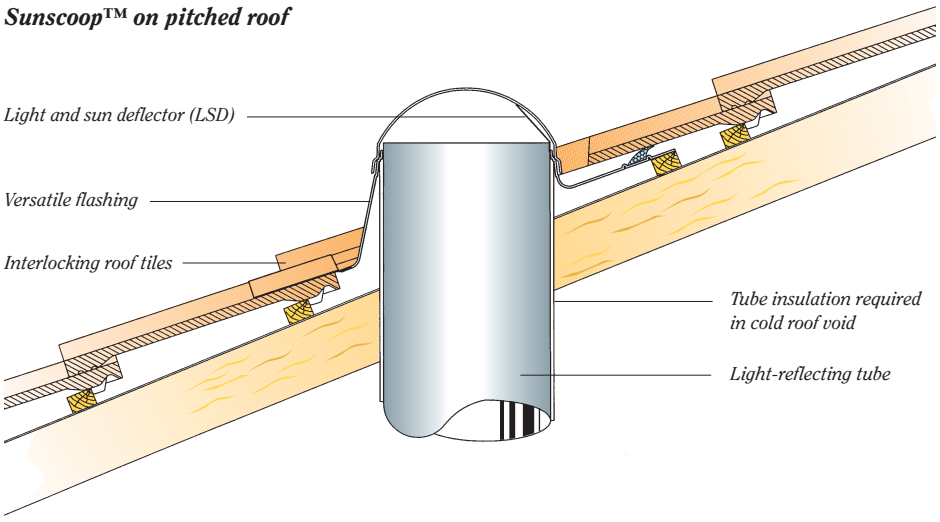

*Universal Top with builder's kerb upstand on flat roof*

# TYPICAL INSTALLATIONS

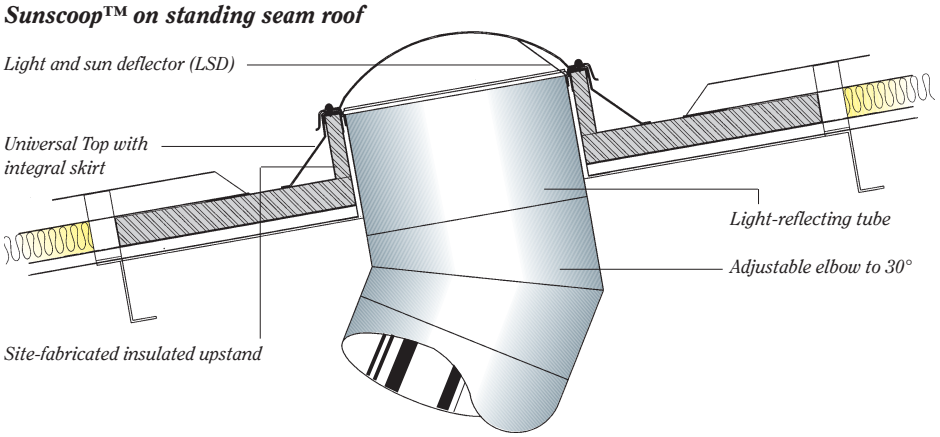
### *Sunscoop™ on flat roof*




### *Sunscoop™ on pitched roof*




### *Sunscoop™ on standing seam roof*




*For more information on installation details please contact Glidevale Technical Services.*

**Specification clause**

Natural lighting to … rooms to be provided by means of Glidevale Sunscoop™ Tubular Rooflight systems comprising:
Roof-mounted glazing of 3.0mm clear uv-stabilised polycarbonate, covered by 10-year warranty against loss of impact strength, excessive yellowing and loss of light transmission.
Roof interface flashing of fire-retardant ABS treated with uv-stable polymeric resin.
In-line/Traditional skylight/ Versatile / Plain tile / Slate soaker flashing / Universal Top with site-fabricated upstand / with integral skirt colour-matched to roof covering / preformed PVC-U insulated upstand.*
Colour: red / brown / grey / terracotta / red streak, blue/black / colour-matched to roof covering.*
To have AA fire rating to BS 476: Part 3: 2004.
Tubes and elbows with multi-layer specular coating with 25-year warranty.
SR98 Mirror reflectance 98% / SR95 Specular reflectance 95%.*
Tube diameter: 250mm / 350mm / 530mm.*
Circular recessed ceiling diffuser of diffused polycarbonate with white-capped ABS ceiling ring / chrome / brass / Skyview diffuser circular / Skyview diffuser square.*
Options to be fitted: Light and sun deflector (LSD), polycarbonate secondary glazing skin, integral electric light fitting, light-attenuating damper, fire protection collar.*
All exposed tubes and elbows within unheated voids to be wrapped with Glidevale Tube insulation.
System to achieve an overall U-value of 2.2W/m²K.*
Supplier: Glidevale Ltd, 2 Brooklands Road, Sale, Cheshire M33 3SS, Telephone: 0161 962 7113, Fax: 0161 905 2085, Email: info@glidevale.com

*delete as applicable

# FURTHER INFORMATION

**Quality Assurance**
The Glidevale Sunscoop™ system has been designed, developed and manufactured under a BS EN ISO 9001 Quality Management System. Independent auditing provides the user with assurance that the products will fulfil their intended purpose.

**Services**
For further information and advice on the selection and design of Sunscoop™ installations please consult Glidevale Technical Services.

**Other products**
Glidevale market a wide range of other building products including:

Metro modular rooflights

Roof ventilation and roofing accessories

Underfloor and cavity wall vents

Underlays and membranes

Loft access traps.

Literature on these is available on request

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