Sunpipe

Natural daylight where windows can't reach







by Monodraught

November 2003

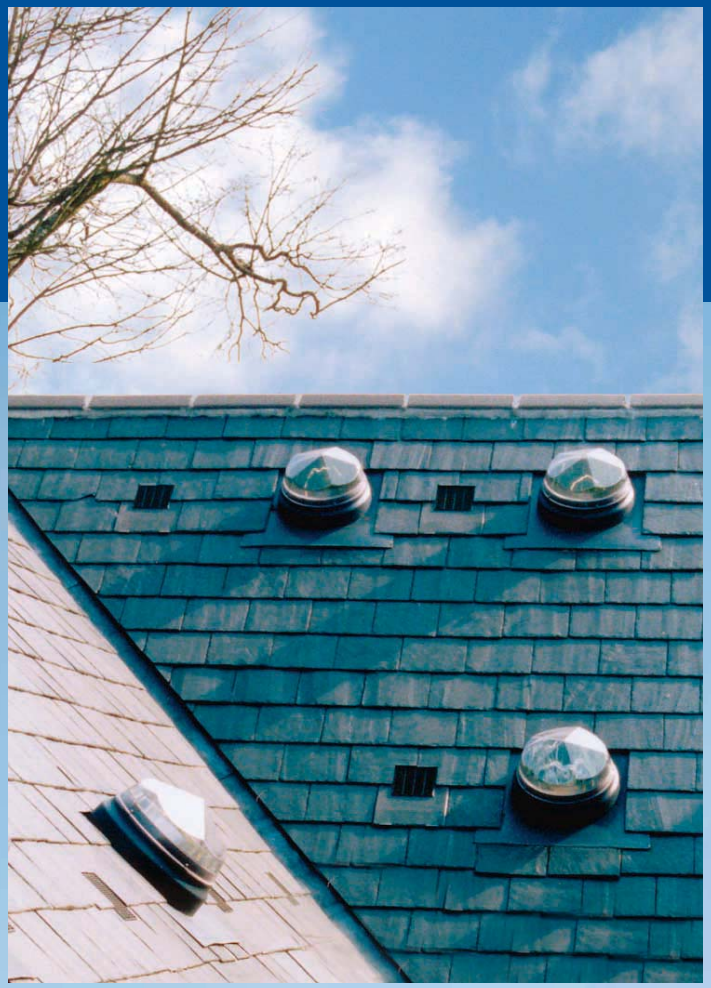
Sunpipe

Contents

'SunPipes' were first used approximately 4000 years ago when the Egyptians used light shafts and mirrors to bring daylight down in to the centre of the Pyramids. The modern version of SunPipes was patented in 1988 but Monodraught recognised the enormous energy saving potential of applying SunPipes to commercial properties, hence the need for this brochure.

According to Government sources, the UK is responsible for discharging 150 million tonnes of carbon dioxide into the atmosphere. In the last 15 years, the amount of energy consumed in Offices, Schools and Hospitals has risen over 250%. More than half of this consumption is electricity. The Government calculates that 20% of the £50 billion a year spent on fuel in the UK could be saved cost effectively by investing in energy conservation.

In Schools alone, Government sources state that 80% of the electricity consumed, is used for electric lighting. By using Monodraught SunPipes, at least 75% of the electricity used for lighting during daytime use can be saved.



Monodraught

Terry Payne, Chairman and Managing Director of Monodraught formed the Company 30 years ago initially to pioneer the development of vertical balanced-flue chimney systems for the domestic and commercial heating market.

Monodraught Ventilation systems installed at Bluewater Retail Park, Dartford, Kent.

In 1982 Monodraught launched the Windcatcher Natural Ventilation system, which encapsulates any prevailing wind to provide energy free, natural ventilation and in 1996 introduced the SunPipe to the UK market.

A significant feature of the Monodraught product range continues to be the high level of architectural design empathy, producing visually appealing designs whilst achieving an efficient and practical contribution to the optimum harnessing of our natural resources.

The Original Patent

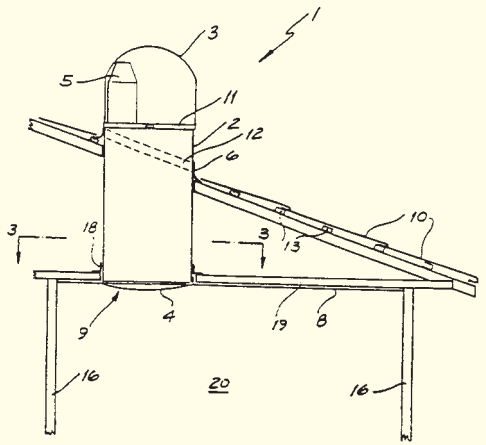
Patent No. 5,099,622 was originally granted to a British inventor, Stephen M Sutton in Oakhurst, Australia on November 22nd, 1988.

The invention was described as, *"a system having a tubular body with a transparent cover to prevent the ingress of dust and with a second transparent cover locating at ceiling level and attached to the tubular body. The composition of all components prevents excess air movement, which creates a static column of air within the tubular skylight. This column of air acts as an insulator which prevents heat from entering the room or conversely in winter from escaping from the room".*

The system has been a remarkable success in both Australia and North America as a highly effective method of conveying natural daylight from roof level down to the room below.

Monodraught has greatly improved the original system and has filed five new Patents covering these improvements. All Monodraught SunPipes are manufactured in the UK and are complimented by a wide range of ancillary products all based on the same concept of energy saving innovations.

Patent No. 5,099,622



Original Patent

The patented SunPipe Diamond dome (Patent No. 0200543.7), introduced in 2002/2003, is available on the four most popular sizes – 9", 12", 18", and 21" (230mm, 300mm, 450mm and 530mm nominal). Many of the photographs or illustrations in this brochure are of the earlier hemispherical design that is continued on the 750, 900 and 1000mm SunPipes.

Technical Details

Description

This system maximises the concept of renewable energy by reflecting and intensifying sunlight and even normal daylight, down through a pure silver base mirror-finish aluminium tube.

A clear UV stabilised polycarbonate top dome seals the light pipe against the ingress of dust and a clear stipple finish polycarbonate diffuser at ceiling level evenly spreads light into the room or space below. The SunPipe system is highly effective in both sunny and overcast conditions and even when it is raining.

There is virtually no limit to the length of SunPipe or the number of bends that can be used and the SunPipe carries a 25 year guarantee with a life expectancy of 35 years.

Composition

The SunPipe consists of a high purity silver coated aluminium tube, which has a 25-year guarantee against discolouration. This specular aluminium surface is coated with PVD and the presence of a UV inhibitor provides outstanding QUV durability with no decrease in total reflectance and the special surface treatment provides excellent colour rendition of natural light.

A brushed nylon gasket at the top of the system allows the system to breathe preventing condensation problems, whilst the diffuser at ceiling level seals against the ceiling. All vertical joints are sealed with aluminium tape.

Top Domes

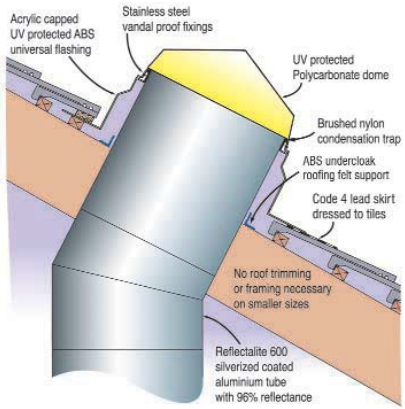
Top Domes are available in UV stabilised unbreakable polycarbonate as standard or are supplied in impact resistant modified acrylic (ICI Perspex) where SunPipes are to be used in a harsh UV prone environment such as the Middle East or southern Europe. The new Diamond domes are injection moulded polycarbonate 4mm thick and are unbreakable and are therefore vandal resistant. Domes can be supplied with optional security screws.

The Diamond Dome

The Diamond shaped dome introduced in March 2002 has proved so popular that all major sizes are manufactured in this Diamond shaped design. The larger systems, 750mm diameter and above, are manufactured as hemispherical domes. Diamond domes are designed specifically to maximise the penetration of sunlight through the flat prisms and to capture the early morning and late afternoon sun through the arrangement of vertical prisms on the circumference.

Patent No. 0200543.7

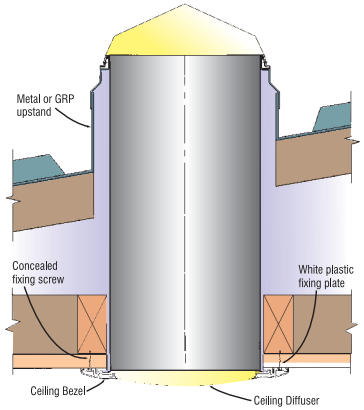
PITCHED ROOF FLASHING



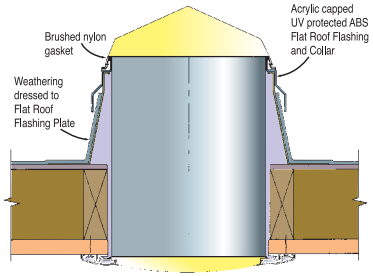
Slate roof

Alternative GRP upstand for British Steel type colour coated roofing sheet, bonded to surface

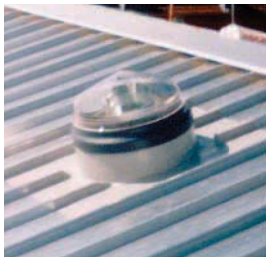
VERTICAL FLASHING



FLAT ROOF FLASHING

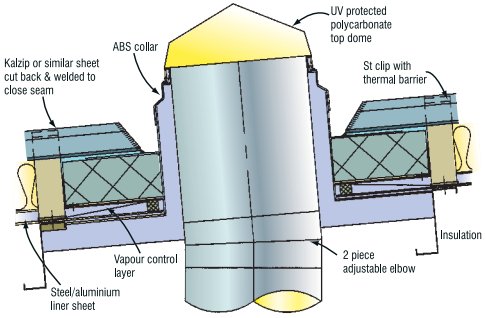


Flat roof application



On-site welded upstand to Kalzip type roof with ABS collar

METAL ROOFING PROFILE



NBS Specification

Typical NBS Specification

- Manufacturer: Monodraught Ltd, Halifax House, Cressex, High Wycombe, Bucks, HP12 3SE. Tel: 0845 2011366 Fax 0845 2011369.
- Type: Monodraught SunPipe system (450mm) diameter
- Lining: Reflectalite 600 silverised mirror finish aluminium tube in 610mm lengths.
- 45°/30° adjustable elbows.
- Glazing details: UV polycarbonate unbreakable Diamond top domes

or • impact resistant acrylic Diamond top domes.

- Kerbs – ABS one piece universal flashing (for slate roof)

or • Kerbs – ABS one piece universal flashing (for tiled roof), and integral lead flashing

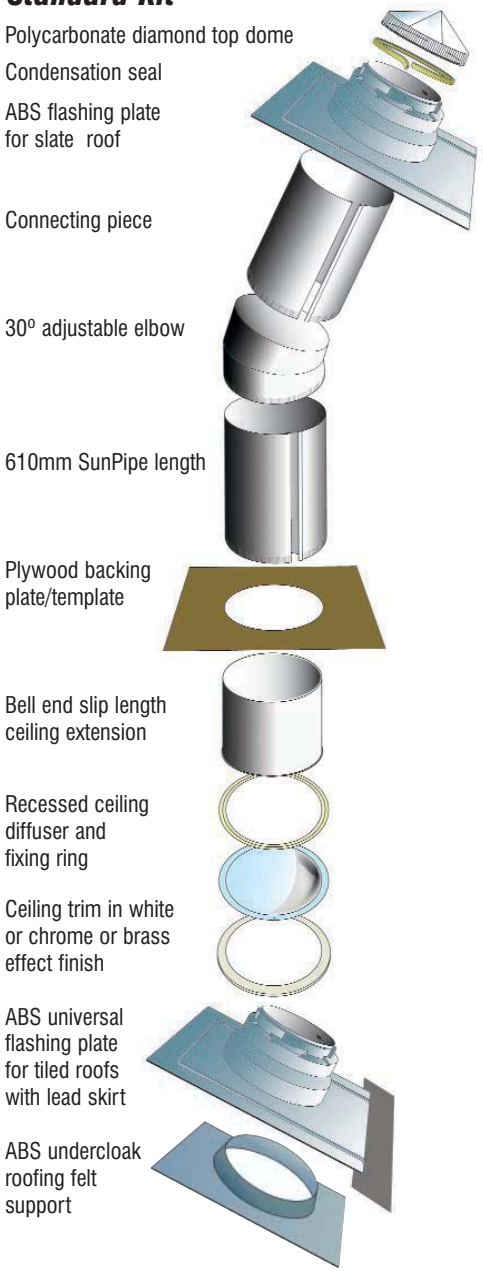
or • Code 4 lead flashing for bold tiled roofs.

- ABS undercloak/roofing felt support
- Flat roofs: Kerbs: ABS two piece flat roof flashing with ABS top collar

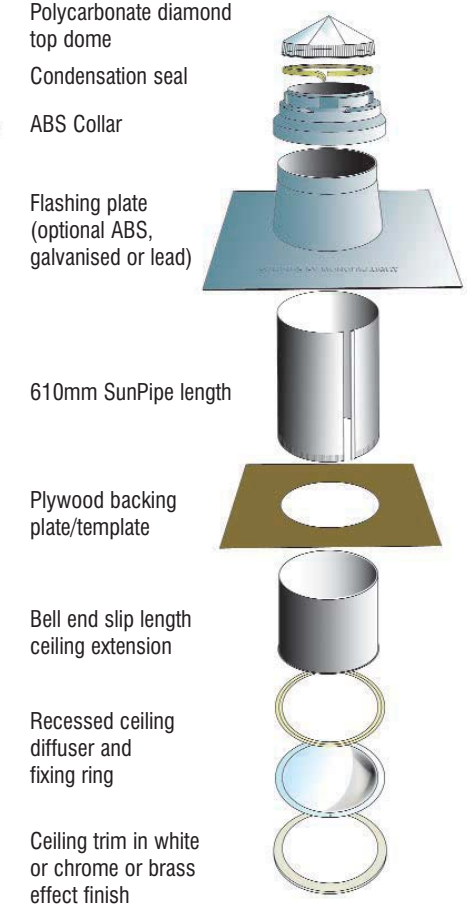
or • Flat roof: Kerbs: Galvanised flat roof flashing for asphalt flat roofs, with ABS top collar

- Colour: grey (standard) black, terracotta.
- All necessary fixings, brackets and supports.
- Ceiling finish: Internal three part polycarbonate ceiling diffuser with white plastic (or brushed aluminium/brass/silver) finish ceiling trim.

PITCHED ROOF Standard Kit



FLAT ROOF Standard Kit

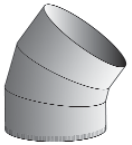


Installation Kit for all systems

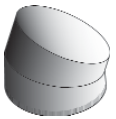
Fixing screws & washers, silicone sealant, aluminium tape and installation instructions supplied as standard.

Additional items

45º adjustable elbow

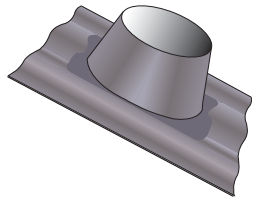


30° adjustable elbow

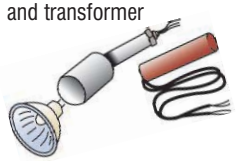


Standard 610mm SunPipe length

Code 4 lead flashing for bold roll tiled roofs



50 watt low voltage integral Light Kit and transformer



Domestic Applications

Most popular sizes:

9" (230mm) for shower rooms, toilets and bathrooms up to 8sq.m (75sq.ft).

12" (300mm nom.) for stairs and landings, kitchens, studies, living rooms and bathrooms to light up to 14sq.m (150sq.ft).

18" (450mm nom.) for larger areas and for where you want that 'wow' factor, will light up to 22sq.m (230sq.ft).

Advantages

- No structural alterations required, easily fits between joists and rafters.
- No maintenance required and will not leak.
- Top dome is self-cleaning due to its shape and eliminates condensation problems.
- All SunPipe systems are guaranteed for 25 years against faulty manufacture.








The SunPipe can twist and turn easily to take natural light where you want it.

There is virtually no limit to the length of SunPipe or number of bends that can be used and the SunPipe can twist and turn easily to take natural light to exactly where you want it.

All bends in the Reflectalite 600 aluminium lining are adjustable from 0° to 30° or 0° to 45°.

- Joints are sealed with aluminium tape
- Few fixings are required, normal single fixing at base of system
- Virtually burglar proof and vandal resistant.
- Can normally be installed in two or three hours.

Listed Buildings

As a result of the increased interest in the application of SunPipes (instead of traditional Velux type windows), Listed Buildings Officers in Conservation Areas often favour this more discreet SunPipe termination, which is available with a low profile dome on all sizes.

Planning Permission

In general terms, it is not necessary to apply for planning permission for the installation of a SunPipe, particularly on smaller sizes, since a SunPipe of 230mm or 300mm diameter is no different to a flue pipe or chimney flue, which does not require planning permission.

However, if your property is situated in a Conservation Area, then specific permission must be sought from your Listed Buildings Officer for the installation of a SunPipe, since it is unlawful to alter any roof profile or covering without prior permission of the Listed Buildings Officer.

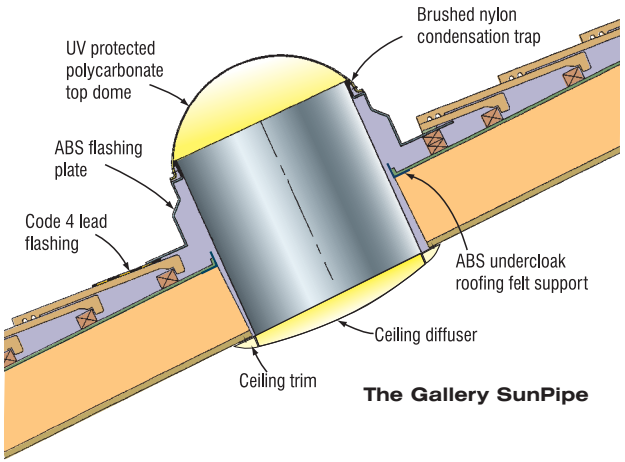
Top left: 300mm diameter vertical SunPipes installed to a thatched roof in Devon.

Top centre: An unusual application where a 300mm diameter SunPipe was installed to a tiled roof on a roof garden terrace.

Top right: 450mm diameter SunPipe fitted on 'blind' side of ridge with the SunPipe taken to internal corridor.

Centre left: 300mm diameter system in a cottage, lighting up the breakfast area.

SunPipe flashing details for tiled roof with ABS upstand to suit a sloping ceiling



The Gallery SunPipe

Conservation SunPipe

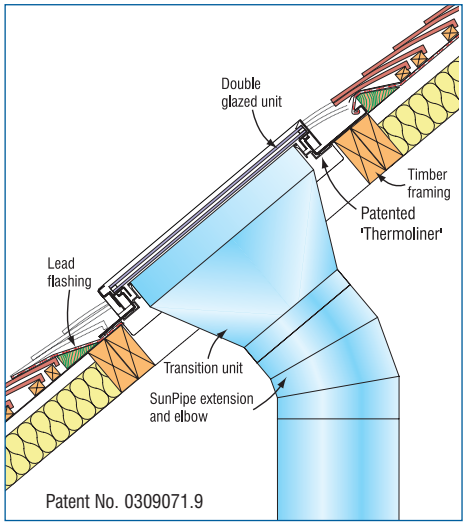
The Conservation SunPipe has been developed to answer the problem encountered in many Conservation areas, where the roofs of listed buildings are required to retain their original lines and often a normal skylight or rooflight is not allowed.

Designed to meet exacting demands

The Conservation SunPipe has been designed to replicate a Victorian cast iron rooflight, and fits virtually flush with the roofline of a pitched roof building. This makes it a very unobtrusive termination for the SunPipe.

Rooflight to SunPipe

The rooflight includes a special adaptor to fit to the circular SunPipe, that captures up to 3 times more light than a standard SunPipe and reflects and intensifies that natural daylight down to the ceiling diffuser creating an even spread of light into the room below.



Schools

Most popular sizes:

300mm (12" diameter) for corridors at 3m centres, store rooms, toilet areas and changing rooms to light up to 14sq.m (150sq.ft).

450mm (18" diameter) for wide corridors at 4m centres and small classrooms to light up to 22sq.m (230sq.ft) where ceiling heights are 3m or more.

530mm (21" diameter) the most popular size for deep plan class-rooms used in conjunction with Windcatcher natural ventilation systems.

750mm, 900mm and 1000mm dia. for sports halls and similar areas where floor to ceiling height exceeds 5m.

Advantages & Benefits

- Enables 4% daylight factor to be met for deep plan classrooms.
- No solar gain in summer months nor heat loss in winter as compared to conventional roof lights.
- No maintenance, inside or out.
- Unbreakable, vandal-proof security domes.
- At least 75% of electricity costs can be saved during the daytime, where SunPipes are used to replace the need for electric lighting during School hours.
- Children and teachers work better under a natural daylight environment.

Top left: 'Typical' infants' Classroom where ample natural light is needed but so often it is otherwise difficult to provide to the centre of the room!

Top right: 750mm dia. SunPipes installed at Hartismere Girls Schools, Eye, Suffolk.

Centre left: An unusual but very welcome application of SunPipes, where SunPipes terminate horizontally in a basement locker room against an internal wall.

Centre right: One of seven Wokingham Schools, where over-roofing took place. SunPipes & SunCatchers were installed to replace original rooflights.

Lower left: SunPipes systems installed at Hope Brook School, Gloucester.

Lower centre: St Vincents School, Enfield, where 450mm diameter SunPipes were used to light internal corridors and classrooms.

Lower right: Interior view of Infants Classroom at The Latifa School for Girls in Dubai, lit entirely by SunPipes.

Colleges and Universities

Recent Projects completed include:

- Aylsham High School, Norfolk
- Beaudesert Park School, Minchinhampton
- Bosvigo Junior & Infant School, Truro
- Down House School, Newbury
- Eton College
- Farnborough Sixth Form College
- Greenford High School, Middlesex
- Hamilton Community College, Leicester
- Hengrove School, Bristol
- Henry Compton School, Hammersmith
- Hurlingham and Chelsea Secondary Sch.
- Jane Lane School, Walsall
- Lady Zia Wernher School, Luton
- Latifa School for Girls, Dubai, UAE
- Leeds University
- Millais School, Horsham, West Sussex
- Nailsea Community School, Bristol
- Portsmouth High School
- Quedgeley Primary School, Gloucester
- Rashid School for Boys, Dubai, UAE
- Riverside College, Leicester
- Roseland Com. School, Tregony, Cornwall
- University of Glamorgan, Treforest
- University of Manchester
- University of Nottingham, Students Union
- Westmoreland Primary Sch., Stockport
- Wycombe Abbey School
- Wymondham College, Norfolk

Top left: Library at Riverside College, Leicester, where existing rooflights were replaced with 14 No. 530mm SunPipes and 2 No. 600mm square Windcatchers, as shown in the photograph below. This eliminated the need for electric lighting during daytime and the need for air conditioning.

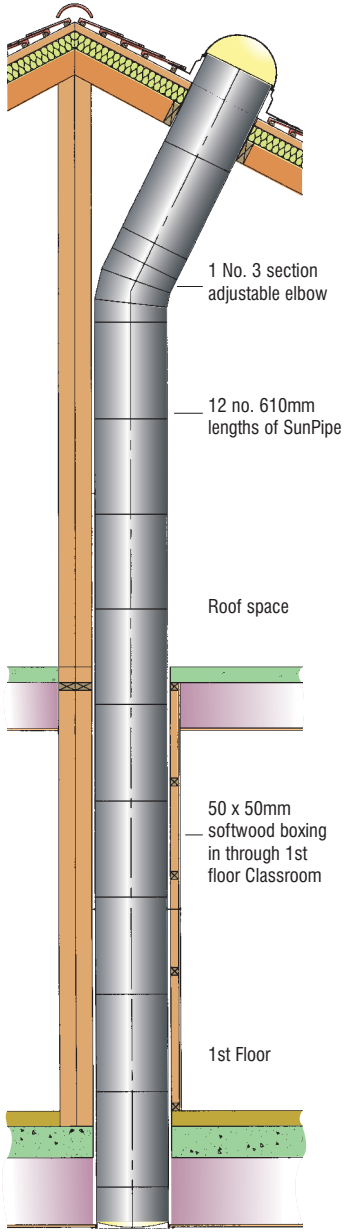
Top right: Roof at Manchester University and internal view, where 130 SunPipes have been installed.

Centre left: External view of Riverside College, Leicester, where SunPipes and Windcatchers have been installed to the Library.

Lower left: Jubilee Campus at Nottingham University, where 12 No. 750mm diameter SunPipes were installed with light shut-off dampers to the barrel vaulted Sedam roof over the Lecture Halls.

Lower right: Corridor at Hatfield First School, Hertfordshire, lit entirely by SunPipes.

450mm SunPipe, 7.6m long, serving ground floor lobby at South Charnwood School



Hospitals

Most popular sizes

300mm (12" diameter) for internal corridors and store rooms.

450mm (18" diameter) for consulting rooms, waiting areas, larger offices.

530mm (21" diameter) for floor to ceiling heights of between three and four metres.

Advantages & Benefits

- Energy saving – typical calculations show a pay-back period of 5 to 6 years where SunPipes are used to replace the need for electric lighting during daytime use.
- Health Benefits – natural daylight is known to combat SAD conditions particularly suitable for Day Centres and Old Peoples Homes.
- Installation Service – Monodraught provide a complete installation service with all necessary attendances.
- No maintenance – the shape of the top dome ensures that dust and dirt is washed off naturally and internal ceiling diffusers require no maintenance.

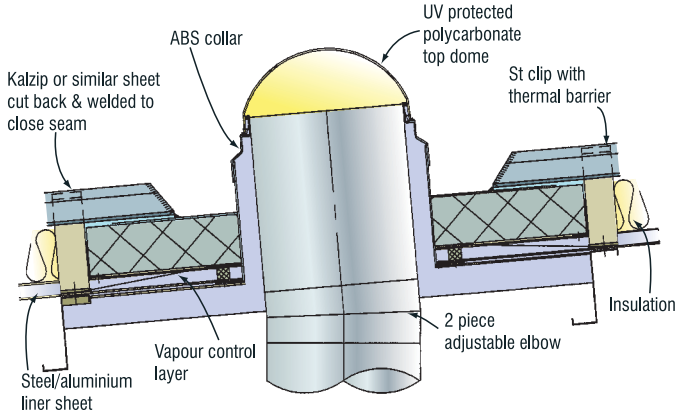
Top left: SunPipes serving the ground floor of The London Clinic, where the extension blocked off natural light to the ground floor windows.

Top right: Internal corridor at Heartlands Hospital, Birmingham, where more than 100 SunPipes have now been installed.

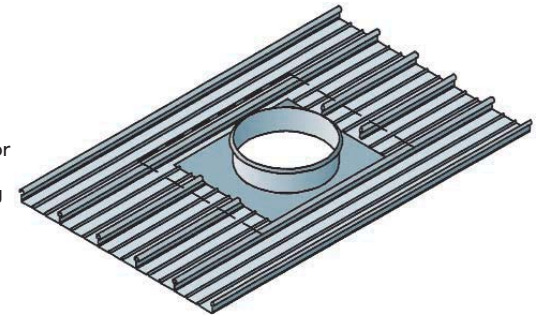
Lower left: Charing Cross Hospital, London, where 24 of our 300mm diameter SunPipes have been installed to internal corridors.

Lower right: 120 of our 530mm diameter SunPipes installed at Newham Hospital, London in 1998, to bring natural daylight down to corridors and Consulting Rooms.

Upstand detail for SunPipe system for a standing seam roof



Monodraught can provide a welded aluminium upstand to a new Kalzip or similar steel profiled roof. Alternatively, oversheeting can be used as shown to existing roofs. See also page 16.

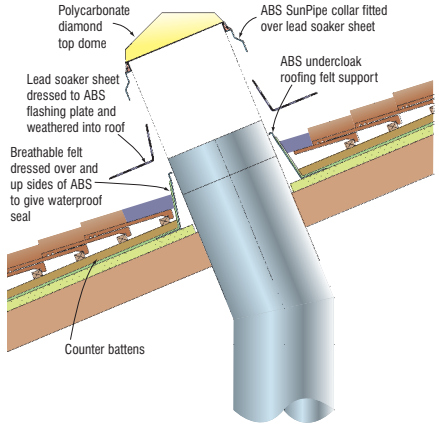


Health Centres & Homes

Recent Hospital Projects completed include:

- Addenbrookes Hospital, Cambridge
- Ailsa Hospital, Ayr
- Airedale Hospital, Keighley
- Amersham Hospital
- Basildon Hospital
- Charing Cross Hospital, London
- Cookridge Hospital, Leeds
- Cromer Hospital, Norfolk
- Derbyshire Royal Infirmary, Derby
- Derriford Hospital, Plymouth
- Halton General Hospital, Runcorn
- Hartlepool Hospital
- Heartlands Hospital, Birmingham
- Kent & Sussex Hospital, Tunbridge Wells
- Kettering Hospital
- Monklands District Hospital, Airdrie
- Newham General Hospital, London
- North Manchester General Hospital
- North Tees Hospital
- Ormskirk Hospital
- Peterborough Hospital
- Princess Marina Hospital, Northampton
- Ronkswood Hospital, Worcester
- Rotherham District General Hospital
- Royal Bolton Hospital
- Royal Hallamshire Hospital, Sheffield
- Royal Preston Hospital
- Scarborough Hospital
- Southend Hospital
- St Nicholas Hosp., Newcastle upon Tyne

SunPipe flashing detail, where a Code 4 lead flashing is used for bold tiled roofs



For a **Plain tile roof** a standard ABS universal flashing is used with a lead skirt, but for a **Bold tile roof** a Code 4 lead flashing is dressed over the tiles, the ABS undercloak roofing felt support plate is used and the collar fits to the top of the lead flashing.

Top left: Morrison Court Elderly Peoples Home, Market Harborough

Top right: St Cecilia's, Leonard Cheshire Home, Bromley, Kent, where a total of 40 SunPipes were used.

Centre left: Meadow View Residential Home, where Square SunPipes where installed

Centre right: The Mulberry Centre, West Middlesex Hospital, Isleworth, where 600mm x 600mm square diffusers are used with 530mm diameter SunPipes to match ceiling grid.

Lower left: External view of the Mulberry Centre, West Middlesex Hospital, Isleworth.

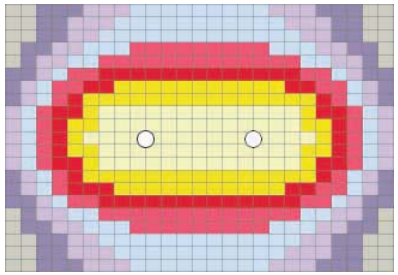
Lower right: Waiting Room at Yaxley Health Centre, Peterborough, where 3 No. 530mm diameter SunPipes where installed.

Technical Matters

Research and Development

Monodraught are currently sponsoring Research students at six Universities:

Nottingham University – Monodraught's Director of Research and Development, Dr Joel Callow, is based full time at the University where Monodraught have a permanent Office and Environmental Test Chamber to carry out the continuous development and assessment of SunPipes and all their associated components.



Napier University – a two year study has been spent on developing a computerised prediction model as above.
Brunel University – research is being carried out into the application of natural ventilation strategies, which compliment SunPipe applications, resulting in reduced heat load requirements.

Reading University, Liverpool University, Loughborough University and UMIST are all carrying out associated research into Monodraught products.

Detailed research has also been carried out at the Belgian Building Research Establishment and Calgary University in Canada.

Range of Systems

The most popular sizes are shown and are all available ex-stock. The other sizes are also available, but delivery is approximately 4 to 6 weeks from date of order.

Monodraught produce a standard range of 7 SunPipe systems, as set out on the right. Larger SunPipe systems, however, up to 3m diameter, can be produced to special order.

SunPipe Sizes and maximum light output

on a typical flat roof application measured approximately 1.5m below SunPipe diffuser

Diameter (mm)	Full Summer Sun 105klux		Overcast Summer 45klux		Overcast Winter 20klux		Area Lit (to a normal daylight level)
	Lux Value	Lumen output of system	Lux Value	Lumen output of system	Lux Value	Lumen output of system	
230	350	2100	160	985	60	340	7.5 sq.m (approx 80sq.ft)
300	700	4110	325	1910	125	728	14 sq.m (approx 150sq.ft)
450	1800	10650	840	4940	320	1886	22 sq.m (approx 230sq.ft)
530	2600	15410	1200	7160	460	2730	40 sq.m (approx 430sq.ft)
Other SunPipe sizes available with hemispherical top domes							
750	3600	21160	1800	10590	900	5300	50 sq.m (approx 530sq.ft)
900	5200	30590	2400	14120	1150	6770	60 sq.m (approx 650sq.ft)
1000	6300	37060	3400	20000	1350	7950	70 sq.m (approx 750sq.ft)

Note: A 100w light bulb generates approximately 1000 Lumens or 170 Lux.

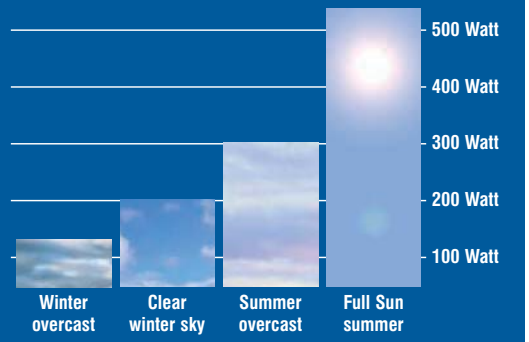
Table of Weights

SunPipe Kit 230mm (9")	Weight in Kg
Standard Flat Roof Kit	2.72Kg
Standard Pitched Roof Kit (Slate)	3.22Kg
Standard Pitched Roof Kit (Tiled)	6.07Kg
SunPipe Kit 300mm (12")	
Standard Flat Roof Kit	3.86Kg
Standard Pitched Roof Kit (Slate)	5.44Kg
Standard Pitched Roof Kit (Tiled)	9.44Kg
SunPipe Kit 450mm (18")	
Standard Flat Roof Kit	7.12Kg
Standard Pitched Roof Kit (Slate)	7.77Kg
Standard Pitched Roof Kit (Tiled)	13.11Kg
SunPipe Kit 530mm (21")	
Standard Flat Roof Kit	7.55Kg
Standard Pitched Roof Kit (Slate)	10.08Kg
Standard Pitched Roof Kit (Tiled)	15.33Kg

...and the Weather?

The most remarkable feature of SunPipe is the amount of intensified light it can deliver. The light will vary depending on the time of year but can be expressed as an equivalent to electric lighting, as shown in these diagrams.

Tables from research conducted by the University of Nottingham



Above chart shows output of a 300mm dia. SunPipe

Optional Extra Components	230mm	300mm	450mm	530mm
Standard 610mm (2') length	0.58Kg	0.82Kg	1.21Kg	1.39Kg
30° Adjustable Elbow	0.13Kg	0.25Kg	0.48Kg	0.62Kg
45° Adjustable Elbow	0.21Kg	0.44Kg	0.82Kg	1.15Kg
Bell End Pipe (300mm)	0.28Kg	0.37Kg	0.59Kg	0.68Kg
Lead Skirt	2.90Kg	3.91Kg	5.24Kg	5.24Kg

25 year Guarantee

All systems supplied by Monodraught are guaranteed for a period of 25 years against faulty manufacture.

Where the installation is carried out by Monodraught's installation teams, the installation is also guaranteed for a period of 25 years.

Insulation

Where required the SunPipe system can be lagged within the roof space quite easily, by simply wrapping the SunPipe with a 25mm blanket. However, with the relatively small area of the SunPipe system, in comparison to the room as a whole, heat loss from such a small area is considered to be insignificant.

For details of fire protection systems for the SunPipe please see page 17.

U-value

Work is currently being carried out at Nottingham University to determine the U-value on the complete range of SunPipe systems but in the meantime, other work carried out on lightpipes has produced the following results:

9" (230mm) diameter - U = 0.315 W/K
12" (305mm) diameter - U = 0.534 W/K
18" (456mm) diameter - U = 0.935 W/K
21" (535mm) diameter - U = 1.515 W/K

Fastcad

All Monodraught systems are featured on Fastcad and detailed drawings can be downloaded from www.fastrackcad.com.

Acoustic Performance

Multilayer Soundguard™ laminated glass supplied by Glazeguard Ltd can be incorporated into SunPipe ceramic ceiling diffusers, (see page 17), and provides a performance of RW 37 dB (Rtra 33 dB).

Horizontal SunPipes

Horizontal applications have been proved to be very successful for basement applications and where a south facing wall is used for termination. Up to 4 metres has been used successfully. An example of a horizontal SunPipe can be seen on page 8.

Lengths & Bends

On smaller sizes a total maximum length of 8m is recommended, but on larger sizes up to 20m in length can be used.

There is an 12% reduction of light for each 30° bend used and a 6% reduction for every metre of SunPipe. 30° & 45° adjustable elbows can be used with all SunPipe applications to direct daylight to where it is required.

Material Specification

Top Dome

4mm UV stabilised unbreakable polycarbonate.
Density: 1.20g/cm³ to ISO 1183 & to BS476 Class 0.
Izod Impact strength: 30KJ/m² to ISO 180/1A.

or 4mm impact resistant modified Acrylic.
Density: 1.18g/cm³ to ISO 1183.
Izod Impact strength: 1.6KJ/m² to ISO 180/1A.

Condensation Trap

Brushed nylon gasket applied to top of SunPipe.

Fixings

Stainless steel self tapping fixing screws with neoprene washers
or tamper-proof pin hex stainless steel fixing screws.

Roof Flashings

3mm ABS universal 1 piece flashing for pitched roofs. ABS two piece flashing for flat roofs. Galvanised flashing plate for asphalt roofs. Code 4 lead flashing and soaker for bold tiled roofs. ABS collar to top of galvanised or lead flashing. Moulded GRP flashing, site fixed for existing metal profiled roofs. Purpose made site welded aluminium flashing for Kalzip type roofs and similar plus ABS collar.

Internal Pipe

Reflectalite 600™ 0.5mm high purity silver coated Aluminium SunPipe with mirror finish and PVD coating 98% reflectance.

Internal Elbows

3-section fully adjustable elbow to 45°.
2-section fully adjustable elbow to 30°.

Ceiling Diffusers

3 part diffuser with white plastic permanent fixing ring. 2.5mm clear polycarbonate stipple finish semi-recessed deep bowl diffuser or 3mm opal. 2mm white twist lock removable ceiling trim also available in brushed aluminium, brass or chrome effect finishes. 3mm plywood backing plate fits above plasterboard. 200mm long bell end slip length into fixing ring.

Light Kits

50 watt 12v Dichroic low voltage light kit with dimmable electronic transformer, all low temperature. Light sensors – purpose designed for each project specification. Provides 430 Lux at desk level.

SunPipe Showrooms and Advice Centres

Monodraught have a network of approved Distributors and Showrooms throughout the UK, where visitors can see SunPipes in a working environment. These are mainly intended for domestic purchases.

Scotland
The SunPipe Centre, Glenrothes
Contact: David Francey
Tel: 01592 771199

North East & North West
D J Tucker, Redcar
Contact: David Tucker
Tel: 01642 471361

Manchester
The SunPipe Centre, Cheshire
Contact: Dave Edwards
Tel: 01606 333605

Yorkshire
Kesteven Roofing Centre, Leeds
Contact: Chris Ball
Tel: 0113 235 1441

Shropshire
Precious Earth, Ludlow
Contact: Paul Williams
Tel: 01584 878633

West Midlands
The SunPipe Centre, Coventry
Contact: Ian Duffy
Tel: 02476 637160

East Anglia
Natrulite, Haverhill
Contact: Andy Bush
Tel: 01440 714650

Gloucester
The Green Shop, Stroud
Contact: Eddie Tottle
Tel: 01452 770629

South London
Bernard Exton Sales, London
Contact: Cliff Cambell
Tel: 020 8870 9916

Norfolk
Thermwatch, Norwich
Contact: Michael Hobbs
Tel: 01603 760255

Kent
Eco Merchants, Nr Faversham
Contact: Joe Hilton
Tel: 01795 530130

Lincolnshire
Joulesave, Grantham
Contact: Chris Robinson
Tel: 01572 768362

East Sussex
The Solar Company, Eastbourne
Contact: Mike Eldridge
Tel: 01323 646979

Milton Keynes
The Lightpipe Company
Contact: Carl Sharman
Tel: 08702 416680

West Country
SunSeekeers
Contact: Marianne Pankhurst
Tel: 01395 568104

South Devon
South West Roofing Ltd, Torquay
Contact: Gary Tasker
Tel: 01803 613212

North Devon
Element Energies Ltd, Ilfracombe
Contact: Lisa Sture
Tel: 01271 866960

Cornwall
Solar Flair, Truro
Contact: Roger Boaden
Tel: 07775 660119

Isle of Wight
A Carpenter & Son, Shanklin
Contact: John Carpenter
Tel: 01983 862014

South Wales
The Welsh SunPipe Centre, Swansea
Contact: Mario Breeze
Tel: 01639 841142

Northern Ireland
Associate Engineering, Ballynahinch
Contact: Steve Philpot
Tel: 028 9756 4321

Republic of Ireland
Davies of Dublin
Contact: Kieran Wise
Tel: 00 353 1 851 1700

Offices

Most popular sizes

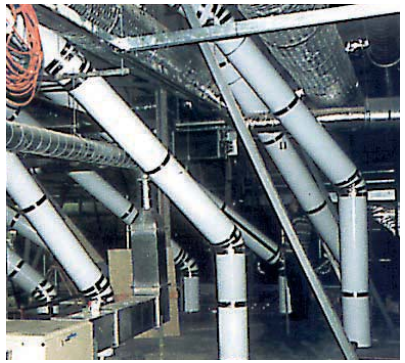
300mm (12" diameter) for small separate offices up to 150sq.ft.

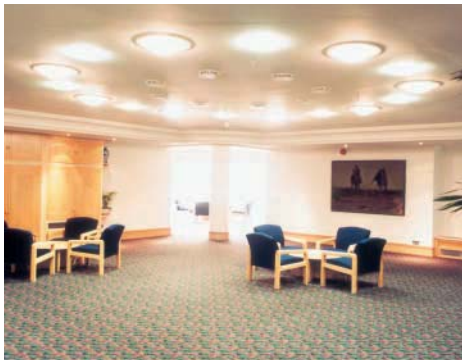
450mm (18" diameter) for open plan offices with a grid of 4m.

530mm (21") diameter to suit a ceiling grid of 5 to 6 m.

Advantages & Benefits

- Natural lighting from SunPipes is known to have a beneficial health effect for office staff as compared to fluorescent lighting.
- No reflection on VDU screens.
- Energy saving helps combat the Climate Change Levy.
- No heat loss or solar gain as compared to conventional rooflights.





Top left: Reception area to Monodraught's offices at Halifax House, lit entirely by SunPipes, where visitors are always welcome.

Top left centre: Monodraught's Accounts office at Halifax House, which is lit by one 300mm diameter SunPipe and has no external windows.

Top right centre: SunPipes installed at Pearl Assurance offices in Peterborough were up to 12m long and some incorporated five elbows.

Top right: Executives' reception area at Pearl Assurance Building, Peterborough, where 330mm diameter SunPipes were installed in 1997.

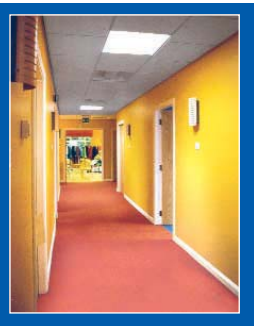
Lower left: Howells Solicitors, Sheffield, where SunPipes were used in converting an old attic store room into offices.

SunPipe Square Diffusers

SunPipes are available with a 600 x 600mm square ceiling diffuser to suit suspended ceilings or to match an existing ceiling grid.

The square diffuser can be used with the 300mm (12") dia, 450mm (18") dia and the 530mm (21") dia SunPipe systems.

A circular to square transition unit fits to the SunPipe tube and spreads the daylight out to the edges of the diffuser, which then spreads the light out evenly into the space below.



The square SunPipe

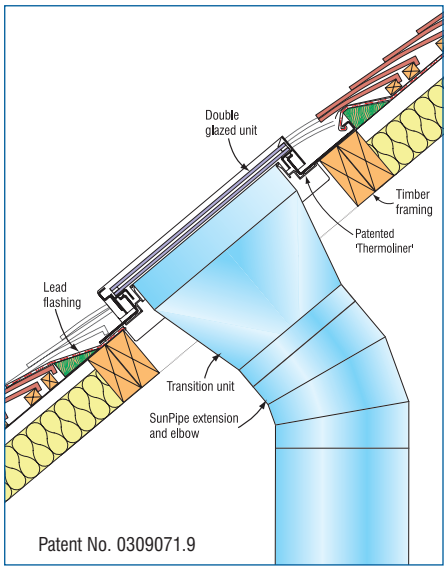
The Monodraught Square SunPipe has been specifically developed to provide an unobtrusive termination for any roof finish. The Square SunPipe is in addition to SunPipe's range of Diamond, hemi-spherical and Conservation SunPipes and is initially produced as standard in a 600 x 600mm nominal format to suit the 300mm (12") dia, 450mm (18") dia and (530mm) (21") dia SunPipe sizes.

Designed to the highest standards

The construction of the Square SunPipe is based on the rooflight construction produced by The Metal Window Company and is constructed to the following specification: 2mm thick CR4 Steel, zinc plated to 25 microns and polyester powder coated to 75 microns DFT to a range of colours and incorporates their patented "Thermoliner" to prevent condensation.

Rooflight to SunPipe

The rooflight includes a special adaptor to fit to the circular SunPipe, that captures up to 3 times more light than a standard SunPipe and reflects and intensifies that natural daylight down to the ceiling diffuser creating an even spread of light into the room below.



Industrial and Leisure

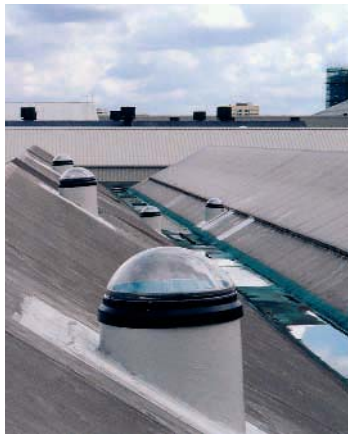
Most popular sizes

450mm (18" diameter) are recommended for most office areas, where ceilings are typically 3m above floor level.

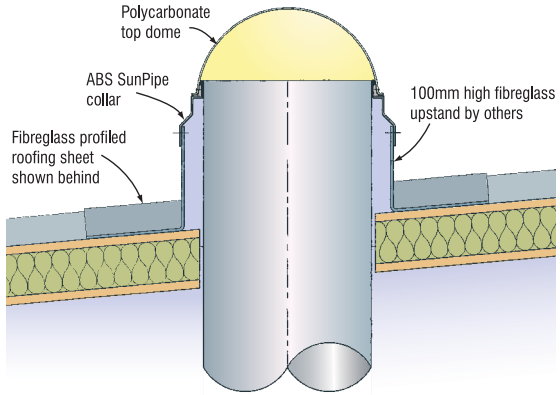
750mm (30" diameter) for large industrial areas.

Advantages & Benefits

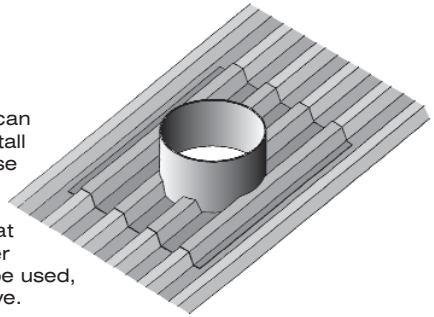
Perhaps the most compelling reason for using SunPipes is to counter the effects of the Climate Change Levy, since SunPipes can be used to provide natural lighting throughout daytime use thereby significantly affecting the dependence on electric lighting, which normally accounts for a significant usage of electrical power throughout daylight hours.



SunPipe flashing detail to metal profiled roof



Monodraught can supply and install either a purpose made GRP flashing or alternatively, flat galvanised over sheeting can be used, as shown above.



Top and Centre left: Sutton Arena, where 14No. 750mm dia. SunPipes were used on the indoor athletics track.

Lower left: Refurbishment of Administration Block at Jaguar Cars, Castle Bromwich, Birmingham.

Top centre: Sutton Arena Pole Vault area.

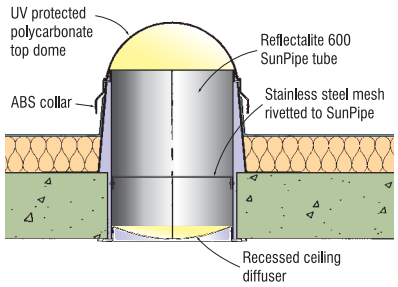
Top right: Woolmer Forest Masonic Lodge, Bordon, Hampshire, where 20 No. 450mm dia. SunPipes were installed.

Lower centre: The Old Saatchi Gallery, London N1, where 530mm SunPipes were used.

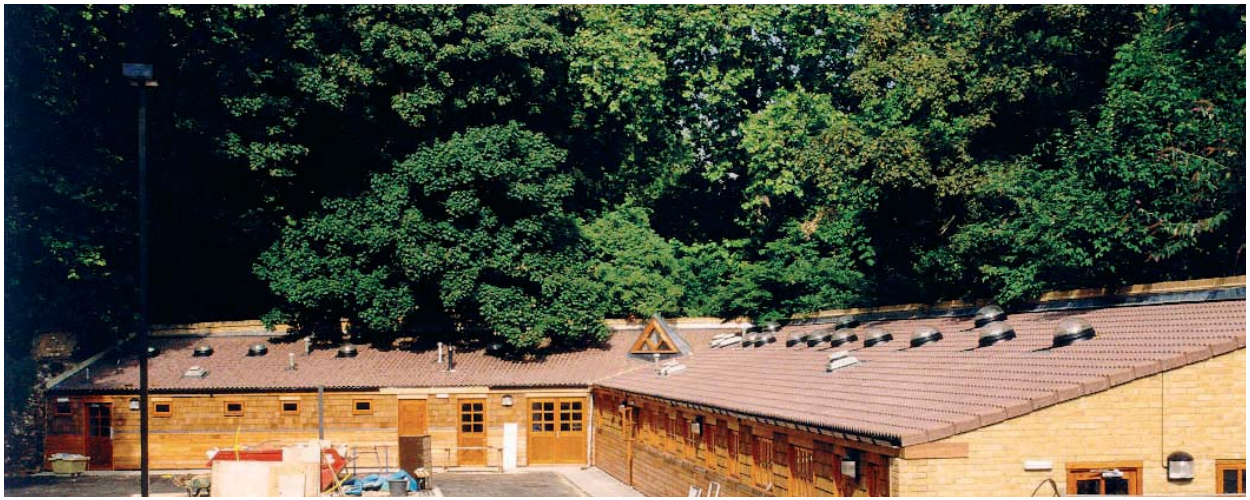
Secure Establishments

SunPipe offers the opportunity to achieve a high level of security by providing small diameter openings through the roof structure which can be heavily protected by additional stainless steel security bars. This is accomplished without detracting from the remarkable ability of the SunPipe to reflect and intensify sunlight and natural daylight.

SunPipe flashing detail to flat roof, serving Ward areas at HMP Winson Green, Birmingham



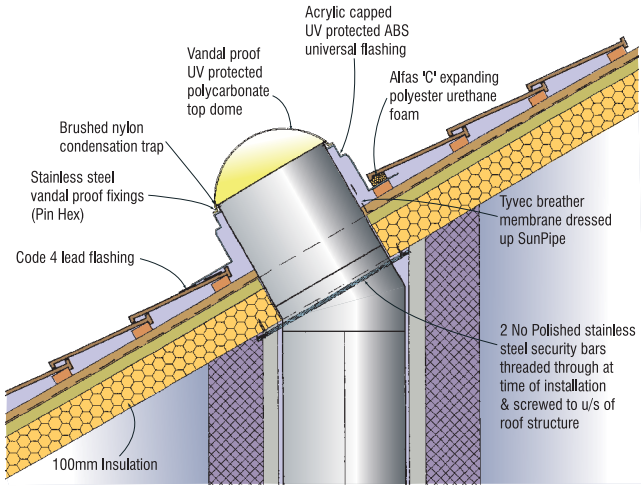
Galvanised steel upstand with security bars



Top: Battersea Park Police Headquarters, where 19 No. 530mm diameter SunPipes were installed to internal cells, corridors and interview rooms.

Centre right & lower right: Lewisham Police Station, London, where 50 No. 330mm diameter SunPipes were installed to the cells of this high security building. The SunPipe systems were fitted with vandal resistant top domes and security bars. Stainless steel ceiling trims were fitted with security screws.

SunPipe flashing detail to pitched tiled roof, at St Catherine's Centre for Girls, St Helens



Recent Projects completed include:

- HMP Rochester Wood, Kent
- HMP Winson Green, Birmingham
- HMP Stanford Hill, Kent
- HMP Preston
- HMP Lincoln
- HMP Wellingborough
- Andover Police Station
- Basingstoke Police Station
- Battersea Park Police Headquarters,
- Greater Manchester Police Training College, Prestwich
- Huddersfield Police Station
- Keighley Police Station
- Launceston Police Station
- Lincoln Police Headquarters
- Plympton Police Station, Plymouth
- Rutherford Appleton Laboratories
- South Yorkshire Police, Doncaster
- St Catherine's Centre for Girls Secure Unit, St Helens
- St Helens Police Station

A specially hardened Polycarbonate top dome and security fixings are available to order.

Fire Protection and Acoustic Performance

Two alternatives

1. SunPipe Fire Guard Fire Resistant Ceiling Diffusers

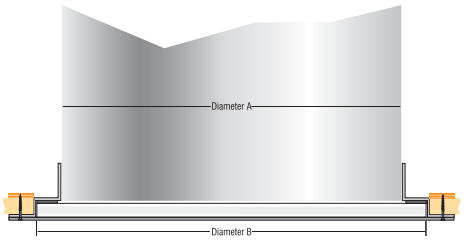
Monodraught have developed a new ceramic based ceiling diffuser for use in conjunction with the complete SunPipe range, to provide up to **2-hour fire resistance**.

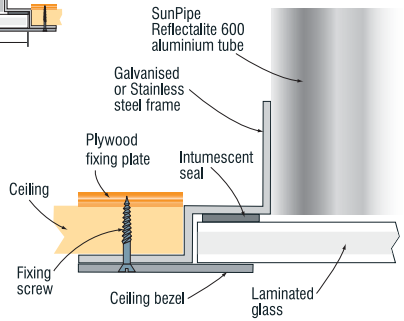
Consisting of a tough, multi-layered glass/ceramic laminated construction which, in sheet form, can provide up to 4-hour fire resistance. The Fire Guard has an acoustic interlayer to provide a sound and fire resistant solution.

The glazed assembly is set into a galvanised steel or stainless steel frame with an intumescent seal.

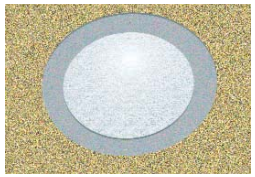
Acoustic plus

This arrangement of multi layer laminated construction also provides a wide choice of acoustic performance profiles up to 37dBa, using SoundGuard™ systems by Glazeguard Limited.





SunPipe Size	SunPipe Diameter (A)	Fire Guard Diffuser Diameter (B)
200mm (8”)	216mm	276mm
300mm (12”)	305mm	365mm
330mm (13”)	330mm	390mm
450mm (18”)	457mm	517mm
530mm (21”)	533mm	593mm



- The system is currently being submitted for testing to the Warrington Fire Laboratories to be assessed under BS476, Part 22.
- In terms of physical safety, SunPipe Fire Guard has been successfully impact tested (BS6206) from both sides.
- The laminated glass will also provide excellent sound resistance to the following performance: 9mm total thickness RW37dB (Rtra 33dB).

Typical Product Performance for 9mm total thickness

Total Thickness	Impact (BS6026)	Rm. (dB)	Rw. (dB)	Rtra (dB)	Weight (kg/m2)	Light Transmission (%)	U Value (W/m2k)
9mm	Class B	34	37	33	21	85	5.30

Notes: Rm. = Mean Sound Reduction Index. Rw. = Mean Sound Reduction Index Weighted with correction ear response.
Rtra. = Mean Sound Reduction Index Weighted for road traffic noise.

2. Sleev-it ‘Fire Choke’ Fire Collars

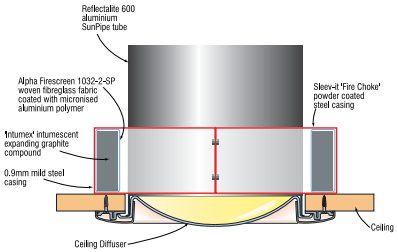
Fitted above a plaster board ceiling and thereby leaving the SunPipe ceiling diffusers unaffected. The Sleev-it ‘Fire Choke’ collars are designed to prevent the spread of smoke and fire through a roof-space by crushing the SunPipe, when the aluminium is subjected to fire giving up to **2 hours protection**.

Each ‘Fire Choke’ collar contains ‘Intumex’, an intumescent graphite compound and Alpha Firescreen 1032-2-SP, a woven fibreglass fabric coated with specially formulated micronised aluminium polymer.

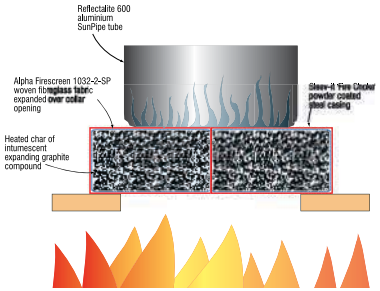
Manufactured in 0.9mm mild steel, the fire choke collar is supplied in two halves, which clamp around the SunPipe aluminium tube.

- Fully tested to current British and/or European Standards. (Test report TE 39902).
- Up to 2 hours fire resistance, specially adapted for Monodraught SunPipe installations.
- Available in a range of sizes up to 750mm diameter.
- Requires no maintenance and is suitable for all interior applications.

SunPipe with Sleev-it ‘Fire Choke’ collar under normal conditions



SunPipe with Sleev-it ‘Fire Choke’ collar in fire situation



The ‘Fire Choke’ patented system contains the expanding intumescent material which crushes the aluminium SunPipe when the temperature in the room exceeds 150°C.

The Alpha Firescreen 1032-2-SP fabric is secured inside each section of the fire collar, laying between the wall of the aluminium SunPipe, and the ‘Intumex’ graphite compound within the fire collar casing. Once the intumescent material expands as a reaction to the increasing temperature, it becomes encased within two pillows of woven fibreglass fabric as it virtually blows up the fabric like a balloon, spreading outwards from both sections to cover the inside of the steel casing of the ‘Fire Choke’ collar. This produces a drumskin effect across the collar opening, which contains the heated char from the exfoliated intumescent material, therefore sealing off the penetration against fire, smoke and hot gases.

Overseas Projects

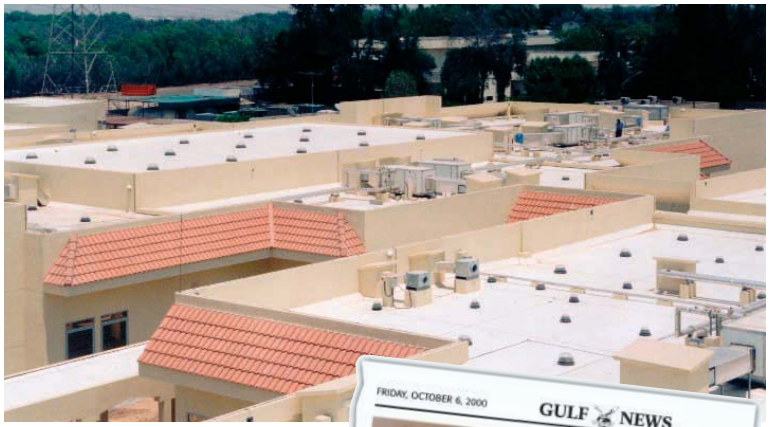
Due to the worldwide uncertainty of the future of energy costs and the almost certain increase in electricity prices over the coming years, considerable interest has been focused on the advantages of the SunPipe system and the advantages it offers, namely:

- No electrical energy costs during daylight hours
- No heat gain to inside areas
- Where used in offices etc, an appropriate reduction in the cooling load will be achieved
- No dependence on outside powers or states for supply of electricity for lighting
- Virtually self-cleansing in most countries due to its shape and, therefore, only occasional external cleaning is required
- Simple to install by local labour
- Supplied in kit form that simply clips together

Top left: Latifa School for Girls, Dubai, where 300 SunPipe systems have been installed.

Top right: Office Development, Jumeirah Beach, Dubai, opposite the famous 6 star Burj Al Arab.

Lower left & right: External and internal views of Electroamsa, Seville, Spain.



No heat gain

Another remarkable feature of the SunPipe system is the ability to eliminate heat gain. With an external temperature of 30°+ the temperature of the air at the top of the SunPipe will increase and expand through the brushed nylon gasket. However, heat will not drop, so the diffuser of the SunPipe remains at room temperature. This phenomenon has been proved on a number of occasions by Architects placing their hand on the underside of the ceiling diffuser in a hot country, which remains cool, as compared to the underside of a rooflight or skylight, which is red hot!

FRIDAY, OCTOBER 6, 2000 GULF NEWS

Dubai school taps sun to light up classrooms

New technology helps create better learning environment

By Joanna Langley

Dubai

Students at a Dubai school are having sunshine piped into their classrooms to save on electricity bills and create a better learning environment.

The Rashid School for Boys has superseded the latest technology which brings natural light from special domes installed on the roof of the school through special tubes into the rooms below.

The SunPipes are said to have had a calming effect on students and the success of the project could see more schools in the UAE adopt the eco-friendly system.

Keith Sedgwick, Head of the school's Primary Department, said: "The aim must we are providing extra light in our classrooms which is totally natural.

Positive effect

"They have been numerous reports of their success, particularly with special needs children, not only because of their calming effect, but because of the safety aspect.

The system works by 'trapping' light in the domes installed on the roof which is intensified as it is reflected through an air tight aluminium tube down into the room or space below, where light is evenly diffused by a ceiling

Overseas Distributors

Austria
Lipfert GesmbH & Co KG, Steyr
Tel: +43 7252 73848

Belgium
HDCV, Waarloos
Tel: +32 15 320 720

Cyprus
Gevo, Nicosia
Tel: +357 2 343045

Denmark
Horn aps, Lunderskov
Tel: +45 75 58 50 87

France
Thomann-Hanry
Tel: +33 466 03 44 03

Germany
SLK Ingenieurgemeinschaft e.V
Tel: +49 3643 748454

Greece
Mipeco Trading Ltd, Athens
Tel: +30 210 664 4611

Middle East
Edison Lighting, Dubai, UAE
Tel: +971-50 6546236

East Africa
Mr Arthur Ntengwe, Uganda
email: arthur.ntengwe@apolohotel.com

Pakistan
Iqbalsons, Karachi
Tel: +92 21 453 3122

Spain
SunPipe de España, Seville
Tel: +34 95 423 00 24

Sri Lanka
Rovican International, Colombo
Tel: +94 75 330 767

West Indies
Barbados Hardware, Bridgetown,
Tel: +1 246 426 4406 x1246

Far East
For Singapore, Hong Kong, Philippines, Malaysia, South Korea, Taiwan and China.
Contact: Overseas Sales Manager, John Edwards on 01494 882476

Daylight on Demand

There are times when SunPipe users may wish to shut out the light into the room, for instance in a Hospital Ward or a Nursing Home, a Conference Room, a School classroom or even a private bedroom.

Two simple methods have been developed for either shutting out the light or indeed, restricting daylight to a desired daylight level.

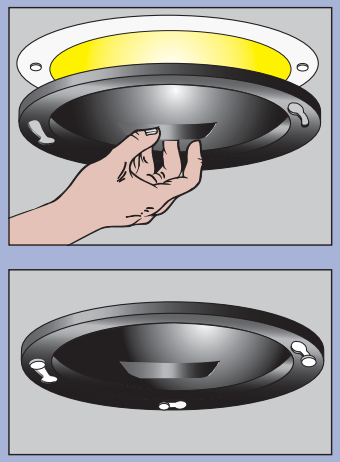
Motorised Damper System

The motorised shut off damper is available with a modulating motor, so that the light level can be varied according to the users requirements. The Belimo motor is linked to a wall switch or small control panel to allow the light to be adjusted accordingly. This system is particularly suitable for larger Conference Halls, Lecture Theatres, etc., where remote control is required.

Motorised Light Shut off Damper Assembly

Black Out Diffuser

This consists of a simple black out cover, which has a twist lock operation, and a ceiling trim with corresponding locking pins that fits to an existing SunPipe diffuser. Ideally suited to bedrooms or hospital wards where a simple black out is required, which can be applied or removed by hand.

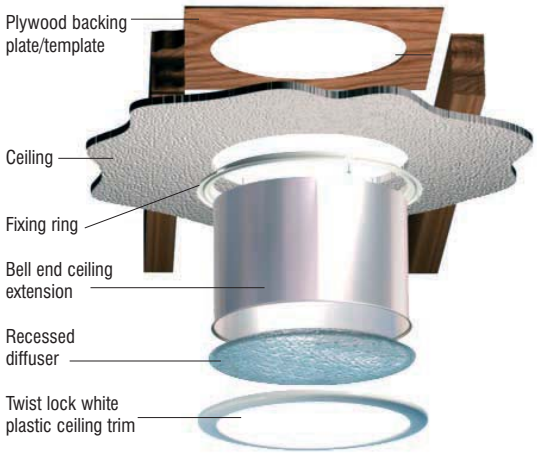


Ceiling Diffusers

The new Monodraught SunPipe Ceiling Diffuser assembly is designed for easy installation and cleaning. It also provides an effective seal for the SunPipe, preventing the ingress of dust from ceiling level.

The new diffuser creates an even spread of light across any designated area. Diffusers are available in clear stippled finish for maximum light output and opal finish for a softer, but reduced level of light.

Ceiling trims are provided in white plastic as standard, but brass, chrome and brushed aluminium effect finishes are available, to enhance a variety of decors.



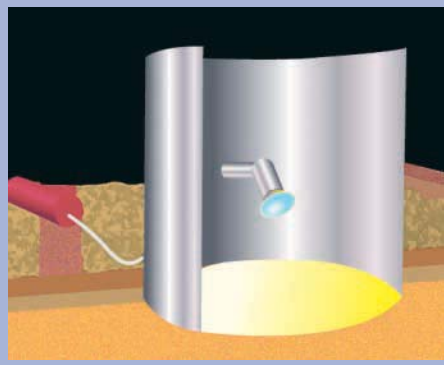
Brushed aluminium effect ceiling trim

Patent applied for No. 0206398.0

Brass effect ceiling trim

Integral Electric Light Kit

Where a single source light is required, such as the top of a staircase, landing etc, the SunPipe can be supplied with a 50 watt low voltage Halogen light fitting and transformer that has been specially designed so as not to affect the natural light output during daytime use. The polished aluminium light fitting can even be supplied with a sensor to automatically bring on the electric light when the natural daylight falls below a preset level. This arrangement provides 430 Lux at desk level.



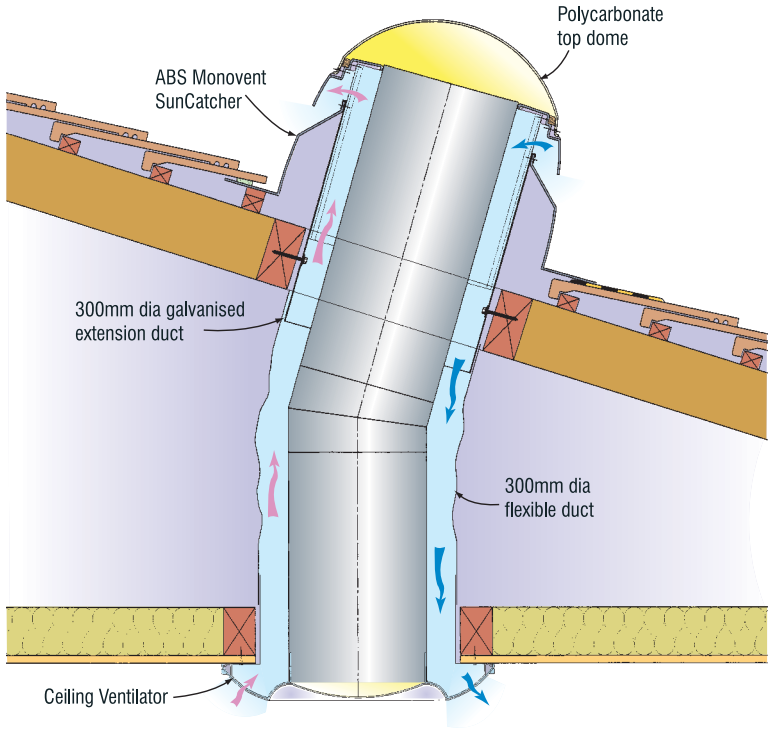
Monovent SunCatcher

The SunPipe and Natural Ventilation in one compact, energy-free system

Designed to provide natural light and ventilation to bathrooms, kitchens, toilets, etc., this low cost ABS system is similar in operation to its big brothers the SunCatcher and Windcatcher. The Monovent can be used on flat roof and any pitched roof applications as the ventilation is carried through flexible ducting.

The Monovent expels stale air from the room as a result of the passive stack ventilation principle, but also has the added advantages of bringing in a supply of fresh air on the windward side of the system. The ceiling ventilator is fully adjustable from closed to fully open and is also available with a brass or chrome finish, where required.

The Monovent encompasses all the advantages of PSV systems, which have proved so popular for social housing, and meets the Building Regulation requirements. However, as with its stable mate the 'Sola-vent', the Monovent also brings in natural light.



Sola-vent

3-in-1 Lighting & Ventilation unit for Bathrooms

Monodraught have launched a new fully integrated bathroom light/ventilation kit, incorporating the SunPipe, two low voltage 50W halogen lights and a 100mm diameter mechanical fan extract – all in one unit! This attractive, modern design is the ideal solution for bathrooms and shower rooms where ventilation is essential. Monodraught are developing a solar powered extractor fan that will make it energy free for 24 hour use.

100mm dia. solar powered or mechanical fan extract with flexible ducting to roof.

2 low voltage IP rated 50W halogen downlighters in stainless steel casings.

230mm (9") dia. SunPipe with clear stippled or opal diffuser. Chrome or brass effect ceiling trims also available.

Patent applied for

BUILDING REGULATIONS

The Monovent system complies with the requirements of the Building Regulations Approved Document F in providing a Passive Stack Ventilation (PSV) system in accordance with BRE Paper, Reference 13/94. This PSV system allows an internal room, without windows, ie. bathroom or utility room, to be used. The Monovent system exceeds the minimum ventilation requirements laid down by the Building Regulations, which is 8,000mm² and a ventilation rate of 15 l/s.

Two Monovent SunCatcher systems are available:

ABS 350: with a 200mm (8") dia SunPipe
To light an area up to 6m²
Has a free area grille of 9,300mm²
Weight: 11kg inc. ductwork 1.5m overall

ABS 550: with a 300mm (12") dia SunPipe
To light an area up to 12m²
Has a free area grille of 18,600mm²
Weight: 20kg inc. ductwork 1.5m overall

Performance Criteria
Minimum area to meet Building Regulations – free air required 8,000mm²

Minimum ventilation rate required – 15 l/s or 0.015m³/s

Monovent Performance
Ventilation rate at external wind speed of 4m/s
ABS 350: 16 l/s or 0.016m³/s
ABS 550: 62 l/s or 0.062m³/s

Natural Ventilation

Always a compliment to the Monodraught SunPipes are the Monodraught Windcatcher natural ventilation systems.

Having eliminated the solar gain associated with conventional rooflights and skylights, the Windcatchers have an even more important role to play in providing the fresh air requirements, as well as providing another energy saving breakthrough in eliminating the need for air conditioning.

In the last 10 years alone, more than 2500 Monodraught Windcatcher systems have been installed.

Please send for separate 20-page brochure and Case Studies on Windcatcher applications.

Top left: Indoor food market, Bridgetown, Barbados, where 10 No. 800dia Windcatchers were installed. The gentle offshore breeze provides the perfect driving force for these systems.

Top centre: Plymouth University, where 7 No. 1000 diameter Windcatchers were installed. Consultants: Oscar Faber, Exeter

Top right: Addey & Stanhope School, Deptford, London, where specially designed Windcatchers were installed, incorporating a special acoustic lining and acoustic pods.

Centre left: The Buddhist Temple and Chanting House at Taplow Court. Architects: Architype Ltd.

Centre right: Queen Elizabeth 6th Form College Library, Darlington. Architects: Browne Smith Baker, Darlington.

Lower left: The Press Association Offices, Howden, where 6 specially designed Monodraught oval systems were installed. Architects: Crease Strickland Parkins.

Lower right: Woodlands Junior & Infants School, Walsall, for Walsall Met. Borough Council.

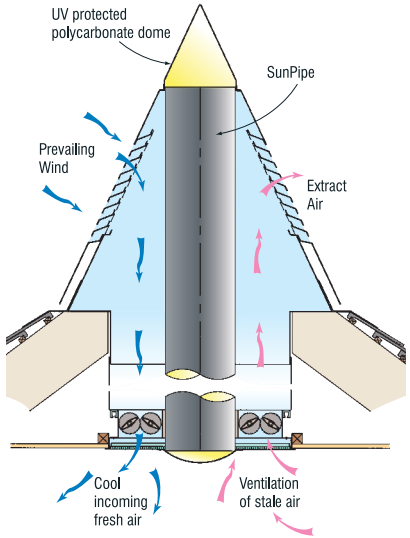
Natural Daylight & Natural Ventilation

Whereas Monovents are designed for domestic and small office applications, Monodraught SunCatchers provide a satisfactory solution of combining natural light and natural ventilation.

The Monodraught SunCatcher system provides controlled natural ventilation as well as providing all the benefits of natural daylight. Any prevailing wind pressure carries a continuous fresh air supply through weather protected louvres on the windward side of the system at roof level. The wind movement is encapsulated by internal quadrants which turns the wind through 90° forcing air down through internal ducts into the room below, slightly pressurising the internal space. Warm, stale air is expelled from the room by the Passive Stack ventilation principle of differential temperatures and the natural buoyancy of air movement. Manual or motorised motors at the base of the system control the rate of ventilation. The central SunPipe tube is integrated into the system and conveys natural daylight to the same room or internal space.

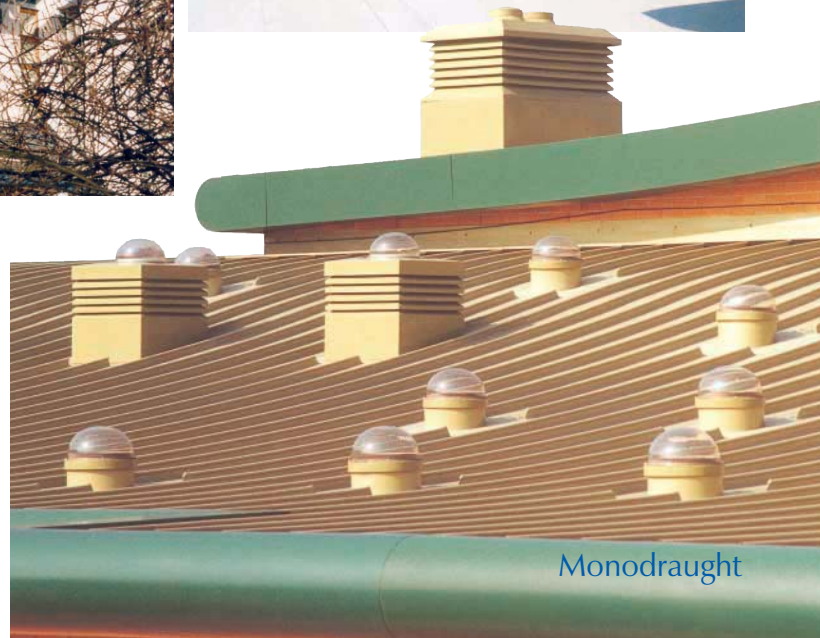
The SunCatcher has the unique advantage that with air intakes on all four sides, it does not matter which way the wind is blowing since one side of the system will always act as the air intake whilst the opposite side, being in the low pressure zone, related to the system, becomes a natural extract to the room. When the wind changes direction so the intake and extract will also change their function.

The system is designed to produce an air change rate of 5 to 6 AC/hr and full calculations are provided for each Project.



The 'famous' Eco House at Nottingham University which has had wide publicity in the Architectural press, featured a bespoke pinnacle SunCatcher system, with a polycarbonate cone. This highlights Monodraught's ability to produce any architectural feature. The pinnacle SunCatcher serves the first floor landing and staircase and a further SunPipe serves the ground floor cloakroom.

Top left: John Groom Housing Association at Borehamwood.
Top right: The Key Centre, University of Hertfordshire.
Centre right: Jane Lane Special School, Walsall.
Lower right: Handsworth Community Fire Station, Birmingham.



Night-Time Cooling

Another major advantage of the SunCatcher is that the dampers can be programmed to fully open at night-time during summer months to allow the prevailing wind movement to force fresh air down into the room below. This not only provides a 'cleansing' effect purging and removing stale odours from the room, but achieves all this without compromising the security of the building.

Winter Operation

During winter months the dampers can be programmed to provide background ventilation only. An air quality monitor can also be incorporated so as to override temperatures where necessary. Under normal ventilation strategies the dampers will be set to be between 3% and 5% open. This will allow trickle ventilation whilst avoiding problems of cold draughts entering the building. The limited cold air intake being denser than the internal ambient air falls to floor level allowing the warmer stale air to rise and exit through the controlled ventilation openings.

The system is controlled by manual or fully modulating dampers, linked to temperature and air quality sensors which in turn are linked to a Cylon digital control panel.

Top left: 26 of the 1200mm square SunCatcher systems installed at BMW Design & Facilities Offices at Cowley, Oxford.

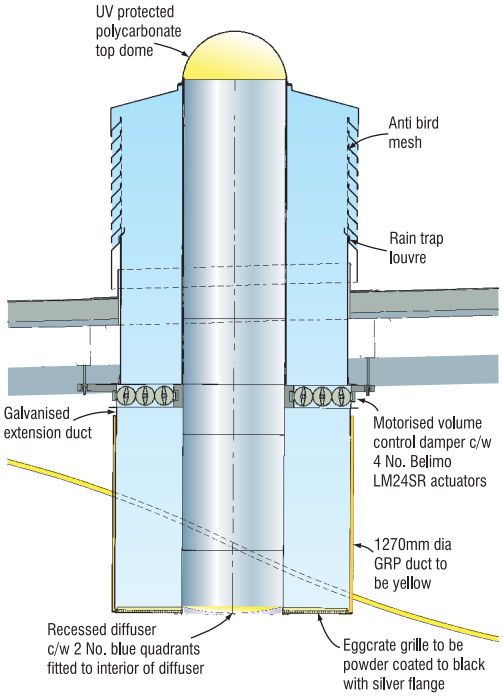
Top right: Detail of the base of the SunCatcher where the SunPipe features the BMW logo.

Centre right: Internal view of BMW Office area.

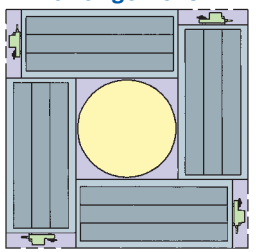
Lower left: Internal view of Natures World, Middlesborough, where our 1500mm diameter bespoke SunCatcher system was installed and sited approximately 6m above floor level.

Lower right: External view of Natures World, Middlesborough, opened May 2002.

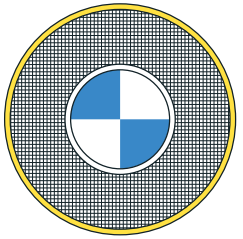
Detail of 1200 Square SunCatcher system serving BMW Amenity area



Plan of Damper arrangement



Plan from below (Amenity area)



Sunpipe



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