

For your house and your activity
Environment protection



NEWS!!
Diameter 900 mm



SOLARSPOT®

The skylight system that brightens the darkest areas of any buildings with its natural daylight without heating. SOLARSPOT® can be used in houses and factories, commercial and public buildings to brighten, even the enclosed areas.



2003

BATIMAT - Paris
Gold medal
for the innovation



2006 - ATEC 6/06-1672

RENEWAL

2008 - ATEC 6/08-1798

AVIS TECHNIQUE

CSTB - France
Centre Scientifique
et Technique du Bâtiment



Well-being and natural sunlight

As we know, the natural sunlight is an indispensable source of life for the living organisms. It has remarkable psychological effects for the quality of the vision of individuals and for their well-being as well: the feeling of a well-aired place, the perception of the true natural colours without distortions, the regulation of the biological cycles: the abstention of sunlight is the principal cause of some depressing pathologies.

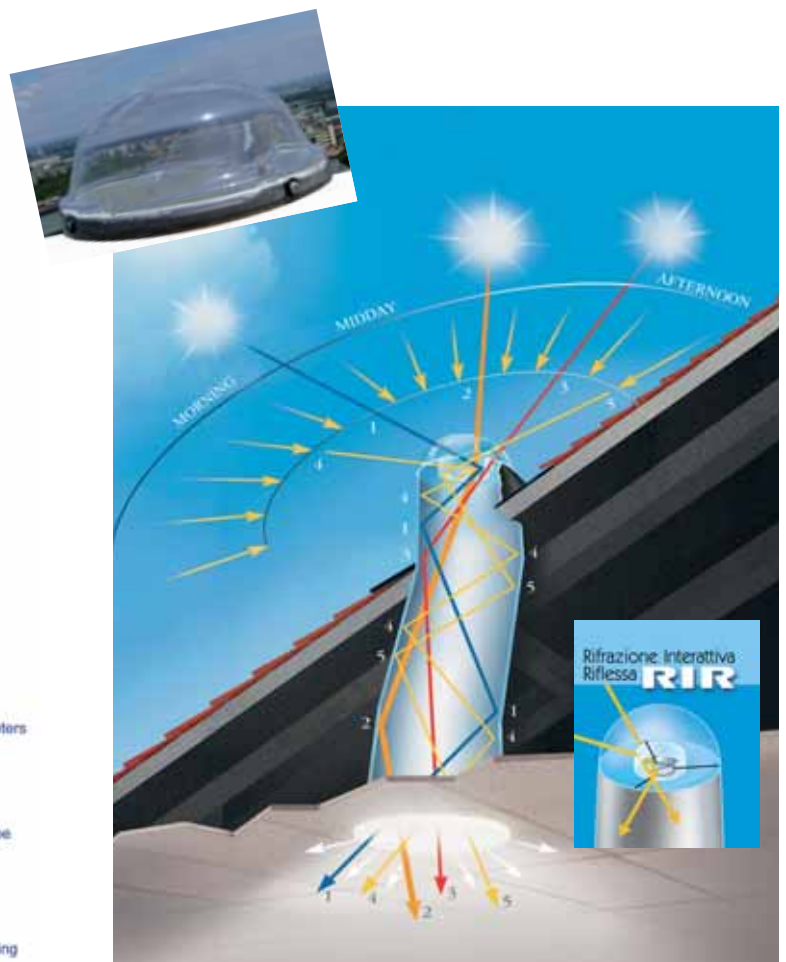
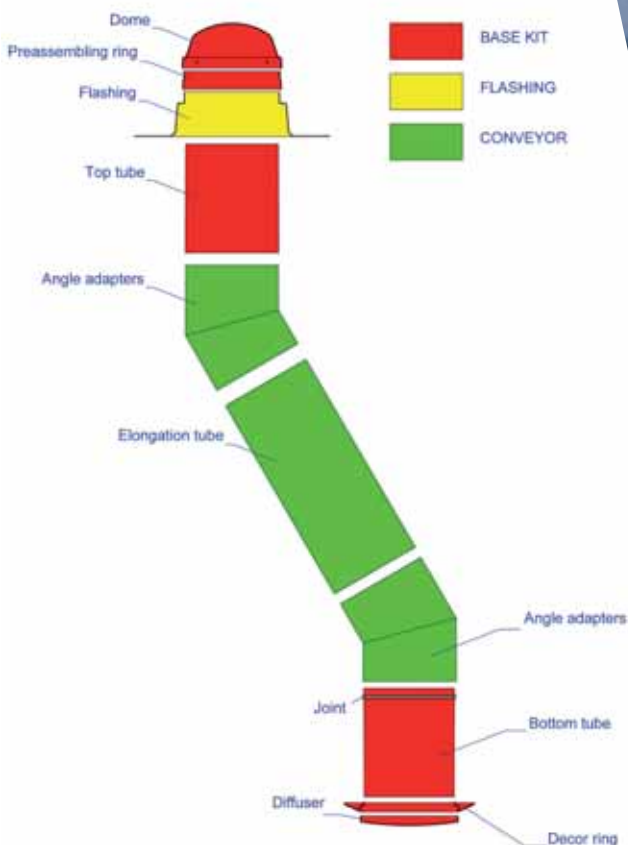
Principle of SOLARSPOT® system

SOLARSPOT® is a lighting system that catches the sunlight in any sky condition (clear or overcast) coming by every direction, thanks to its specific components: the transparent dome in anti-shock acrylic, protected against UV rays, the optical intercepting device RIR® - a true light funnel - that redirects all light beams coming from North and even the lowest on the horizon, inside the transfer cylindrical duct, made of internal and super-reflective surfaces of Vegalux™. Bouncing on the specular surface of the duct, the light beams reach and cross the translucent diffuser (available with many finishings) by creating a highly lighting surface (circular or quadrangular) on the ceiling, capable of lighting even the darkest areas. Diffusing the light from the top of the area, SOLARSPOT® increase the room daylight and make more homogeneous the natural luminance of room walls not so regular when produced only by side and roof windows. Above all brings the benefits of natural light into the enclosed areas that would be still dark without its contribution (world patents). SOLARSPOT® blocks UV rays and doesn't heat the areas with direct heating, usually produced by glass windows and traditional skylights.

Energy saving and environmental protection light up even our future

As soon as we have sufficient and free sunlight, the daily excess of artificial lighting constitute a wasting of precious electrical energy. During summer, enlightening the big areas of workplaces by SOLARSPOT®, you can save the energy to refresh them from the heating produced by electric lamps. SOLARSPOT® contributes to reduce the abuse of the precious fossil fuels and the inevitable environmental pollution which derives from, true natural disasters wasting non-renewable resources which should be protected keeping their availability and use, for the uses "that cannot be renounced" in the many daily current and future activities.

Capturing, redirectioning and conveying of diffused and direct light

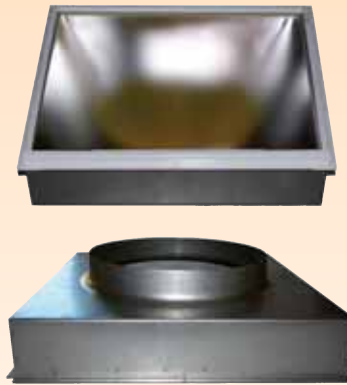




Universal flashing,
for any diameter, tile and
sloping roof



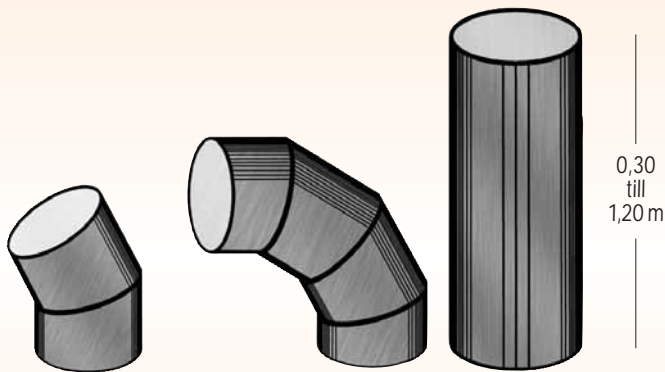
Metal transition box with glass
diffuser:
reaction to fire M1



Electrical and manual
darkening systems



Angle adapters and elongation tubes



COMPONENTS OF PRE-ASSEMBLED KITS

Capturing devices with RIR, pre-assembling rings for the fastening to the flashings of roof exit, starting tube and room-tube, (unified in lamp kits) with completely assembled diffusers and finishing frame, and accessories in suitable packs. Instructions for a **quick and correct assembly**



CSTB - CENTRE SCIENTIFIQUE ET TECHNIQUE DU BATIMENT - PARIS AVIS TECHNIQUE n° 6/08 - 1798
Download from www.cstb.fr
CERTIFICATES AND EXPERIMENTAL RESULTS FOR AVIS TECHNIQUE

1 - Durability test of 3000h en WOM CI65 (Atlas, BST = 60°C) on the brown watertight sheet associated with a 250mm SOLARSPOT® system. Test report CSTB n° BV05-491 dated 26th July 2005.

2 - AEV test on pre-assembled kit of the 530mm diameter SOLARSPOT® system. Test report CSTB n° BV05-441 dated 7th July 2005.

3 - Choc test on the dome of the 250mm diameter SOLARSPOT® system. Test report CSTB n° BV05-440 dated 7th July 2005.

4 - Reaction to fire test on PROTEO® - Formula 5682 brown watertight sheet of fireproof synthetic rubber. PV N° RA05-0525 dated 8th December 2005.

5 - Calculation of thermal dispersion through the light ducts. Thermal study report. CSTB - Affair 05-027 DER/HTO 2005-140-FL/LS dated 1st August 2005.

6 - Characterization of the luminous performance on pre-assembled kit of the 250 mm, 375mm, 530mm e 650mm diameter SOLARSPOT® systems. Luminous balance data present at the end of the technical dossier per Avis Technique. Test report CSTB n° EN-ECL 05.02C dated 28th June 2005.

7 - Optical characterisation in transmission and reflection of the elements of the SOLARSPOT® system. Test reports n° CPM/05-0047 dated 16th September 2005.

8 - Identification by IRTF spectroscopy of organic materials that intervene in the manufacture of elements of the pre-assembled kits of the SOLARSPOT® system. Test report n° BV05-575 dated 27th July 2005.

9 - Durability test of 4000 h (BST = 65°C with cycle for plastic materials) en WOM c 15000 (ATLAS) of the dome in PMMA associated with a SOLARSPOT® system. Test report n° CPM 05-0009 (September - October 2005).

10 - Operative test on a preliminary model of a pre-assembled kit 250 mm SOLARSPOT® system for a covering plain terracotta roof tiles and PROTEO® universal outlet from the roof CSTB (July - August 2005).

11 - Operative test on a preliminary model of a pre-assembled kit 375 mm SOLARSPOT® system for a covering of double interlocking roof tiles with a weak relief to the extrados and PROTEO® universal outlet from the roof - CSTB (July - August 2005).

12 - Operative test on a preliminary model of a pre-assembled kit 530 mm lamppost type SOLARSPOT® system for a covering of double interlocking roof tiles with a strong relief to the extrados and PROTEO® universal outlet from the roof - CSTB (July - August 2005).

13 - Characterization of the luminous performance of the new boxer of diffusers. Test report CSTB n° EN-ECL 08.08.C (June 2008).

14 - Reaction to fire test on VULCANO-V33S, rolled glass Type 33.1 assembled with a sheet of PVB. PV N° RA08-0242 dated 7th July 2008.

15 - Characterization of the luminous performance. Complementary measures. Test report CSTB n° EN-ECL 09.02.C (January 2009).

16 - Reaction to fire test on VULCANO DQL, flat plate in polycarbonate for light duct (translucent circular Fresnel lens). PV N° RA09-0069 dated 4th March 2009.

17 - Reaction to fire test on LEXAN EXELL D FR, rigid plate in co-extruded transparent polycarbonate by UV treatment. PV SNPE N° 13145-07 dated 21st February 2007.

18 - Reaction to fire test on LEXAN 9030FR, plate in fireproof white opal polycarbonate. PV LNE N° G020154 - CEMATE /1 dated 15th February 2006.

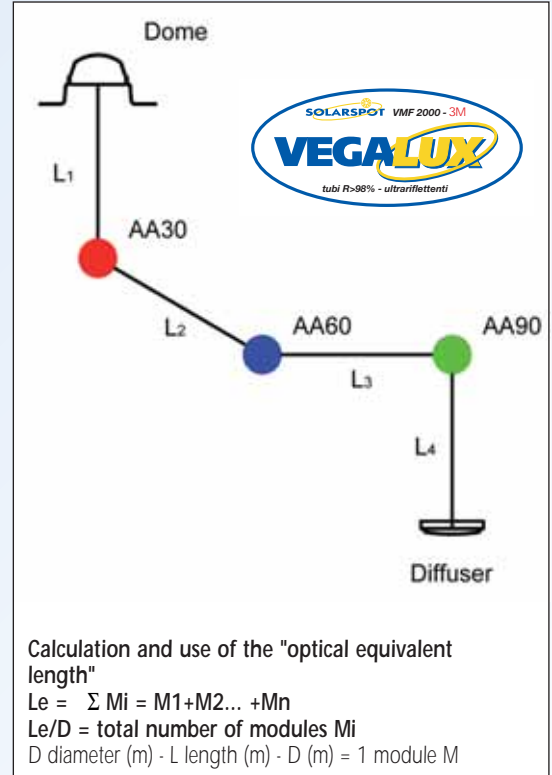
19 - Audit report n° 2031521/1A : production site of "SOLARSPOT®" systems. Bureau Veritas (17.07.2009).

(Tube Transmission Efficiency)

Angle adapters (elbows)

The Avis Technique gives the efficiency in light transmission of the angle adapters (elbows) to their maximum angular deviation; their experimental values in "optical equivalent lengths" (L_e - m) have been deduced confronting their efficiency with that of the straight tubes having the same diameter and defining their length (m) which will produce a loss of light flux equal to that measured for the elbow; as well as L_e , every elbow is classified even with ΣM , number of modules corresponding to L_e (m) and to the module $M = D$ (m) of the plant. The sum of all the modules will correspond to the relationship between the "optical equivalent length" and the diameter of the SOLARSPOT®, both expressed in metres.

Shape and shape factor		1M = D 250 D = 0,250 m	1M = D375 D = 0,375 m	1M = D 530 D = 0,530 m	1M = D650 D = 0,650 m
AA30 until 30° L=0.30 m 	L_e (m) =	1,200	1,225	1,219	0,910
	$n^\circ M = L_e/D$	4,800	3,500	2,300	1,400
AA60 until 60° L=0.60 m 	L_e (m) =	2,400	2,137	2,385	1,820
	$n^\circ M = L_e/D$	9,600	5,700	4,500	2,800
AA90 until 60° L=0.90 m 	L_e (m) =	3,200	2,700	3,074	2,405
	$n^\circ M = L_e/D$	12,800	7,200	5,800	3,700
2 - AA30 L=0.60 m 	L_e (m) =	3,200	2,700	3,074	2,405
	$n^\circ M = L_e/D$	12,800	7,200	5,800	3,700
2 - AA90 L=1.8 m 	L_e (m) =	3,200	2,700	3,074	2,405
	$n^\circ M = L_e/D$	12,800	7,200	5,800	3,700



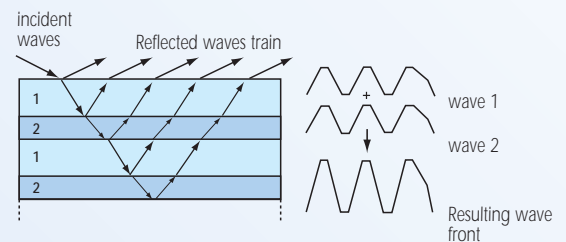
Vegalux™ - super-reflective duct produced with our exclusive plating procedure and with net width of 1200 mm, matching, by our special procedure, the multi-layer VMF film, a technological miracle of **3M**, on rolled aluminum alloys hardened, to assure the maximum elasticity and solidity to the duct, which will have the interior walls with a specular reflectance in the visible range (440-780 nm) of almost 99,5%. Vegalux does not reflect the infrared long waves and minimizes the heat transfer, even due to solar heat gains, for the best true colors rendering (100%).

D, m		0,250		0,375		0,530		0,650	
L_i	m	L_e m	$L_e/D=M$	L_e m	$L_e/D=M$	L_e m	$L_e/D=M$	L_e m	$L_e/D=M$
L_1	1	1	4	1	2,7	1	1,8	1	1,5
L_2	2	2	8	2	5,3	2	3,6	2	3,0
L_3	2	2	8	2	5,3	2	3,6	2	3,0
L_4	1,5	1,5	6	1,5	4	1,5	2,8	1,5	2,2
AA30	0,3	1,2	4,8	1,2	3,2	1,2	2,2	0,9	1,3
AA60	0,6	2,4	9,6	2,1	5,6	2,4	4,4	1,8	2,7
AA90	0,9	3,2	12,8	2,7	7,2	3,1	5,7	2,4	3,6
TOTAL	8,3	13,3	53,2	12,5	33,3	13,2	24,1	11,6	17,3

D	TTE 25(10°)	TTE 37,5(15°)	TTE 53(21°)	TTE 65(25°)	TTE 90(35°)
L					
0,25	1,00	1,00	1,00	1,00	1,00
0,5	0,99	0,99	1,00	1,00	1,00
1	0,98	0,99	0,99	0,99	1,00
2	0,97	0,98	0,98	0,99	0,99
3	0,95	0,97	0,98	0,98	0,97
4	0,93	0,95	0,97	0,97	0,98
5	0,92	0,94	0,96	0,97	0,98
6	0,90	0,93	0,95	0,96	0,97
8	0,87	0,91	0,94	0,95	0,96
10	0,84	0,89	0,92	0,94	0,95
12	0,82	0,87	0,91	0,92	0,94
14	0,79	0,85	0,89	0,91	0,94
15	0,78	0,84	0,89	0,91	0,93
16	0,76	0,83	0,88	0,90	0,93
18	0,74	0,82	0,86	0,89	0,92
20	0,71	0,80	0,85	0,88	0,91
25	0,66	0,75	0,82	0,85	0,89

Natural light reflection model on a packet of transparent films (multilayer films)

Examples:
VISIBLE DAYLIGHT FILM 3M CON R-99,5% - VEGALUX



$$TTE = \frac{e^{\frac{L}{D} \cdot tg \vartheta \cdot \ln R}}{\left(1 - \frac{L}{D} \cdot tg \vartheta \cdot \ln R\right)^2}$$

TTE = VEGALUX tube transmission efficiency (CIE - overcast Sky entry angle of light 30°), versus length of the straight duct (L-m), or elbow (Le-m) and diameter (D-m)

Fd: luminous flux (lm) emitted by the diffuser with exterior lighting

$I_{oe} = 10.000$ lux (CIE Overcast sky - diffused natural sunlight) - Eg certified ATEC Solarspot®

	D 250				D 375				D 530				D 650						
L	1,2	3,6	5,4	6,0	1,8	3,6	5,4	6,0	7,6	8,2	11,8	11,8	0,6	7,2	7,2	16,8			
L/D	4,8	14,4	21,6	24,0	4,8	9,6	14,4	16,0	14,3	15,5	22,3	22,3	0,9	11,1	11,1	25,8			
Eg %	61	53	44	42	57	54	45	42	54	46	43	42	73	57	50	43			
Fd (lm)	305	265	220	210	627	594	495	462	1188	1012	946	924	2409	1881	1650	1419			
I_{oe} (lux)	10000																		
A	captor: dome + top tube L= 30 cm with RIR (Solarspot)				C	tube L=60 cm				d	tubo L=120 cm				i	bottom tube L=30 cm			
l	bottom tube L= 30 cm + square transition box				M	angle adapter (curve) 0°-30° L=30 cm				O	angle adapter (curve) 0°-90° L=60 cm								
Q	prismatic diffuser				r	square radial lens diffuser				S	square prismatic diffuser								

Procedure suggested for the design of a SOLARSPOT® plant

Diameter of the systems and number of units required.

- 1) define the total surface of the area to be lit (m^2) and the average daylight factor [$Fldm = I_{0,9} \times 100 / I_{oe}$ (%)] so as to assure the aim of the project.
- 2) define the course of the duct from the roof exit to the diffuser, measuring the lengths of straight tubes and of types of necessary elbows
- 3) verify how many systems (with an overall efficiency Eg, calculated according to the experimental values of ATEC) you will need to install to obtain the lighting inside the areas $I_{0,9}$ (lux) in the required report as regards to the lighting outside of the building I_{oe} (lux) in overcast conditions (only diffused light) to obtain Fldm.

Example: $Fldm = 1\%$, minimum suggested value for a living room, for aged people who live in a room with floor area $A_t = 50 m^2$. We choose the overcast condition of 10.000 lux for the calculation, so the aim to lighten the room at $I_{0,9} = 100$ lux (1% of 10.000 lux). The SOLARSPOT® systems to install should have the configuration illustrated on this side and emit a total luminous flux of 5.000 lumen ($50 m^2 \times 100$ lux)

Therefore, you can proceed as follows:

- a) choose a system which is considered the most suitable for the area according to the experience; in the example, it is suggested a Solarspot 530 having a collector aperture area $S = \Sigma D^2/4 = 0,22 m^2$, a configuration with an optical equivalent length $Le=6,4m$ and an overall efficiency:

$$Eg=0,56 \text{ (56\%)}$$

- b) calculate the luminous flux (lumen) emitted at the diffuser of the chosen systems with the formula $Fd = I_{oe} \times S \times Eg$, in the illustrated example

$$Fd = 10.000 \text{ lux} \times 0,22 m^2 \times 0,56 = 1232 \text{ lm}$$

- c) calculate the area of the room A_i that every system 530 proposed can light to 100 lux with the formula:

$$A_i = 1232 \text{ lm} / 100 \text{ lux} = 12,32 m^2$$

- d) in conclusion, calculate the required number of systems according to the relation

$$A_t / A_i = 50 / 12,32 = 4,06$$

This number you can reasonably round up to 4 systems sufficient to lighten naturally all the $50 m^2$ of the room with 100 lux; this value will represent most probably the minimum daylighting in the room you can get over one whole year. In the illustrated example, the annual average value for European localities between latitude 35° and 54° north will be for $50 m^2$ between 200 lux (Northern Europe) and 400 lux (Southern Europe) for any $50m^2$ rooms, with the 4 Solarspot systems 530 studied.

Repeating the calculation by making a comparison with the concurrent of Solarspot system (see side graph), **the lighting-engineering result comparable to that expected for Solarspot could be given by the other product, by installing at least 7 (7,3) systems, of similar dimensions, (instead of 4 SOLARSPOT®), to get the same Fldm=1%, the same illuminance inside**
 $I_{0,9} = 100$ lux, in the same $50 m^2$ size room, with overcast sky of $I_{oe} = 10.000$ lux.

Determination of the Overall Efficiency O_e , of light ducts through certified values for the Avis Technique, according CIE TC-38 guide line

CSTB - LABORATOIRE NANTES

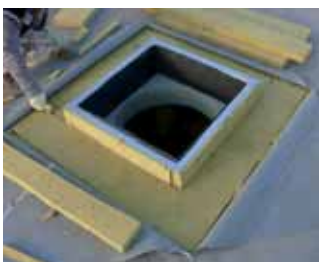


	Solarspot® ATEC 6/08 - 1798		D530	Other product ATEC 6/08 - 1768	
Curve 30°	0,83	1,4 m	Captor + tube Le	1 m	0,73
	0,94	2,4 m	Curve 30° Le	3,6 m	0,90
2,4	0,95	2,4 m	Straight tube Le	2,4 m	0,93
0,4	0,93	0,4 m	Bottom tube 0,4 m + Square emitter Le	0,4 m	0,59
	0,81		Prismatic diffuser		0,86
	6,4 m Le global		7,4 m		
	$0,83 \times 0,94 \times 0,95 = 0,93 \times 0,81 =$		$0,73 \times 0,90 \times 0,93 = 0,59 \times 0,86 =$		
	0,56		Eg Global efficiency		0,31

Installations in industrial and commercial buildings

EUROSPED, Italy, 4600 sq.m.
lighted by Solar-work lamp kit:
N. 105 D650 - N. 6 D530 - N. 5 D375
(2001-2002)

Giannino Distribuzione spa, Italy
18.000 sq.m. lighted by Solar-work lamp kit
N. 580 D650
(2006)



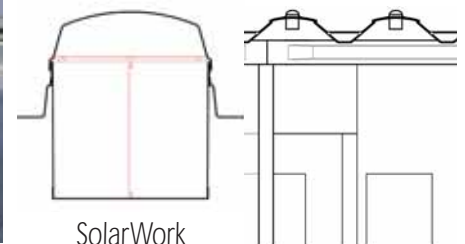
Square and isolated lifting bearing



Square flashing installed on the bearing (Tesco - 2009)



Bearing and square-based flashing with cylindrical flue and transom flashing (Massalengo school 2009)

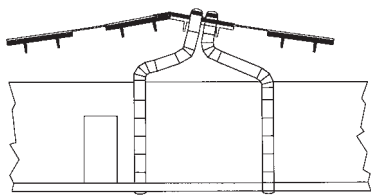


SolarWork lamp kit

Installation examples



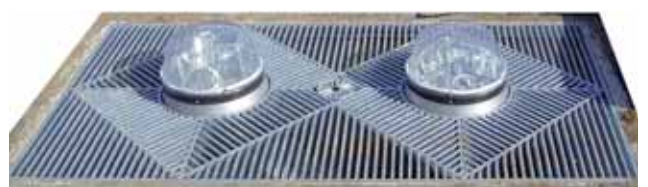
N. 14 SOLARSPOT 650, of very complex configuration, made of 22 tubular sections, light 560 sqm of the enlarged workshop FRE.TOR in Puos d'Alpago, Belluno (Italy). (2001)



Environment Park (TO) Italy
Underground, kitchen and restaurant, Direction and Offices.
Urban design Arch. S.Dotta (2002-2005)



Underground



Round and square diffusers



round in pearled acrylic with ceiling ring,
available for D-250-375-530



(25DR10N+25-1DTPN) (38DR10N+38-1DTPN)
(53DR10N+53-1DTPN)

round in prismatic acrylic with ceiling ring,
available for D-250-375-530.



(25DR10N+25DTPN) (38DR10N+38DTPN)
(53DR10N+53DTPN)

round vision in transparent or pearled acrylic,
or in polycarbonate, with ceiling ring,
available for D-250-375-530.



(25DR10N+25DTVN) (38DR10N+38DTVN)
(25DR12NP+25DTNPOV)(38DR12NP+38DTNPOV)

lamp VISION Fleur in pearled or prismatic acrylic, avail-
able for D530 e 650



53-1DCNACPV 65-1DCNACPV
53DCNACPV 65DCNACPV 90DCNACPV

round VISION in polycarbonate with ceiling ring
in polycarbonate available for D530



(53DR12NP+53DTNPOV)

lamp VISION Fleur in transparent acrylic
available for D530 e 650



53DCNPOV 65DCNPOV

Transition box with frame and square diffuser, radial
Fresnel lens (available for D250, 375, 530 e 650)



38RT40R+38DQL3 25RT30R+25DQL30
38RT66R+65DQL59 53RT66R+65DQL59
65RT66R+65DQL59

Lamp, radial Fresnel lens with metal finishing frame, lac-
quered grey or white
(available for D250, 375, 530, 650, 900)



65DCNLEF + 65GEDAL15 + 65GISAL15

Transition box RT60R without frame and with square dif-
fuser, radial Fresnel lens
available for D375-530



38RT60R + 53DQL57 53RT60R+53DQL57

(ask at our technical desk for other size and dimension)

Round and flat aluminized flashing with brim



53SAFALB 65SAFALB 90SAFALB

Round and flat aluminized flashing, round edge of the diameter 522 mm



38SATOB

Round and flat aluminium flashing (variable heights)



25SATO1 38SATO1 53SATO1 65SATO1 90SATO1

Square and flat copper flashing 625*625 available for D.250-375 with bent brims according to standard measures



25SQRA116 38SQRA116

Universal flashing - PROTEOTM - for any kind of tile and sloping roof (zenith or coplanar installation) Available for all diameters.



Aluminized round and flat flashing with isolation (variable heights)



25SATO2 38SATO2 53SATO2 65SATO2

Round and flat flashing base 1000*1000mm, available for all diameters. It can be made with different materials (aluminized steel, annealed aluminum, stainless steel, copper, etc.). It can be bent if there is the need, for installation on lifting bearing, and seam on covering of sheets as long as the pitch.



25SQ12V 38SQ12V
53SQ12V 65SQ12V

Round and flat flashing, maximum measure 625*625mm, available for D250-375. It can be made with different materials (aluminized steel, annealed aluminum, stainless steel, copper). Bent according to standard measures, for installation on lifting bearing.



25SQ116V 38SQ11V

Ø standard mm: 250 (10") - 375 (15") - 530 (21") - 650 (25") - 900 (35")

With electrical accessories

Solar-Dimmer™

Controls of the amount of light by the ease of an electric switch; negligible lost of light when Dimmer open (<6%); available for all standard diameters



Available for standard diameters
250-375-530-650



(Patented in Europa e USA)

Solar-Luce™

Night lamp



Solar-Fan™

Areas ventilation



Solar-ATTIC™

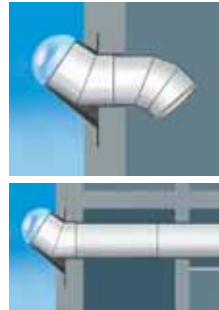
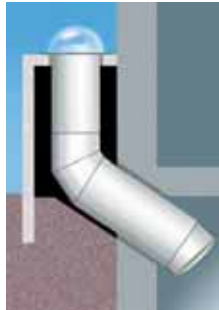
Ideal to enlighten garrets and lofts



SOLAR-WALL™

When areas can be reached only from ground and wall. Solarspot® can convey light horizontally and... uphill thanks to angle adapters and tubes made of

VEGALUX® R = 99,5%



For the large surfaces of new buildings and restyled ones

Standard

Lamp kit



SOLAR-WORK™

traditional or lamp, provides natural light, but not heat



3 November 2009, Solar Project Srl and Energo Project Srl merged in SOLARSPOT INTERNATIONAL SRL.

<p>Producer</p> <p>Solarspot International S.r.l. Via Milano, 96/A 21034 Cocquio Trevisago (VA) Italy Tel. +39 0332 700137 - Fax +39 0332 702098 www.solarspot.it - E mail: info@solarspot.it</p>		<p>Retailer</p>
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