

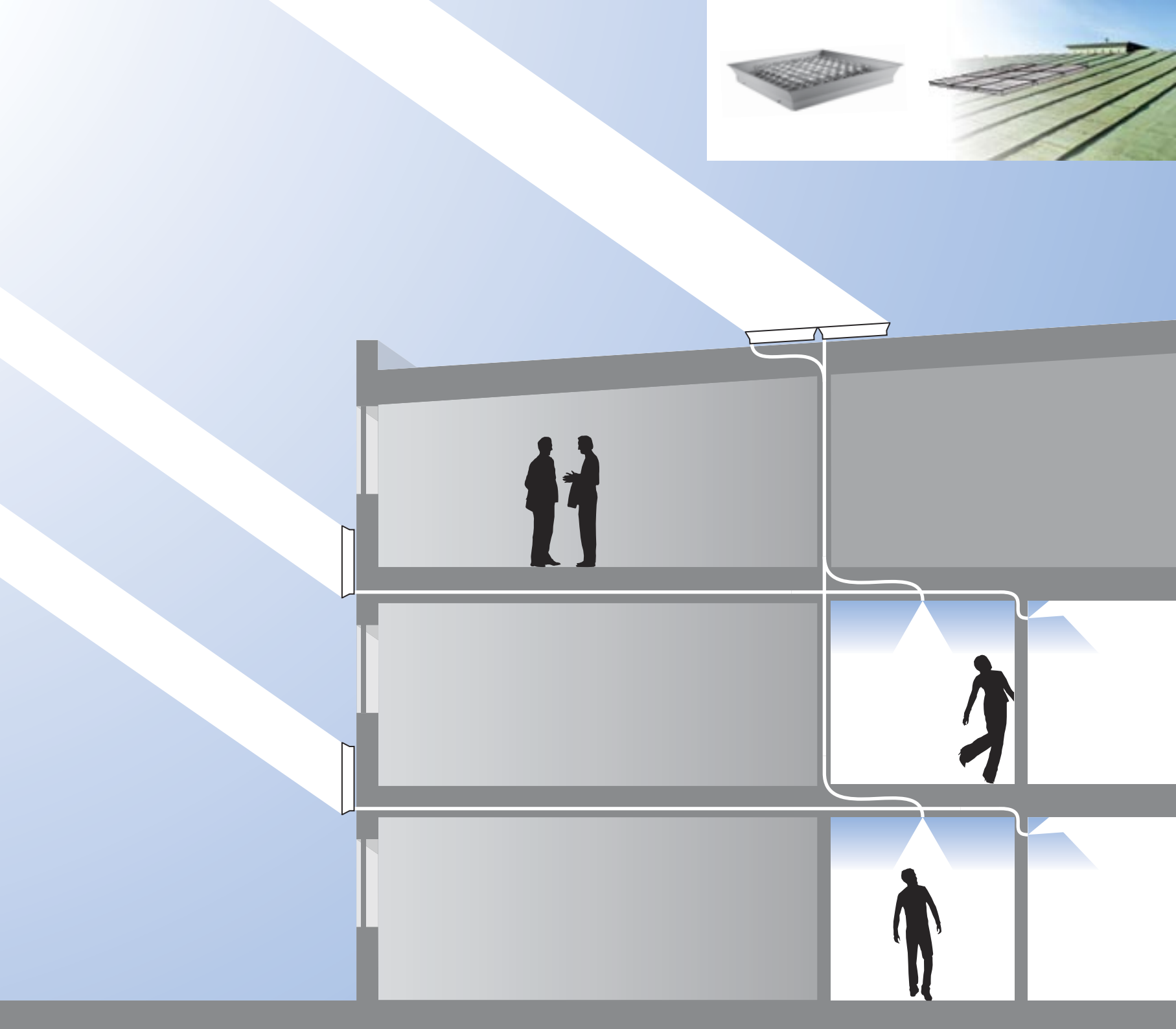
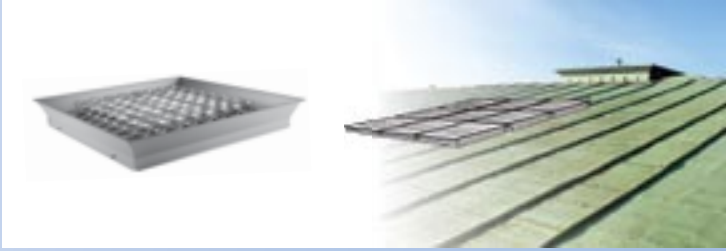
PARASIS

BRING NATURE INSIDE



Sunlight has the highest light quality available – now Parans lets you use it for real. Parans solar lighting collects sunlight outdoors and brings it indoors using fiber optic cables. This way you can experience the presence of nature in rooms where you work, live, love and learn...

Welcome to Parans!



Parans solar lighting

Imagine an indoor environment where the variation of outdoor light is always present - a house that has sunlight in every room. With this brochure, Parans has the pleasure of introducing the concept of Parans Solar Lighting.

The Principle

In the sketch to the left, the simple principle of Parans solar lighting is shown. First, sunlight is collected by Parans solar panels outdoors. The sunlight is then brought into the building through the Parans optical cables. Indoors, the sunlight flows out through Parans luminaires. This technology is called Fiber Optic Solar Lighting.

Parans Solar Panel

Parans solar panel can be mounted on roofs or facades and employs an array of optical lenses to collect and concentrate incoming sunlight. It is easily installed and integrates with buildings' surfaces to allow for architectural integrity.

Parans Optical Cable

Parans optical cable is made of several fiber optic strands. The cable is thin and flexible and thanks to the high light transmission, sunlight can efficiently reach many locations deep inside buildings.

Parans Luminaires

In the chosen rooms, the sunlight is emitted through a Parans luminaire, specifically designed to recreate the feeling of sunlight. A line of luminaires is available to match the outline, purpose and aesthetic of the specific room that is illuminated with the healthy sunlight.

Illuminating interiors with sunlight from Parans solar lighting gains many benefits ranging from increased alertness to reduced global warming.

Wellness & Productivity

- Productivity increases by 6 – 16 percent when natural light is added to a workplace.¹
- 1 percent productivity increase equals the total energy cost in offices.²
- Pure sunlight is dynamic and has a full spectrum that triggers the ganglion cells, which controls levels of melatonin and cortisol, thereby synchronizing the body clock. This makes us alert daytime and sleep well nighttime, enhancing our immune systems and general health.
- Sunlight gives improved visibility from improved light, better color rendering, and the absence of flickering from electrical lighting.³

Sustainability & Energy Savings

- Electrical lighting represents 40 – 50 percent of the energy consumption in commercial buildings.⁴
- Electrical lighting contributes 25 – 30 percent of the emission of greenhouse gases generated in commercial buildings.⁵
- Exchanging half of a building's electrical lighting for Parans Fiber Optic Solar Lighting can lower the energy costs by 20 – 25 percent and the emission of greenhouse gases by 10 – 15 percent.



Increased Property Value

- Larger parts of buildings can be used commercially as Parans brings the valuable sunlight to rooms that lack natural light and thereby transforming areas which are commercially unviable.
- The property income per each rented square meter can be significantly increased as spaces are enhanced with sunlight. Wellness and Productivity are economical realities for all occupants.
- Parans solar lighting offers an advantage for attracting customers that desire a sustainable facilities solution. Especially as a Green corporate profile is more or less a necessity for modern companies and societies.

Retail Sales

- A study of 108 nearly identical stores showed 40 percent higher retail sales in stores with natural light compared to those without, by 99 percent statistical certainty.⁶
- Shoppers stay longer and feel more at ease in a store with natural light. Increased customer loyalty as a result.
- Staff experiences increased efficiency and health, decreasing absence and sick leave.

Applications

In any building where a comfortable and healthy indoor environment or energy efficiency plays a role, Parans solar lighting offers a valuable contribution. Using Parans solar lighting adds distinct advantages in the following areas.

Office and Education

Wherever people are involved in intellectual work or learning, it's crucial to provide a supportive environment that keeps the brain relaxed, the mind alert and the body healthy. Research proves that natural light does just that. In a 1999 study, students in the classrooms with most natural light progressed 20 percent faster on math tests and 26 percent faster on reading tests. Workforce studies show how productivity increases by typically 6-16 percent, absence decreases by around 5-25 percent. Add to this the energy savings of up to 25 percent of the annual costs and it's not difficult to calculate a short time between investment and payback.

Healthcare

It is important to provide a healing and positive atmosphere in hospitals or other healthcare facilities. Therefore, creating a living and healthy lighting that brings elements of nature indoors is a sound investment. Hospitals are such large structures that many occupied areas can be left without natural light. A problem that Parans solar lighting is capable of solving.

Galleries and Museums

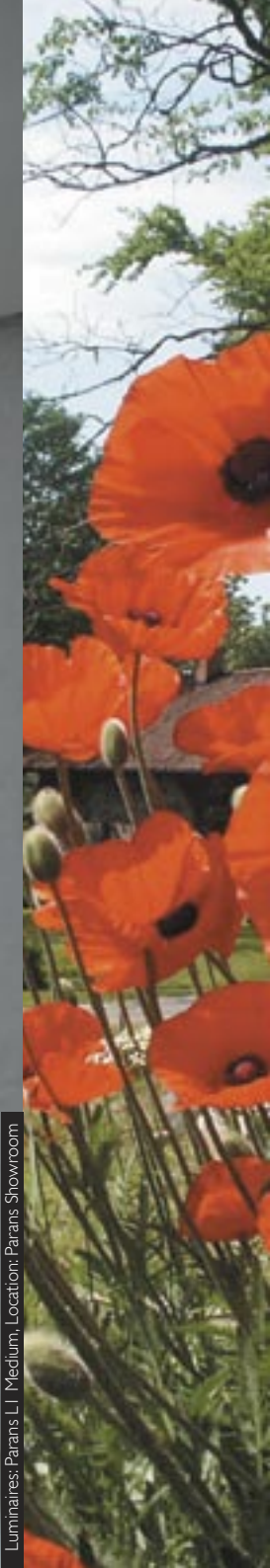
At last art galleries and museums can show paintings and sculptures in the natural light it was created in! This is possible since Parans solar lighting does not transfer the harmful ultraviolet radiation of the sunlight into buildings, which can degrade artwork and textiles. It only transfers visible light. The heat-intensive infrared radiation that requires energy-consuming cooling is also filtered away.

Retail Stores

Crucial to the success of any retail store is to attract customers and to make them stay and shop. It is therefore no wonder that sales can increase by 40 percent as shoppers stay longer in environments made more comfortable and interesting by adding natural light. In addition, the uniqueness and brightness of Parans solar lighting is sure to attract a great deal of attention to any venue.

Residential

Our home is where we spend time without obligations, a place for safe and relaxed living. Many homes have rooms that could be so much more inviting and comfortable if they were reached by the living sunlight. With Parans solar lighting, many more rooms - deep inside buildings, north facing or even under ground - can be illuminated with real sunlight.



Luminaires: Parans L1 Medium, Location: Parans Showroom

Product Line Overview

With this overview you can see how many Parans luminaires that can be used with each Parans Solar Panel. Four optical cables come from each Parans SP2 and different luminaires can be used with one Parans SP2, for example two Parans L3 and one Parans LI Medium.

Parans Solar Panel



Parans SP2

Parans Optical Cable



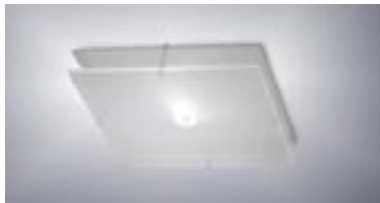
Parans OC:
4 per Parans SP2

Parans Luminaire



Parans L3:
4 per Parans SP2

Parans Luminaire



Parans LI Small:
4 per Parans SP2

Parans Luminaire



Parans LI Medium:
2 per Parans SP2

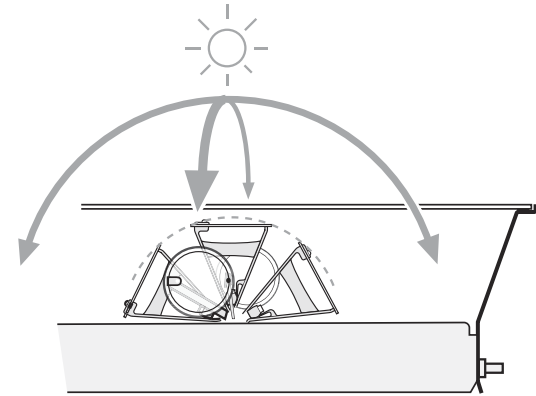
Parans Luminaire



Parans LI Large:
1 per Parans SP2

Parans Solar Panel

It is with pride that we present the second generation of Parans solar panels, the Parans SP2. This is an upgraded version of the key innovation which makes Parans solar lighting possible. On roofs or facades, it collects incoming sunlight and channels it into Parans optical cables that flexibly transports the sunlight into buildings.



About the Technology

Parans solar panels are 1 m² modules that are mounted fixed on roofs or facades. Inside the panel, 62 Fresnel lenses move uniformly around their axis, tracking and concentrating sunlight. This concentration of sunlight is Parans' solution to bringing sunlight so far into buildings in such an easy and flexible way. The technology is patented.

Tracking the Sun

The Parans SP2 employs active tracking, guiding the Fresnel lenses so that they are always orientated towards the sun. This movement is achieved with three motors, resulting in an average electricity consumption under 2 W. Thanks to the active tracking, the Parans SP2 can be installed or moved to any location and orientation without pre-programming. On a technical level, the tracking is controlled by two photosensor that continually feeds the internal microcomputer with light level data. At installation, the SP2 immediately scans the sky to detect the direction to the sun. It then learns and remembers the solar path so that it always is ready to collect sunlight.

Concentrating Sunlight

The tracking keeps the surface of the Fresnel lenses perpendicular to the direction of the incoming sunlight throughout the day. The configuration ensures that the sunlight is efficiently concentrated into the 0,75 mm optical fibers that are placed underneath each lens.

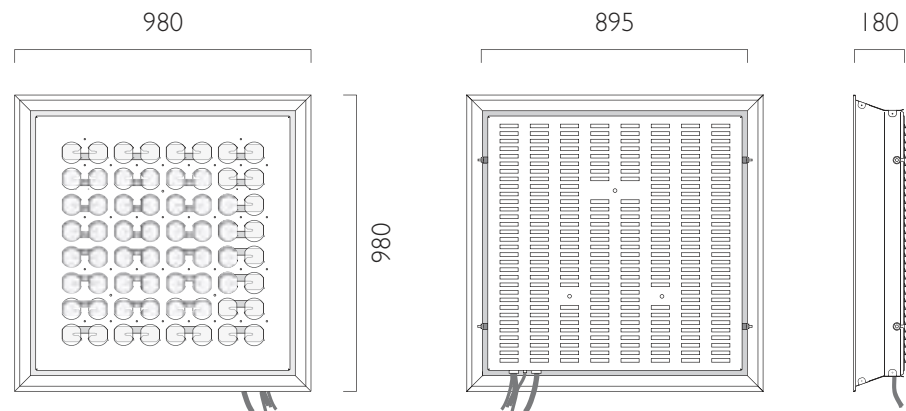
Performance

Parans SP2 has the capacity of collecting sunlight over wide angles as well as delivering high luminous flux. The SP 2 can collect sunlight with an incident angle of 60 degrees from the direction to the sun, thus forming a 120 degrees active cone. This represents on average 8 hours of sunlight.

For more technical data on Parans SP2, see www.parans.com or contact Parans!

Specifications

Dimensions	980 × 980 × 180 mm
Weight	30 kg
Number of Fresnel Lenses	62
Fiber Optic Cable Quantity	4
Power Supply	AC 110 - 250V
Mean Power Consumption	2 W
Shell Material	Eloxated Aluminium
Glass Surface	Tempered Glass



Mounting

Parans SP2 can be installed on both roofs and facades thanks to the capacity of collecting sunlight from wide angles. The panels are mounted fixed with standard building elements. In general, the optimal azimuth (compass direction) of the panel is facing south if north of the equator and vice versa. On the vertical plane, the optimal elevation angle generally equals the latitude of the specific location.

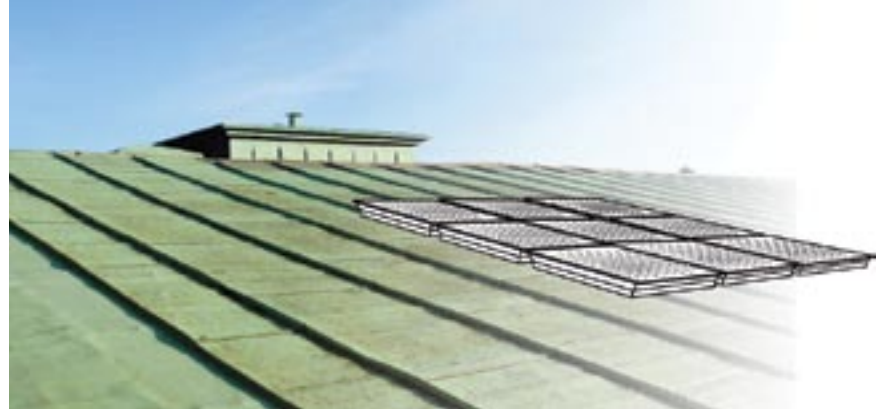
Roof Mounting

Depending on how much the roof angle deviates from the optimal orientation in both azimuth and elevation, the panel can either be mounted flat on the roof or with a tilt.

Facade Mounting

On all latitudes, the panel can be mounted flat on facades having access sunlight throughout the year for facades facing east or west. On southern facades, the panel can be mounted flat on on latitudes from 90 to 53 degrees (North of for example Berlin).

Contact Parans for information regarding mounting, orientation and solar hours for your specific project!



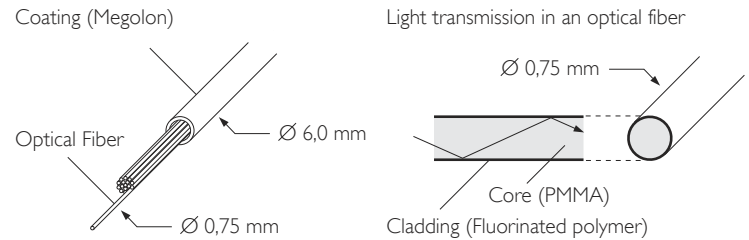
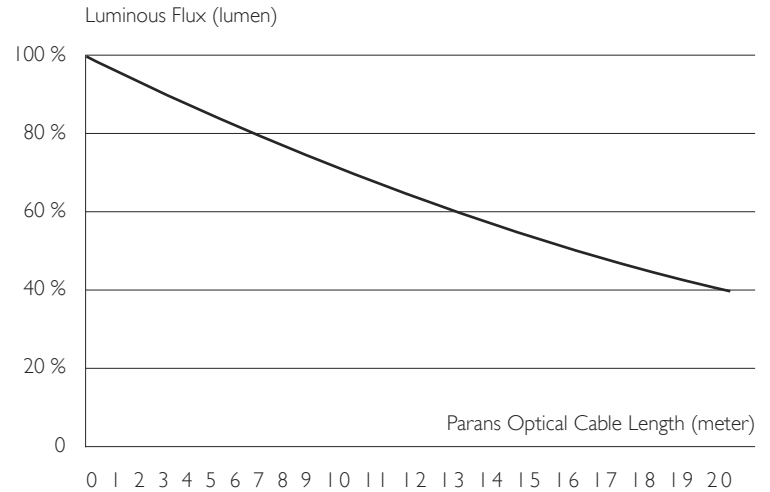
Parans Optical Cable

The fiber optics that leads the light in the Parans optical cable has high light transmission and flexibility. These are the main reasons why Parans solar lighting makes it possible to bring sunlight so far into buildings without occupying valuable building space.

Specifications

From each Parans solar panel come four optical cables. These are 6 mm in diameter, a density of 30 g/m and can be ordered up to 20 m long. The bending radius can be as small as 50 mm, making light work of tight corners.

The optical cables are sheathed with fire retardant Megolon. Within the cable, the light is transported in 16 of the 0,75 mm High Performance Plastic Optical Fiber made of PMMA (PolyMethylMethAcrylate). The light transmission is 95,6 percent per meter.



Parans Luminaires

The experience of sunlight in a room is exclusively different from that of artificial light. The sunlight has a continuous color spectrum that makes it healthy. It is also living and dynamic, following the conditions of the outdoor light. Yet it is calm in its character and does not suffer from the hardly noticeable, but brain disturbing flickering of electrical light. Parans luminaires bring out the positive properties of sunlight and to fulfill the potential of every room.

Designs for Sunnier Days

Parans has a dedication to bringing sunlight inside. A team of lighting specialists and architects collaborate to create Parans luminaires that make the most of the valuable sunlight. Consideration must be taken to the design of the luminaires themselves so that these are light and representative for the transparency that Parans solar lighting brings to a building. But even more consideration must be taken to how different rooms can come to life when illuminated with the bright and dynamic sunlight.

Parans Solar Lighting and Electrical Lighting

Parans aims at establishing a connection to the outdoor environment. Having the sun as light source, Parans solar panels do not transfer light at nighttime or when clouds block the sun. This dynamic is one key element of natural light. Therefore Parans solar lighting should rather be treated as other sources of natural light in that the need for artificial back-up lighting remains in order to ensure lighting capacity at times when there is no sunlight.



Luminaires: Parans L1 Medium, Location: Parans Showroom



Parans L3

The Parans L3:s are spotlights leaving great freedom to the user to design the light experience. The Parans L3:s have adjustable focal ranges and are easy to direct in different angles. This creates the possibility to freely adjust the illumination images according to each situation. Ideal for highlighting objects or creating indirect lighting by emitting the sunlight on walls or ceilings.

Mounting

Recessed in ceilings or walls with a quick fixing requiring no tools.

Specifications

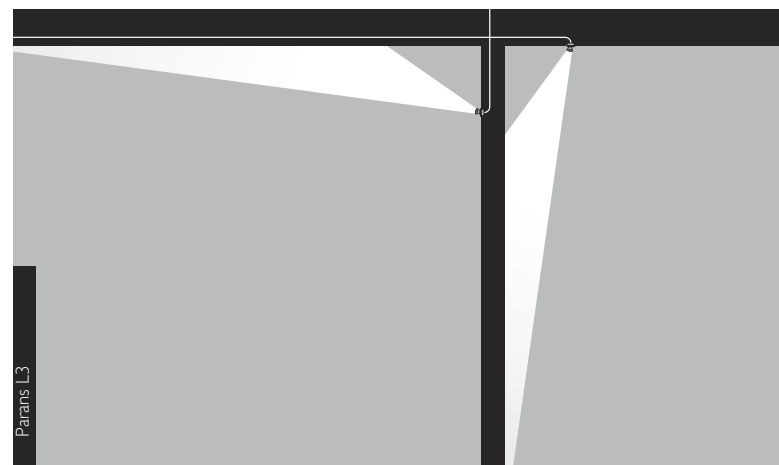
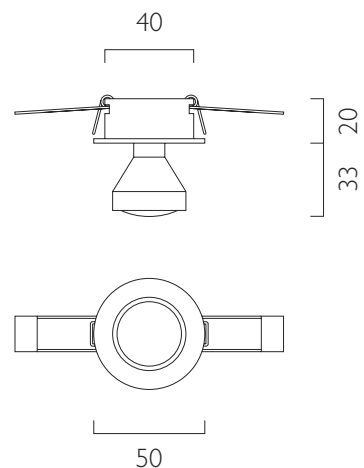
Parans L3

Dimensions (mm)

Ø 50

Weight (kg)

0,053



Parans LI

The first series of Parans luminaires, Parans LI gives the sensation of standing under the foliage of Birch trees when the sun strikes through. Parans LI:s are made of thin semi-transparent acrylic sheets. The light and transparent design make them spectacular to use in a broad variety of interiors, be it an art gallery, a circulation area or a conference room. It can be ordered in three geometrical variations to suit different interiors.

One key to the success of Parans LI is the way sunlight illuminates the bottom acrylic sheet including its edges. Thereby the sunlight is experienced also from a good distance to the luminaire.

Mounting

Parans LI can be mounted directly underneath a ceiling or pending down with wires.

Specifications

Parans LI Small

Dimensions (mm)

450 × 450 × 86

Weight (kg)

3,6

Parans LI Medium

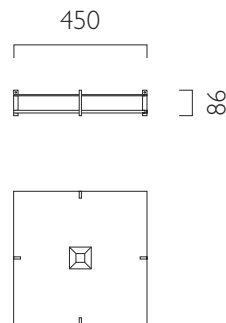
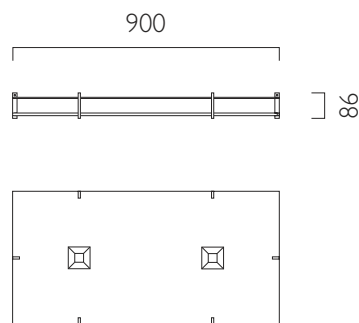
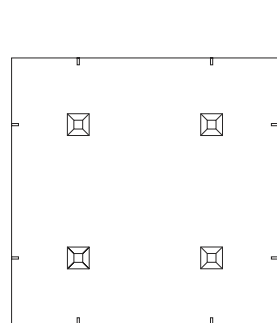
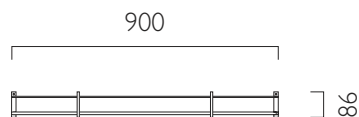
450 × 900 × 86

7,2

Parans LI Large

900 × 900 × 86

14,4



References

Brighter Days for Academia

Alertness, focus and learning all improves with natural lighting. Well aware of this, Lund University was delighted to find that Parans could easily bring sunlight to their windowless meeting room.

Meeting Room, Lund University

This meeting room, located between two corridors was from start doomed to artificial lighting. Now, the days of gloomy meetings and seminars are over as four large luminaires (Parans LI Large) bathe the large table and surrounding seats with healthy fullspectrum sunlight!



Solar Panel: Parans SP2



Luminaire: Parans LI Large

Selling a condominium without good access to natural light proved very difficult for the condominium society Tängen 12 in Stockholm.

Parans solution in this 8 storey building was to place a Parans SP2 on a southern facade and bring sunlight to the kitchen 20 meters away.

Condominium Tängen 12

As can be seen in the image below, this building lies in a beautiful area with one of Stockholms renowned watercourses and a park nearby. Unfortunately, the bridge overcrossing this water blocks both view and incoming natural light. Thanks to the flexibility of Parans solar lighting, sunlight is collected some ten meters south and five meters up, effectively bringing life to the open kitchen and dining room area.



Solar Panel: Parans SP2

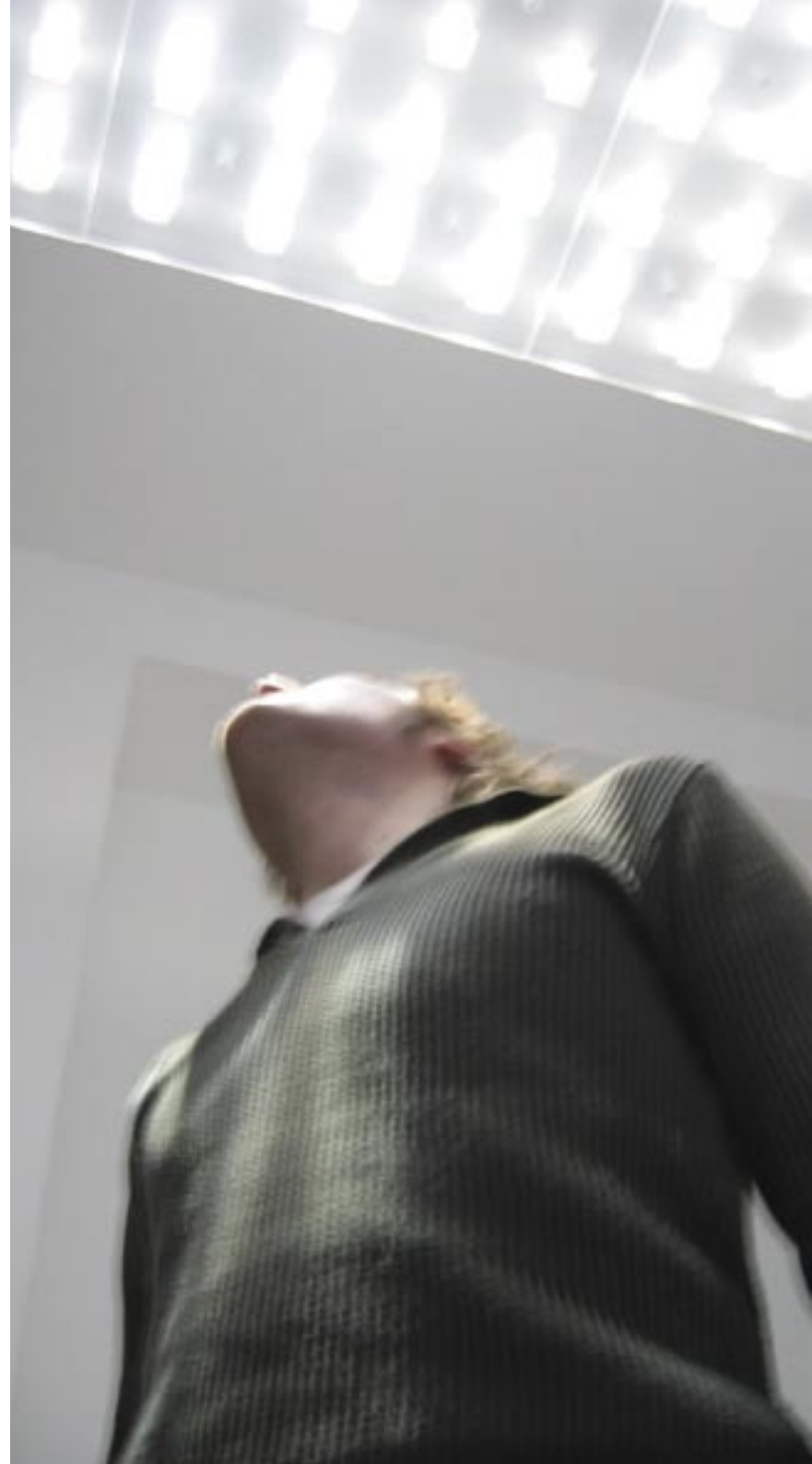


Luminaire: Parans L1 Large

Parans solar lighting creates a healthy workplace for employees and an inviting ambience for shoppers. In fact, research shows that sales increase by 40 percent when natural light is added to a retail store.

Fashion Store Arena Viktoria

The fashion store Viktoria Arena in Gothenburg resides in a 1910's cinema. Its interior was spectacular from start, but as many stores do, it lacked natural light. Its only connection to the outside world was the street entrance. With Parans' system this has changed. Content staff now report that they can tell the weather by looking at the staircase that Parans luminaires illuminate with sunlight. The relaxing and enjoyable atmosphere created by natural light brings economical gains. A Californian study of 108 nearly identical stores revealed that the stores with sunlight in the premises sold 40 percent more than those without.



The lack of natural light was a real problem when recruiting staff to this workplace. The hospital management is now content to report that Parans solar lighting has solved their problem.

*“Everybody gets happy when the sun shines in”
– Rolf Skuncke, Head of the Radiology Department.*

Radiology Department, Södertälje

Typical trademarks of a hospital layout are long and wide buildings with work places located throughout; many without windows. This radiology (x-ray) department in Sweden lies deep inside the building where no daylight normally would reach. With Parans' solution at hand, healthy and living sunlight enters the area through an optical fiber!



Museums show us more than just the past. At least the Museum of Technology in Malmö that lights up the way to the future with sunlight from Parans.

“Parans solar lighting is an important step towards a sustainable city” – Johan Larsson, Facility and Energy Manager, Malmö City Properties.

Technical Museum of Malmö

The purpose of this installation is threefold. First, the brightness and vividness achieved, creates an inviting and healthy atmosphere. Further, the technological principle behind the product has become part of the museum’s showcase. Here, it is as much a source of inspiration as it is educational. Third, the installation saves electrical energy consumption by reducing artificial lighting and its resulting needs for cooling off excess heat. This perfectly demonstrates an effort from the client to turn to environmentally sustainable solutions. Something that becomes increasingly important year after year.



Companies with a solid corporate health policy like IKEA realize that natural light is fundamental for a good working environment.

"I would recommend anybody to work with Parans. Great products, great company." – Markus Herchet, IKEA Iberica

IKEA Cash Office

Sunlight enhances indoor environments on many levels. Its brightness and dynamic spectrum and intensity are among the first qualities that are perceived. The long-term quality of natural illumination in a workplace lies however in the beneficial psychological and physical effects on the employees. Research shows an increase in performance of 6-16 percent and a decrease in absence and employee turnover of the same magnitude, when adding natural light to a workplace.



Frequently Asked Questions

New technology brings new thoughts and ideas.

In this final section, we answer some of the most frequently asked questions. Don't hesitate to contact us if you have further inquiries.

How many Parans solar panels do I need for my Project?

The number of panels needed depends on the size of the area to light up but just as much on the purpose and idea of installing Parans solar lighting. As a guideline, one Parans solar panel gives a good natural light experience in rooms of around 20 m². Since the number of solar panels needed varies so much with the specific use and purpose of the installation, the geographical position, illuminated areas and cable lengths, Parans is more than happy to assist you in planning a project!

Can I install Parans solar lighting myself?

Installing Parans products is comparable to installing of for example a satellite dish system. The mounting of Parans solar panels on roofs or facades and apertures in buildings shall be done professionally.

Where can I buy Parans' Products?

Parans solar lighting is sold through a network of Authorized Dealers. Visit the parans website www.parans.com to locate your nearest dealer.

Can I become a Dealer for Parans solar lighting?

Please read more on www.parans.com or contact Parans for dealership opportunities.

Will I get a Tan under a Parans Luminaire?

No, the UV-radiation that creates a tan is blocked by Parans solar lighting (and so is IR-radiation). UV-radiation is also harmful to tissues and textiles. Thus, museums love this product since it enables them to show art in natural light (just as classical pieces of art were created in).

What is Warranty of Parans products?

Parans products come with a 2-year limited manufacturer's warranty.

Is it possible to store the Sunlight?

No, sunlight is instant and is with exceptions for the scientific achievement of storing light in a Bose-Einstein element 1 ms, not storable.

Is it really Sunlight that comes out of the Fiber?

It is indeed the same sunlight that shines on Parans solar panels that is emitted through Parans luminaires. Therefore, variations in colour and intensity of the sunlight will instantly be transferred into the indoor environment.

Can I turn the System off?

Yes, as an additional feature a switch can be connected to the system. This feature is valuable in many situations, for example when you have an on-screen presentation.

What Maintenance requires Parans Solar Panel?

Just as an ordinary window needs to be cleaned, so does the glass on the solar panel. We recommend the glass to be cleaned one to three times per year depending on how dirty the local environment is.

What happens when cloudy - and at Night?

Parans aims at establishing a connection to the outdoor environment. Having the sun as light source, Parans solar panels do not transfer light when clouds block the sun. This dynamic is one key element of natural light. Therefore Parans solar lighting is no complete lighting solution but should rather be treated as other sources of natural light: they need artificial back-up lighting in order to ensure 24 h lighting capacity.

How does the Investment compare to other Techniques for Natural Lighting?

Already the initial investment is often lower than for competing solutions for natural illumination, such as light shafts and atriums. Furthermore, Parans solar lighting has a competitive advantage in that the light transport does not occupy a building's valuable space. This generates the large economical advantage of being able to use a building's space more efficiently. Especially since the rent and building cost per m³ is rising faster than many other costs in society.

For which Projects can Parans solar lighting be used?

Parans solar lighting can be installed as easily in existing buildings as in buildings under construction. There are only two factors that are crucial:

- 1: Parans SP2 must be exposed to sunshine.
- 2: The resulting length of the Parans optical cable must not exceed 20 meters,

Does the System transfer heat into Buildings?

No, the sun's IR-radiation that converts to heat when absorbed by an object is blocked out by Parans' system. This is an obvious advantage compared to competing techniques for natural illumination as well as to electrical lighting that creates excess heat. This cooling stands for about 15 percent – a large part of the energy consumption in buildings.

How can Parans assist me in planning an Installation?

Here at Parans our dedicated staff are open to all ideas for projects. Consulting with you over your needs and desires, our expert staff will then make a project plan. Included in the plan is everything from the design and placement of Parans solar panels and Luminaires and pricing right through to details on delivery and installation. Parans' team of highly trained architects, designers and engineers ensure the highest quality in every aspect of the installation.

At what point in the Building Construction Process is Installation advisable?

This differs from case to case but most often, the actual installation is done around the time of preparing interiors and installing electrical lighting.

Do Parans Solar Panels require Electricity?

Parans Solar Panels consume on average less than 2 W, which is a minimal amount of power. The electricity cost per year is less than 1 Euro (based on average European electricity costs).

Why is Sunlight Healthier than Artificial Light

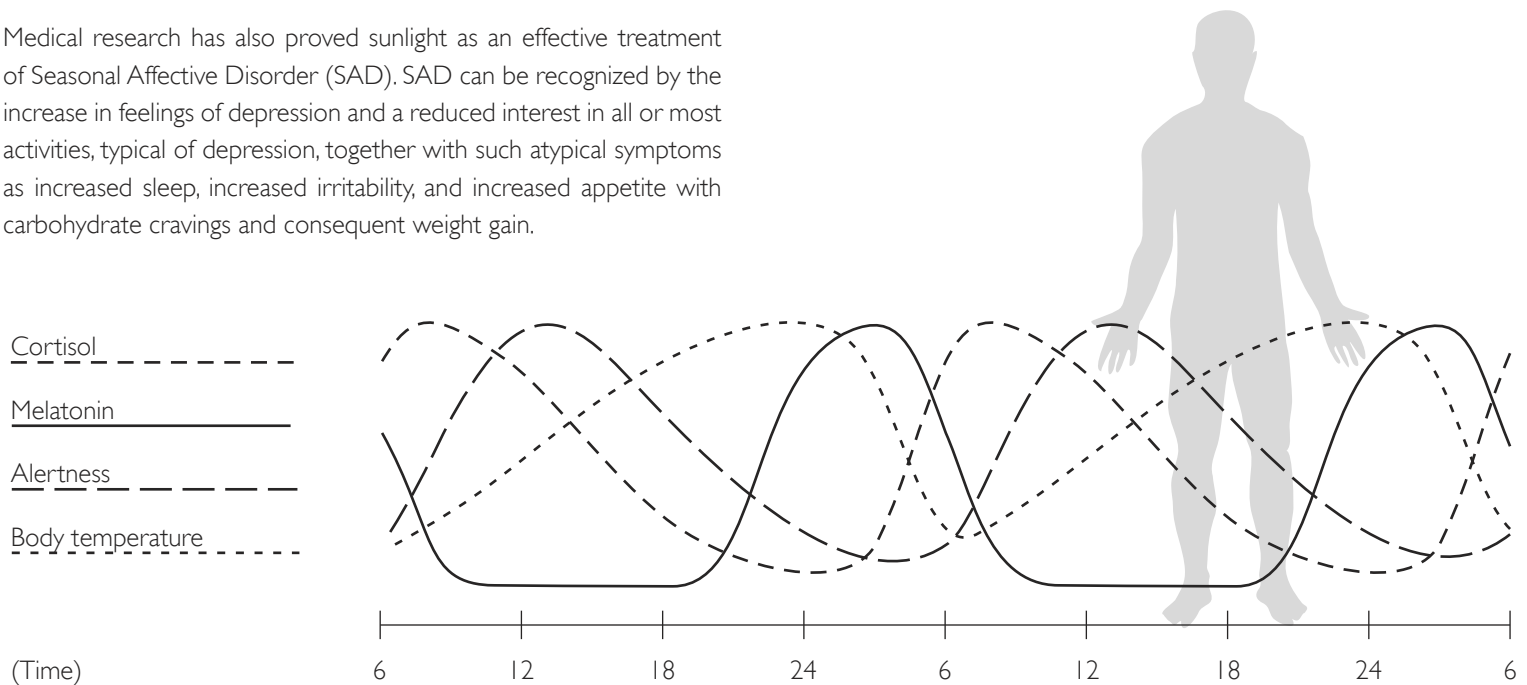
It was only in 2002 that David Berson at Brown University discovered a new cell in the eye that acts as a photoreceptor like a rod or a cone and sets the body rhythm. This ganglion cell is also known as the third receptor.

Natural sunlight has a continuous spectrum, while artificial light lacks many frequencies that the human body requires for essential functions. The human organs are orchestrated to work in harmony with each other, generating a body rhythm that is set everyday by daylight. This rhythm is called circadian and includes production and secretion of hormones (see graph) to regulate functions such as body temperature, awareness and immune system activity.

Medical research has also proved sunlight as an effective treatment of Seasonal Affective Disorder (SAD). SAD can be recognized by the increase in feelings of depression and a reduced interest in all or most activities, typical of depression, together with such atypical symptoms as increased sleep, increased irritability, and increased appetite with carbohydrate cravings and consequent weight gain.

References to the Facts in the Benefits Section

- 1,3 L. Edwards, P.Torcellini, (2002), A Literature Review of the effects of Natural Lighting on Building Occupants, NREL
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- 4 Green Building Council, www.usgbc.org
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