



looking for the future



CATALOGUE
PV MODULES
BIPV
CUSTOMIZED



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Solar Innova is a global company in the Renewable Energy sector, mainly in the solar field of Photovoltaic Energy, enabling our customers to improve efficiency facilities and energy while reducing environmental impact.

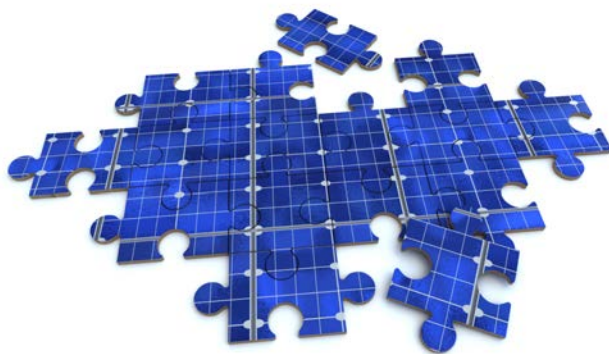
Technology plays a key role in **Solar Innova**.

We develop products with advanced technologies that allow us to be more competitive and to respect the environment. We are committed to providing our customers high quality services to meet your expectations and guarantee your complete satisfaction.

We have a distribution network in constant growth, to provide a service with maximum quality and speed.

We want to be present in all areas where is the development of alternative energy, offering added value to our products and services such as:

- ✓ Advice
- ✓ Competitiveness
- ✓ Sustainability
- ✓ Professionalism
- ✓ Service quality
- ✓ Certified by internationally recognized laboratories





BUILDING INTEGRATED

Photovoltaic modules architectural integration, also named "Solar Architecture" or "BIPV" (Building Integrated Photovoltaics), is defined as the installation of those photovoltaic modules that keep a double function; energetic and architectonic (cladding, enclosure or shading) and replace conventional constructive elements too or can be constituents elements of the architectonic composition.

Solar Innova BIPV photovoltaic modules line has been developed considering engineers and architects to provide them of modules that can be integrated functionally and aesthetically into facades and roofs where simultaneously serve as an architectonic material and energy generator.





EFFECTIVE ARCHITECTURE

The latest technological advances in photovoltaic materials allow possible today to integrate photovoltaic panels on the surfaces of buildings and building elements, leading to a new photovoltaic application, called integration facilities PV system in buildings, more known by its acronym in English as BIPV (Building Integrated Photovoltaics).

The photovoltaic solar glass is an innovative building material high technology; perfectly integrating solar photovoltaic cells in a glass structure.

Replaces the traditional building materials; PV is an integrated production system in buildings, providing clean power to the building and bringing the production cost alternatives to conventional energy energies.

Photovoltaic systems have BIPV starting with the great advantage that they are , today, the renewable energy electricity production best suited to cities and public environments, thanks to its silent features of production and clean. Under these assumptions and considering the growing awareness about the environment, the future which promises to BIPV (Building Integrated Photovoltaics) facilities is really promising.





TECHNOLOGY

Solar Innova technology shows the latest technological advances in the field of photovoltaic integration, this is intended to cover all our customers' needs and provide a customized solution.

In the photovoltaic sector, BIPV systems are classified as completely different to conventional facilities on-grid (photovoltaic plants on deck and on land with or without solar tracking). Although they share some common features, they differ in the purpose for which they are designed.

In conventional photovoltaic systems is the idea of financial product, which disburses capital investor, it pays and gets a profit after a period of time. All the energy generated is fed to the grid and purchased by utilities. This raw power is undoubtedly true subsidy of the installation, which makes it a profitable and viable product.

By contrast, in the BIPV installations there are other values that prevail over the economic performance, such as innovation, modernity, integration with the environment, aesthetics, etc.





DESIGN

Our BIPV modules are custom made according to individual customer specifications, with a custom design both in terms of shape, color and visual layout. Unlike standard photovoltaic modules, these modules can perform the same functions as the previous in all areas of the facades of buildings, not only in decks or flat surfaces.

The facades and skylights Solar Innova plus efficient power generation, minimize the visual impact of PV systems integrated into the design of the building and providing new aesthetic possibilities.

The Solar Innova modules ensure compliance with the highest quality standards in terms of safety, comfort and design.

These transparent photovoltaic modules have two major advantages: let in light and integrated into the glass building. The system applies to any construction, is particularly suitable for commercial, required to install photovoltaic and thermal solar energy in new construction sites.





PHOTOVOLTAIC MODULES BIPV

GLASS

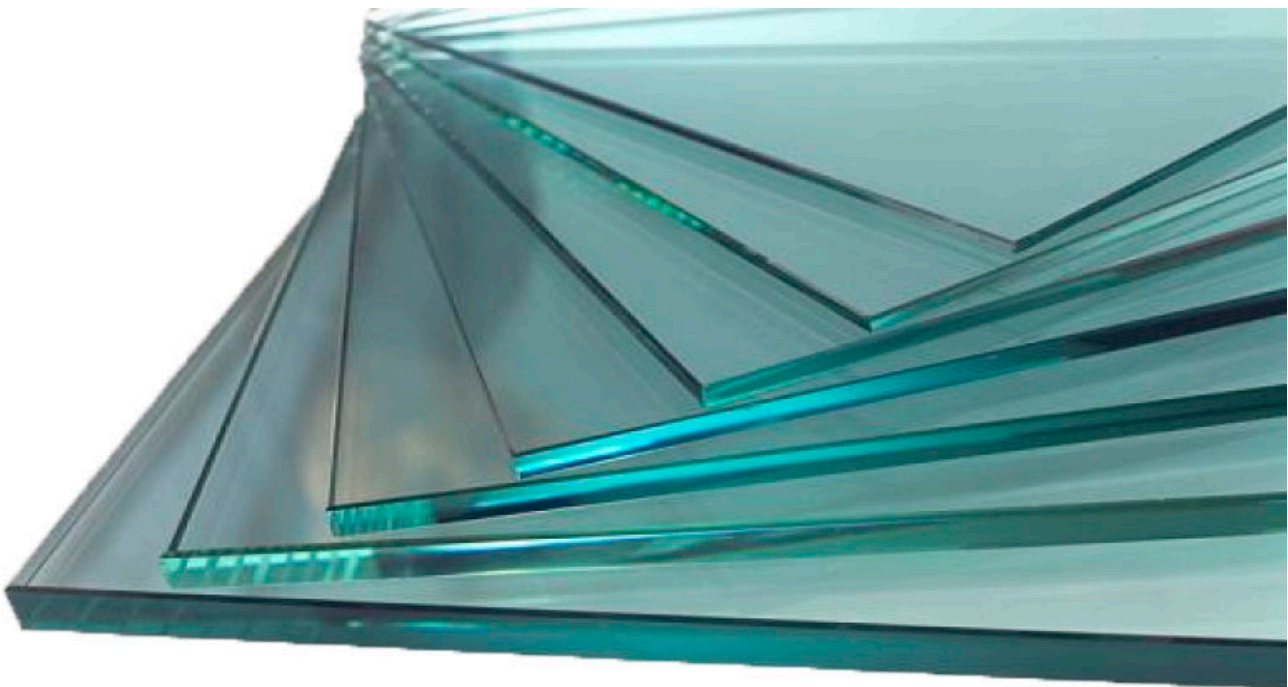
The front of the module contains a tempered solar glass with high transparency with high transmissivity, low reflectivity and low iron content.

The glass forms the front end of photovoltaic module and protects components housed within the laminate from the weather and mechanical stresses.

At the same time serves as carrier material in the lamination process.

A high transmittance increases the efficiency of the photovoltaic cells and thus has a direct influence on the potency and performance of the final module. A low iron content in the glass composition and an antireflection coating to reduce absorption of radiant energy.

The glass of the modules Solar Innova achieve excellent resistance against mechanical stress and temperature changes due to the preload of the manufacturer.



Laminated glass

Laminated glass is a type of safety glass that holds together when shattered. In the case of breakage, it is held in place by an intermediate layer, typically of EVA (Ethyl Vinyl Acetate) or PVB (Polyvinyl Butyral), between two or more layers of glass. The interlayer glass layers kept together even when broken, high strength and prevents the glass breaks into large sharp pieces. This produces a "spider web" characteristic cracking pattern when the impact is not enough to fully puncture the glass.

Laminated glass is normally used when there is a possibility of human impact or where the glass could fall if shattered. Skylights glass and automobile windshields typically use this type of laminated glass. In geographical areas requiring hurricane resistant construction, laminated glass is often used in exterior storefronts, curtain walls and windows. The EVA or PVB



interlayer to glass also gives a much higher sound insulation rating, due to the damping effect, and blocks 99% of the incoming UV radiation.

The thickness of integrated crystals depends on the type of construction, as well as legislation to accomplish at the implantation site.

Glass thickness may be chosen in the range of 2.5 to 10 mm.

Float tempered glass

Float glass is a glass plate manufactured by floating the molten layer on a glass molten tin. This method gives the glass a uniform thickness and a very flat surface, so the glass is most commonly used in construction.

It is transparent and offers a high visible light transmission and low UV radiation.

Tempered safety glass ESG

Prestressing ESG hot tempered glass has a high mechanical strength, which property is achieved by the heat treatment of the manufacturing process.

In case of breaking the glass fragments into lots of small pieces without sharp edges.

Laminated safety glass VSG

VSG tempered glass has a high mechanical strength, which property is achieved by the heat treatment of the manufacturing process.

Highly resistant to breakage. In case of breaking the glass fragments into lots of small pieces without sharp edges, and remains attached to the sheet.

Low emissivity layer

Is a layer of pulverized particles of oxide particles and noble metals, mainly silver, on one side of the glass that gives this special maintaining its reflective properties colorless.

Low emissivity glasses should always be used in Insulating Glass Unit (IGU) and treated her face in contact with air it oxidizes rapidly, deteriorating it both physical and aesthetic properties.

This low emissivity coating allows much solar shortwave radiation from the sun passes through the glass while reflecting most of the longwave radiation they produce, among other sources, heating systems, retaining this so the heat inside environments.

It is recommended for cold areas where it is necessary to maximize the heat generated inside and outside which comes from the sun and make maximum use of natural light.

One of its main applications is where glaze housing, in most cases, colorless transparent glazes used. When used in Insulated Glass units made of an outer solar control glass, colored or reflective also improves performance solar control by approximately 15%.

- The value of heat transfer for units with an air chamber 12 mm wide, with normal glass, is $K=2.8 \text{ W/m}^2\text{K}$ and Low E Glass $K=1.8 \text{ W/m}^2\text{K}$.

- It is used exclusively as an interior glass Insulating Glass unit, improving by 35% its thermal insulation.



- Also helps to reduce the burden, solar radiation enters through the Insulating Glass.

- In case of low emissivity glass is tempered, has the same features as the tempered glass without treating low emissivity affecting their properties.

- In case of low emissivity glass is laminated, has the same characteristics as the glass laminate without treating low emissivity affecting their properties.

According insulation needs two types of low-emissivity glass:

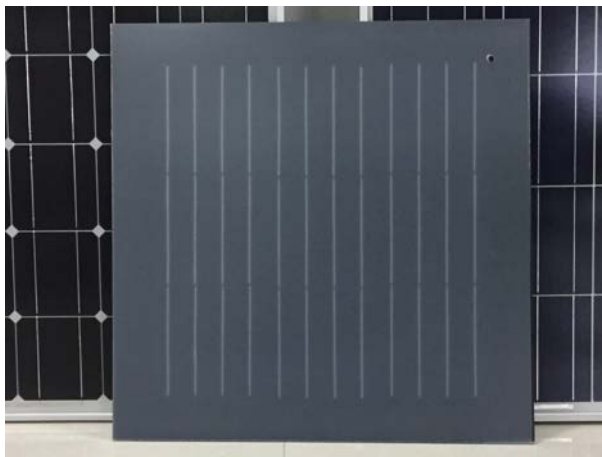
- Cold zones, the treated glass is placed into the building with special face to the air chamber Double Glazing. Thus, radiation of long wavelength (from heating, for example) reflected in the glazing, returning inward and reducing energy losses. The following table can be seen as the "U" value considerably improved over conventional glazing.

- Warm areas, the treated glass is situated towards the outside of the building, with the treated side facing the air chamber Double Glazing. In this way it is possible to reduce transmission energy from the sun (heat) into the room, reducing the cost of air conditioning, climate, etc.

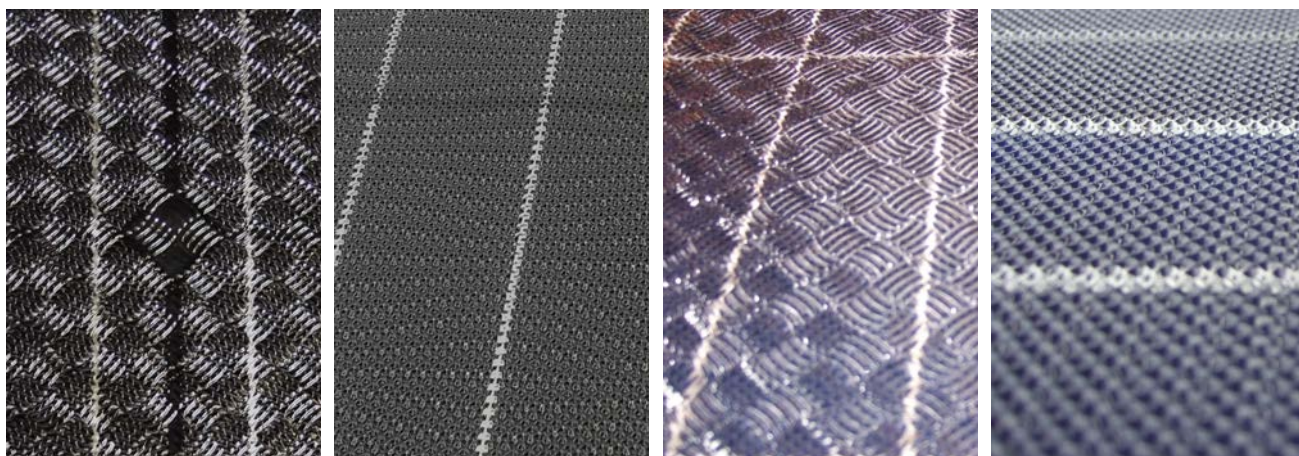
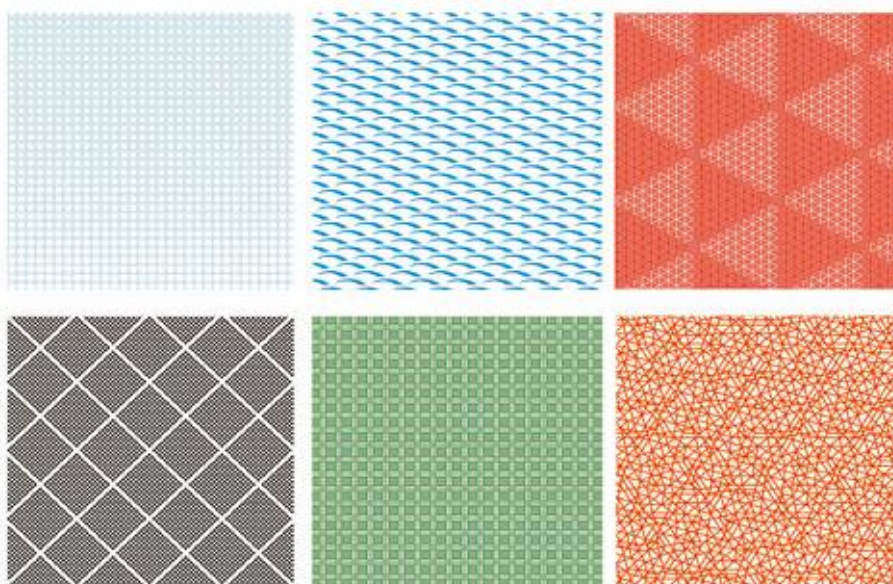


GLASS-DESIGN

Anti-reflective



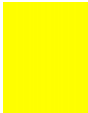





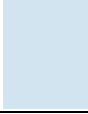






We can customize and design patterns for the back glass panel to meet the requirements of different architectural styles and transparency.





GLASS-COLORS

The colors are obtained using colored glasses or using translucent glasses with colored encapsulants.

PICTURE	NAME	HEXADECIMAL	RGB DECIMAL	CMYK	DECIMAL
	Pure (or mostly pure) yellow	#ffff00	R: 255 G: 255 B: 0	C: 0 M: 0 Y: 1 K: 0	16776960
	Pure (or mostly pure) orange	#ff9900	R: 255 G: 153 B: 0	C: 0 M: 0.4 Y: 1 K: 0	16750848
	Pure (or mostly pure) red	#ff0000	R: 255 G: 0 B: 0	C: 0 M: 1 Y: 1 K: 0	16711680
	Very soft lime green	#a7e7a2	R: 167 G: 231 B: 162	C: 0.28 M: 0 Y: 0.3 K: 0.09	11003810
	Moderate lime green	#5ec35c	R: 94 G: 195 B: 92	C: 0.52 M: 0 Y: 0.53 K: 0.24	6210396
	Dark moderate lime green	#428940	R: 66 G: 137 B: 64	C: 0.52 M: 0 Y: 0.53 K: 0.53	4360512
	Light grayish blue	#d1e4ef	R: 209 G: 228 B: 239	C: 0.13 M: 0.05 Y: 0 K: 0.06	13755631
	Very soft blue	#9ac5db	R: 154 G: 197 B: 219	C: 0.3 M: 0.1 Y: 0 K: 0.14	10143195
	Soft blue	#5a8bdb	R: 90 G: 139 B: 219	C: 0.59 M: 0.37 Y: 0 K: 0.14	5934043
	Dark moderate blue	#456aa8	R: 69 G: 106 B: 168	C: 0.59 M: 0.37 Y: 0 K: 0.34	4549288
	Dark moderate magenta	#a83fa3	R: 168 G: 63 B: 163	C: 0 M: 0.63 Y: 0.03 K: 0.34	11026339
	Black	#000000	R: 0 G: 0 B: 0	C: 0 M: 0 Y: 0 K: 1	0
	White	#ffffff	R: 255 G: 255 B: 255	C: 0 M: 0 Y: 0 K: 0	16777215



CELL STRUCTURE

For the choice of high-quality crystals available sizes, formats and styles varied: from the glass/glass combination to models with insulated glass, soundproof glass.

The cell is opaque glass but there are gaps between them which allow the local filtering of light, the amount of light passing through the module will depend on the separation of cells and their arrangement.

In this type of modules is possible to identify the cells, making them suitable for locations where aesthetic result accept this type of arrangement.





CELLS-TYPE

The final aspect of the module will be directly related to the cells used for the realization. The wide range of colors and shapes of the cells allows great freedom for architects in the individual building design.

Solar Innova modules will meet the functional and aesthetic goals achieved by a conventional glazing and requiring no maintenance.

To individualize the most of every building, Solar Innova has the widest range of cells with different structures, sizes, colors and efficiencies.

The selection and distribution of photovoltaic cells is flexible and is done according to the customer. Are made to measure according to the customer and adaptable to a wide range of design specifications.

The design of the electrical characteristics of the module is done according to customer specifications. These characteristics depend primarily on the type of photovoltaic cells available, the amount, distribution and interconnection



BIFACIAL MONOCRYSTALLINE 125 MM/5"

COLOR: Black

DESCRIPTION: Bifacial cell allows efficient use of front and rear side of module for electricity generation. It produces from 10 % to 50 % more energy in comparison with same size single face BIPV module. It is suitable to use in vertical installation and sound insulation units.



MONOCRYSTALLINE 125 MM/5"

COLOR: Black

DESCRIPTION: Has a uniform color, it fits the aesthetic in architecture design.



MONOCRYSTALLINE 156 MM/6"

COLOR: Black

DESCRIPTION: Has a uniform color, it fits the aesthetic in architecture design.



POLYCRYSTALLINE 156 MM/6"

COLOR: Dark Blue

DESCRIPTION: It gives a special outlook to the building.

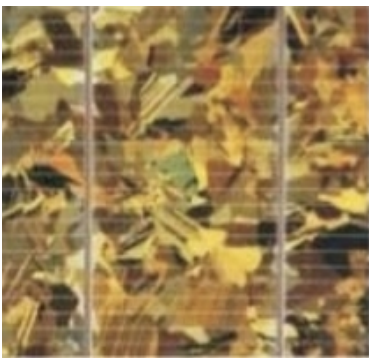
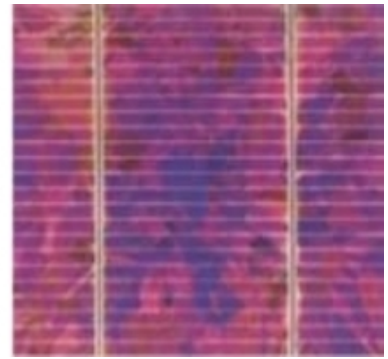
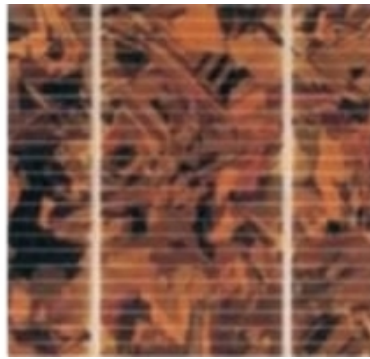
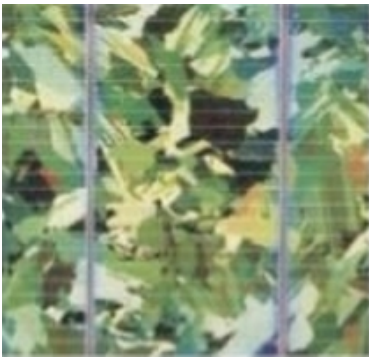


CELLS-COLORS

The colors choice in BIPV module is a very important factor in architecture design.

We offer a wide range of color for our double-glazed BIPV module.

The lighter the color provides lower the efficiency.





JUNCTION BOXES

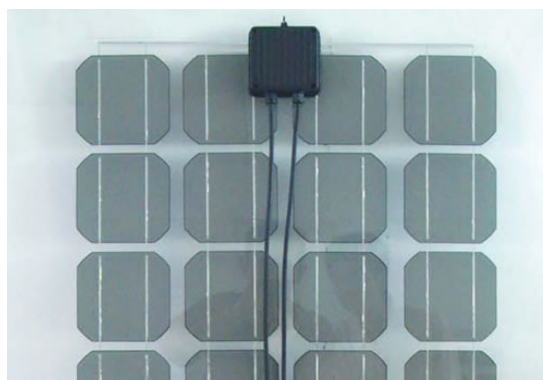
Electrical connections can be via the junction box rear or side connectors. In all cases the diodes required will be incorporated to protect the cells from overheating. These diodes, in principle, will be placed inside the laminate in order to gain flexibility in the location of the outer terminals designed to be placed in any profiles of conventional structural systems.

The junction box must have features of anti-aging and UV-resistance and have electrical resistance up to 1,000 Volts. It must satisfy with IP65 protection, the working temperature should be -40 to +85° C.

According to the module power status and requests for project design and aesthetic requirements, you can install different models of junction boxes.

If installed with frame exposed or semi-exposed frame, junction box be installed at the edge of the module.

If this is a concealed box can be installed in the back of the module is required.





INSULATION

It provides thermal comfort by eliminating the effect of "cold wall" in the areas near the glazing and provides a reduction of condensation on the inside glass.

The separation between glass is defined by a spacer profile inside which a molecular sieve desiccant called stays. The tightness is guaranteed by a double perimeter barrier with organic sealants. The first seal is made with butyl on the aluminum profile, before assembly of the glass. The second and final is performed with polysulfide, once assembled glasses on the spacer profile.

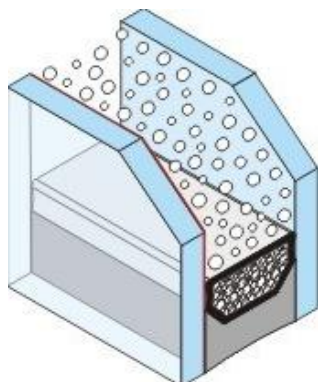
By filling the chamber with an inert gas in the insulating glass is to optimize product features compared to the standard system with an air chamber getting so:

- Better thermal insulation, the gases used to have thermal conductivity than air.
- A better sound insulation, as by the appropriate choice of the quantity and quality of the gaseous mixture with a suitable mounting system, the attainable improvement in sound insulation is about 3 dB.
- A protection for the metallic layer of energy windows, and the fill, unlike air, is made with chemically pure gases or gas mixtures, in addition to a protective function metal layers coated glass.

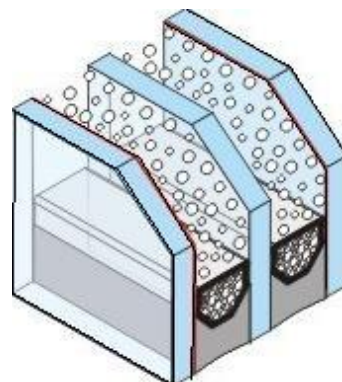
Argon gas filling in the insulating glass meets the following criteria:

- It is colorless, non-toxic and remain unchanged in the temperature range which is under the glazing.
- Presents stability and chemical compatibility with the various components of insulating glass, due to the different fields of application of insulating glazing. Argon (noble gas) fulfills this function with a protective effect. Also, in order to prevent reactions with the spacer profiles, the desiccant material or sealants.
- Presents adequate diffusion rate as the permeability of the system depends mainly on two factors: the diffusion rate of the sealant and gas solubility in organic compounds.

1 GAS CHAMBER (Air/Argon)



2 GAS CHAMBERS (Air/Argon)





FORMATS

Solar Innova provides a wide range of shapes: rectangular, square, round or triangular, trapezoidal or any other.

Besides having a wide range of common formats can make special formats, allowing the realization of buildings with very sophisticated design.

The standard composition of the photovoltaic module is:

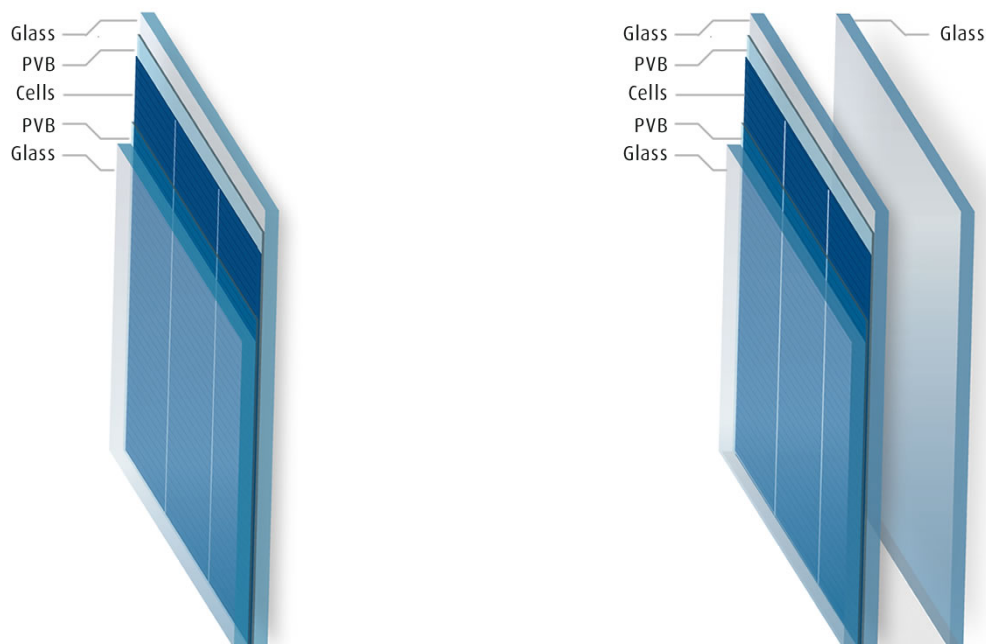
- Front: extra-white glass tempered safety glass with polished edge.
- Encapsulating: EVA or PVB.
- PV cells.
- Encapsulating: EVA or PVB.
- Rear: colorless tempered safety glass with polished edge.

These PV modules are suitable for installation in any conventional facade system, thus fixing the four sides as buttoned punctual fixation systems.

Possible finishes are also multiple module:

- Screen Printing as architectural design on back, front or both glass.
- Different sizes of front and rear glass as architectural specifications.
- Transparency of the module according to degree of sun protection and light transmission required. You can play with the distance between cells and the type of finish or back glass.
- Background color module, matte or simile acid, etc. Both encapsulated (EVA or PVB) of translucent color and with vitreous enamel rather dull can you get different effects in the background of the module.
- Different cells, mono or poly-crystalline or semi-perforated cells offer interesting architectural design options.
- Design as glass chamber for better thermal performance.
- Design with the possibility of acoustic insulation.
- Design to improve performance in areas of heavy weather.

Under mounting system required the necessary mechanical treatment is carried out, for example the appropriate holes for fastening with a buttoned system.

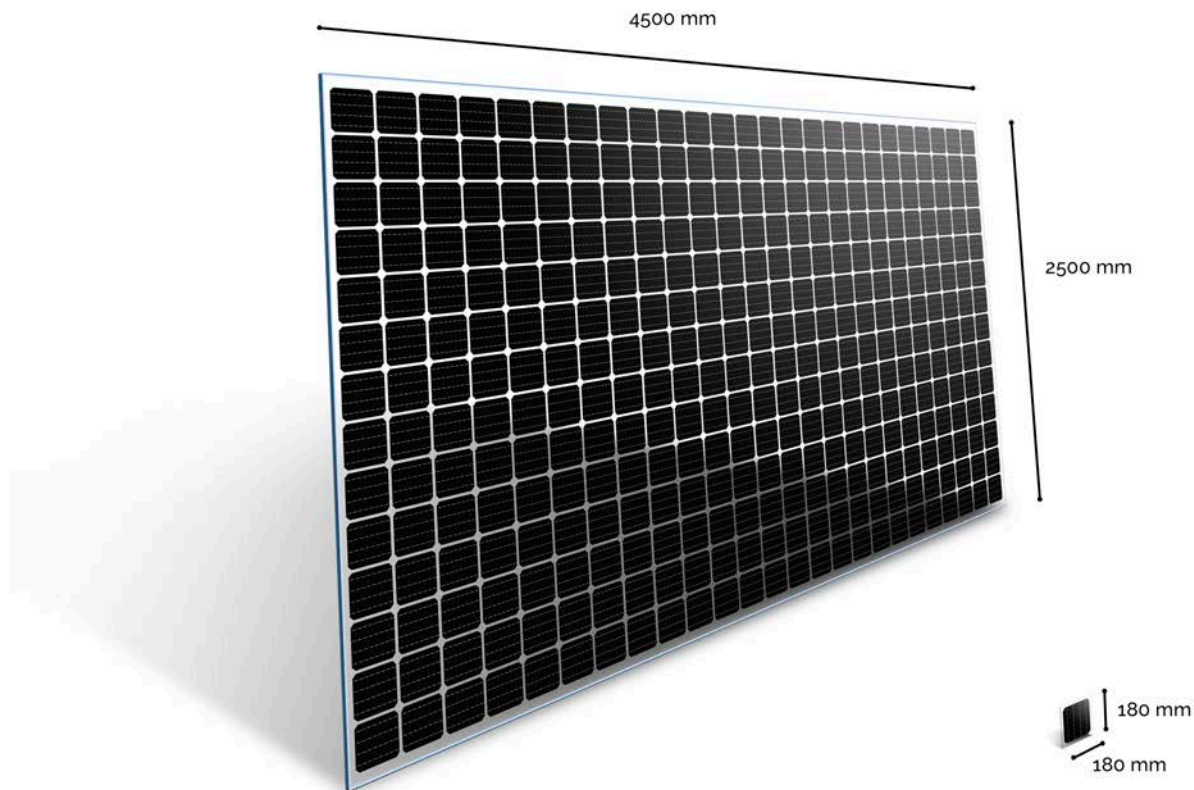




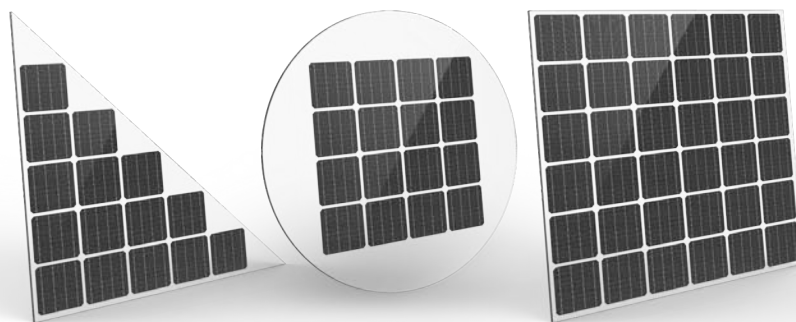
SIZES AND SHAPES

Solar Innova provides a wide range of sizes:

- The minimum dimensions are 180 x 180 mm.
- The maximum dimensions for rectangular modules are 4500 x 2500 mm.
- Under mounting system required the necessary mechanical treatment is carried out, for example the appropriate holes for fastening with a buttoned system.



Solar Innova provides a wide range of shapes: rectangular, square, round, triangular trapezoidal or any other.



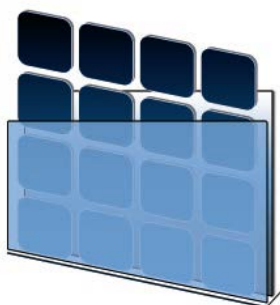


TYPES

GLASS/GLASS

The BIPV glass/glass PV modules are made of two sheets of tempered glass at its peak including photovoltaic solar cells allowing access of light depends on the distance between each of the cells are encapsulated.

They have successfully passed the EN 14449:2005 and can be called "Laminated Safety Glass". The encapsulant material is EVA (Ethyl Vinyl Acetate) or PVB (Polyvinyl Butyral) material traditionally used for laminated safety glass for its advantages in robustness.



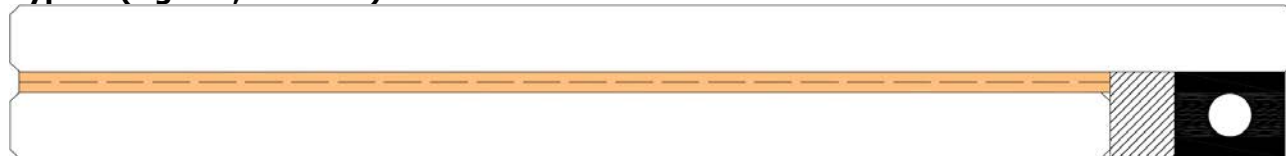
Materials:

- Glass
- EVA or PVB
- Cells
- PVB
- Glass

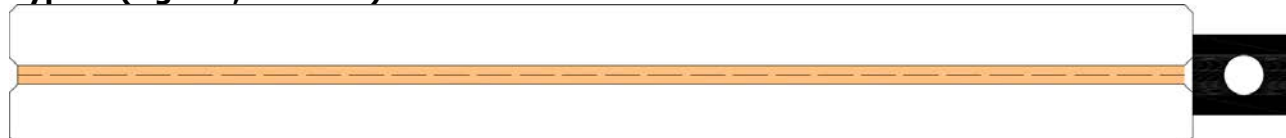
* EVA or PVB (optional)

* Glass (optional)

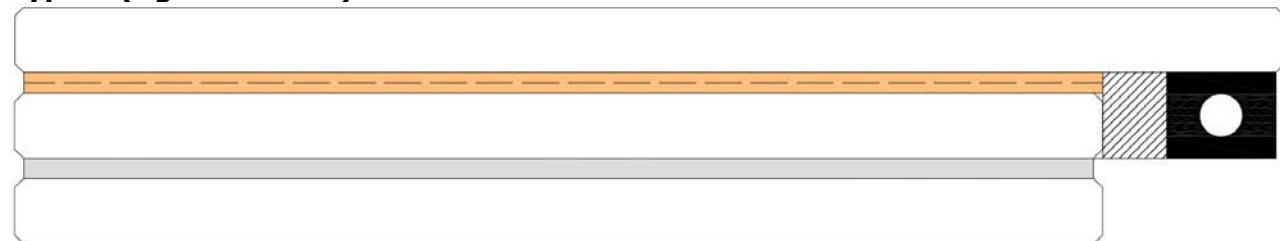
Type 1 ($U_g = 5,3 \text{ Wm}^2\text{K}$)



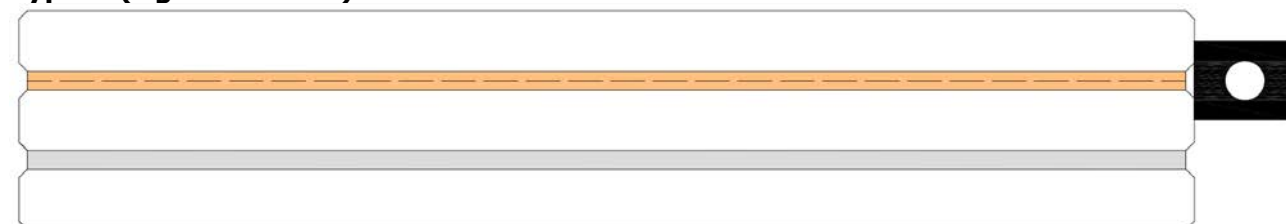
Type 2 ($U_g = 5,3 \text{ Wm}^2\text{K}$)



Type 3 ($U_g = 5 \text{ Wm}^2\text{K}$)



Type 4 ($U_g = 5 \text{ Wm}^2\text{K}$)





GLASS/GLASS/THERMAL INSULATION

The modules are designed with thermal insulation for use in the exterior of buildings.

They have a semi-transparent glass-glass arrangement, formed by mono or polycrystalline cells with a structure of tempered glass and an encapsulated by EVA (Ethyl Vinyl Acetate) or PVB (Polyvinyl Butyral).

The front consists of a highly transparent glass, which ensures a high pathlength. The intermediate part is composed of a chamber filled with an inert gas that provides high thermal insulation.

The back is composed of a sheet of insulating glass in conjunction with a "warm" safety glass with a layer of low thermal transmission.

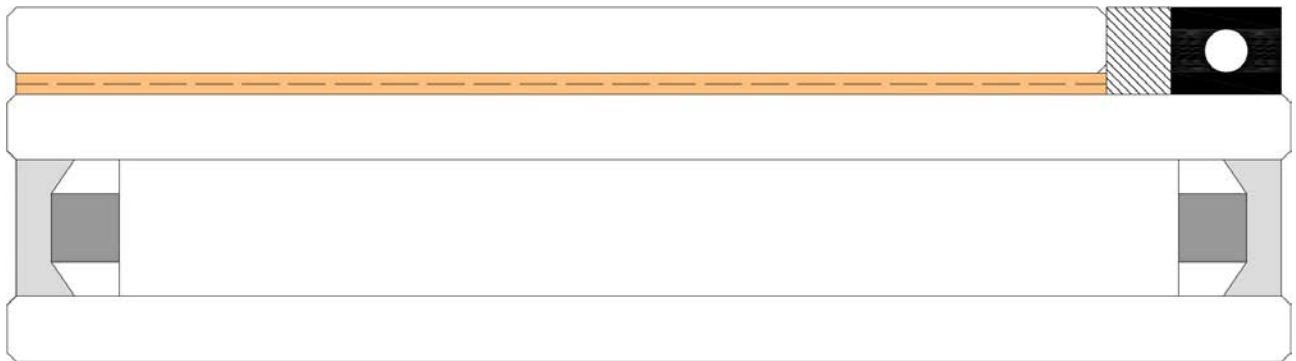


Materials:

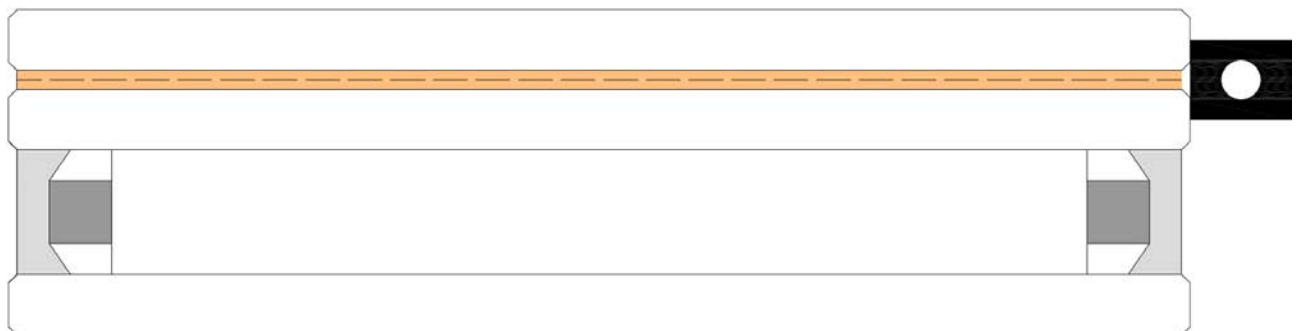
- Glass
- EVA or PVB
- Cells
- PVB
- Glass
- Chamber with Argon gas
- Glass

- * EVA or PVB (optional)
- * Glass (optional)

Type 1 ($U_g = 1 \text{ Wm}^2\text{K}$)



Type 2 ($U_g = 1 \text{ Wm}^2\text{K}$)





Type 3 ($U_g = 0,9 \text{ Wm}^2\text{K}$)



Type 4 ($U_g = 0,9 \text{ Wm}^2\text{K}$)





GLASS/GLASS/ACOUSTIC INSULATION

The modules are designed with acoustic insulation for use in the exterior of buildings.

They have a semi-transparent glass-glass arrangement, formed by mono-or polycrystalline cells with a structure of tempered glass and an encapsulated by EVA (Ethyl Vinyl Acetate) or PVB (Polyvinyl Butyral).

The front consists of a highly transparent glass, which ensures a high pathlength.

The intermediate part is composed of two chambers filled with an inert gas that provides high thermal insulation.

The back is composed of a sheet of insulating glass in conjunction with a "warm" safety glass and also with two layers of low thermal and acoustic transmission.

Suitable for walls and facades with needs for sound insulation. Sound absorption is related to the thickness of the glass sheet, in a range of 38 to 40 dB, or even higher.

For the protection of walls that move from north to south modules may include bifacial cells, which convert light into electricity on both sides, getting an increase in the energy of the system.



Materials:

- Glass
- EVA or PVB
- Cells
- EVA or PVB
- Glass
- Chambers with Argon gas
- Glass
- Chambers with Argon gas
- Glass

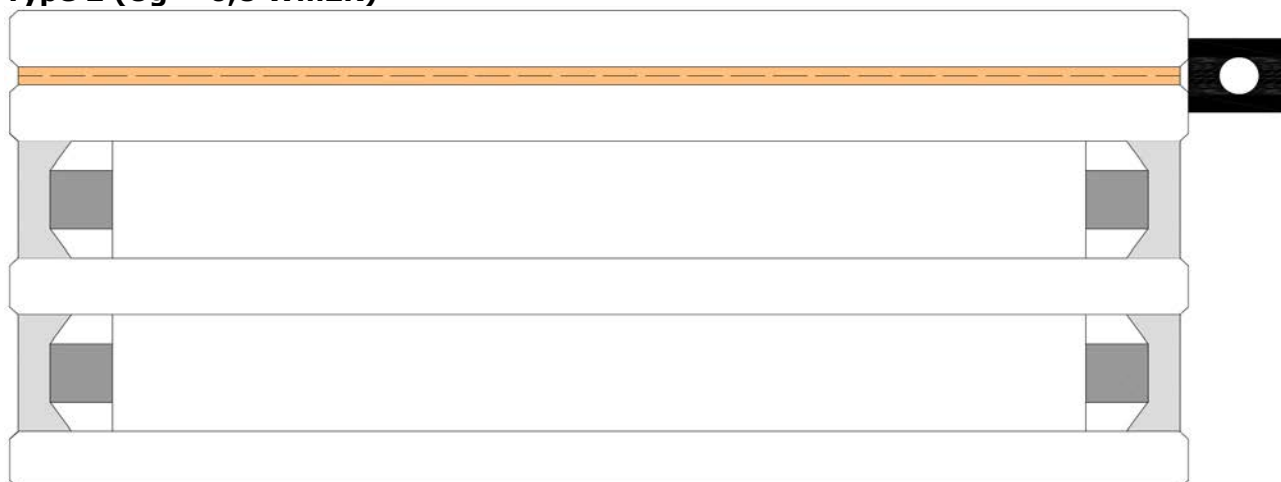
- * EVA or PVB (optional)
- * Glass (optional)

Type 1 ($U_g = 0,8 \text{ Wm}^2\text{K}$)

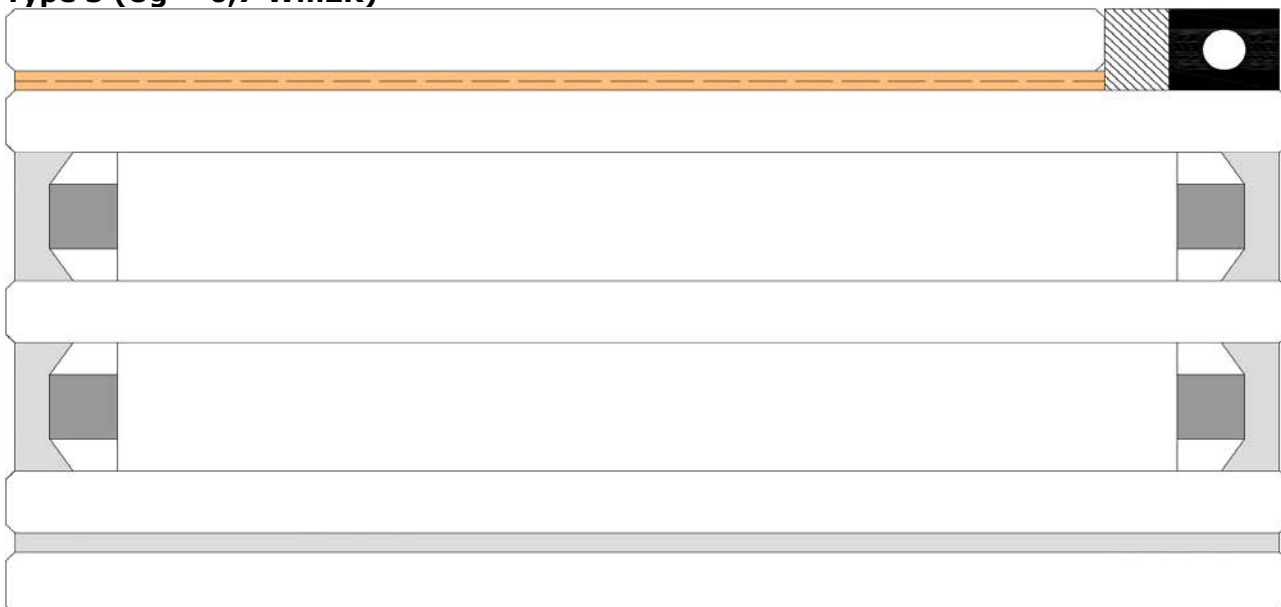




Type 2 ($U_g = 0,8 \text{ Wm}^2\text{K}$)



Type 3 ($U_g = 0,7 \text{ Wm}^2\text{K}$)



Type 4 ($U_g = 0,7 \text{ Wm}^2\text{K}$)





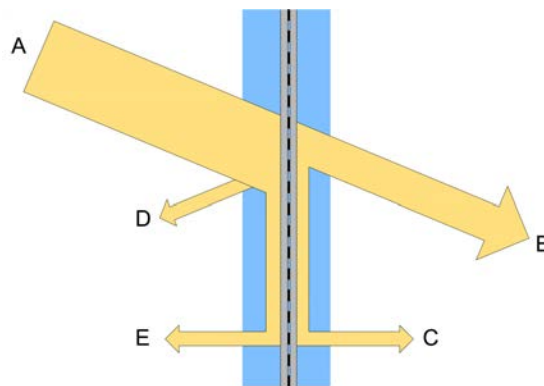
SOLAR FACTOR (G)

The solar factor indicates what percentage of all solar radiation (300 to 2500 nm) is usable as energy behind a glass.

To determine the thermal transmittance of the facade one of the parameters that must be considered is the solar factor with a normal incidence of semitransparent parts thereof (usually glass windows and rooflights).

This parameter is defined as the ratio between the total energy entering the home through the glazing and the total perpendicular energy incident on its outer surface.

Total energy incoming the local through the glazing is the sum of the transmitted energy and energy absorbed by the glass and then transmitted inside the local by convection.



Solar factor (g): $(B+C)/A$

A: Solar energy flow of incident (100%)

B: % solar energy flow transmitted directly into the building

C: % solar energy flow absorbed by the glass and sent into the building

D: % solar energy flow reflected by impinging on glass

E: % solar energy flow absorbed by the glass and sent outside the building

It is represented with the letter "g" and its value is between 0 and 1. The method of calculation is described in ISO 15099:2003 standard.

When the solar radiation hits a glass, a part of it is reflected towards the outside, another part goes directly into the interior and the rest is absorbed by the glass itself, from which the 2/3 parts are irradiated to the outside and the remaining 1/3 goes into the enclosure that delimits.

When smaller is the solar factor, a larger fraction of incident solar energy is reflected by the glass outside favoring a decrease in energy demand for cooling. Glasses which have lower solar factor values are called low emissive.

The crystals that have lower values of the solar factor are the so-called low emissives.



THERMAL TRANSMITTANCE (U)

The thermal insulation of a glass enclosure depends on the coefficient of thermal conductivity of the component materials and the thickness in which they are used.

The "U" thermal transmittance is the measurement unit for determining the loss of heat in a building element.

It expresses the quantity of heat which crosses a square meter of a building element per second for a temperature difference of 1° C between internal and external air.

The lower the value, the higher the thermal insulation.

The thermal conductivity (λ) of the glass is 1.05 W/mK.

Thermal resistance of a transparent glass of 6 mm thickness is $R=0.19$ mK/W and the thermal transmittance $K=1/R$. W/m²K.

Considering the coefficients of surface resistance of the air in face masses of a glass, a K value for the glass of 4 mm $K=5.70$ W/m²K is obtained.

Winter nighttime U-values are calculated using the following conditions:

- Outdoor air temperature of 0° F (-17.8° C).
- Indoor air temperature of 70° F (21° C).
- Outdoor air velocity of 15 mph (6.7 m/s).
- Indoor air velocity of 0 mph (0 m/s).
- Solar intensity of 0 BTU/hour/square foot (0 W/m²).

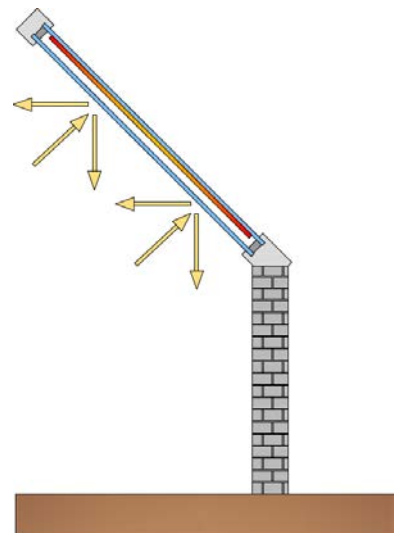
Summer daytime U-values are calculated using the following conditions:

- Outdoor air temperature of 89° F (32° C).
- Indoor air temperature of 75° F (24° C).
- Outdoor air velocity of 7.5 mph (3.4 m/s).
- Indoor air velocity of 0 mph (0 m/s).
- Solar intensity of 248 BTU/hour/square foot (783 W/m²).

The best resource to improve the thermal insulation of a glazed surface, is to use insulating glass units composed of two glasses, separated from each other by an air chamber or another dry and waterproof gas (argon), which is the one that provides the improvement of thermal isolation.

The K value for an insulating module with a 12 mm wide camera is 2.80 W/mK, with a 9 mm camera is 3 W/m²K and a 6 mm camera is 3.20 W/m²K. By using a low-emissivity glass in a module it is possible to reduce the value of the thermal transmittance coefficient K to 1.8 W/m²K.

The lower the value of the coefficient K, the greater the capacity to retard the flow of heat between the spaces that separate a glazed surface. A good thermal insulation prevents the condensation of moisture on the glass and eliminates the feeling of "cold wall" on its surface during the winter

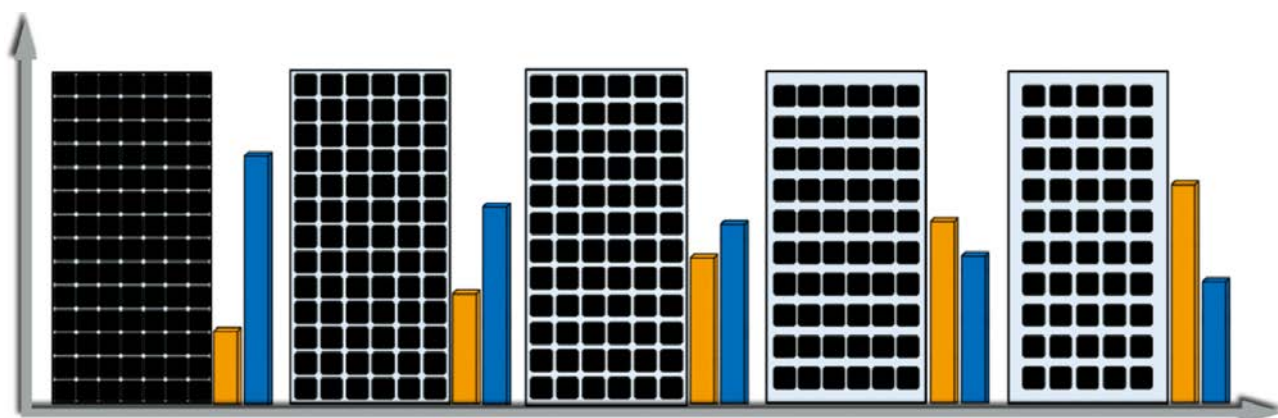
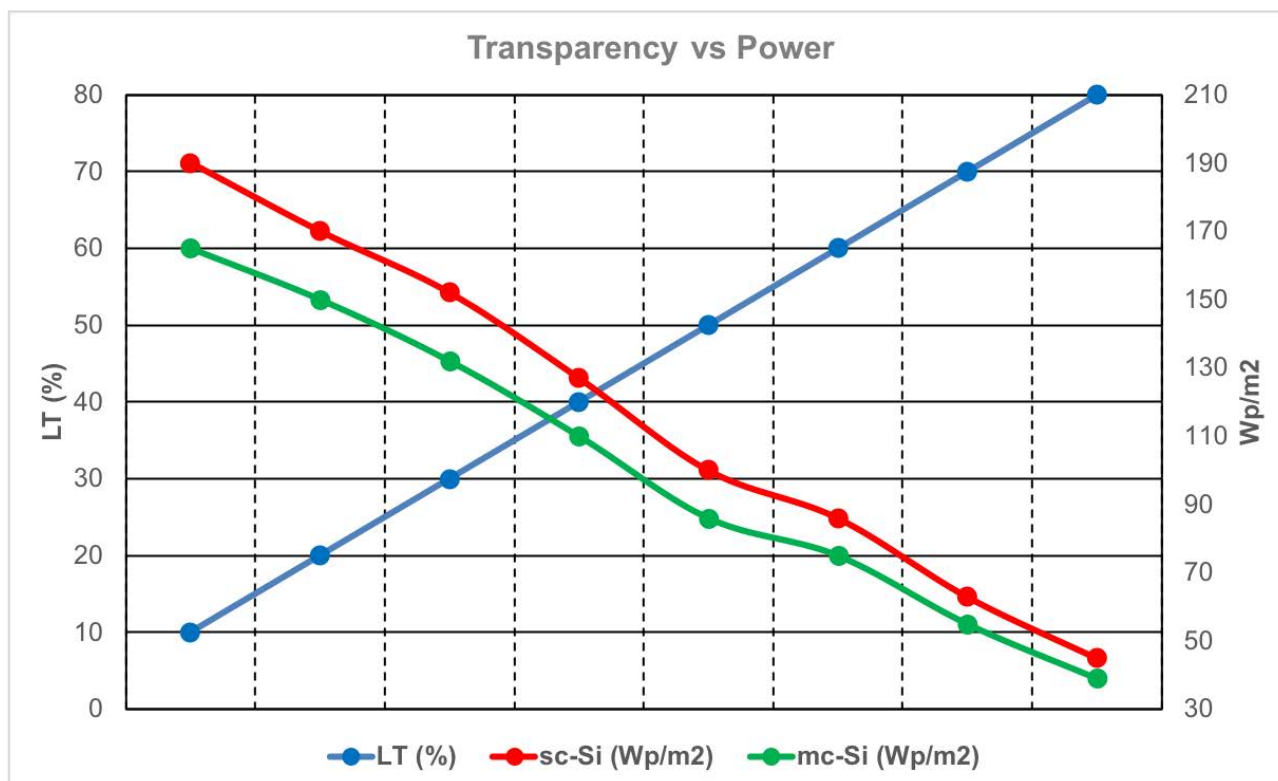




LIGHT TRANSMITTANCE (LT)

It indicates what percentage of the solar radiation in the range of visible light (380-780 nm) passes directly through the glass.

The power module according to the desired transmittance is:



Transmittance - **Power**

Module's power output increases along with the decrease of the light transmittance.



COMMON TECHNICAL FEATURES

THERMAL CHARACTERISTICS MONOCRYSTALLINE		
Temperature coefficient of short circuit current α (I _{cc})	%/° C	+ 0.0814
Temperature coefficient of open circuit voltage β (V _{oc})	%/° C	- 0.3910
Temperature coefficient of maximum power γ (P _{mpp})	%/° C	- 0.5141
Temperature coefficient of current at maximum power (I _{mpp})	%/° C	+ 0.10
Temperature coefficient of voltage at maximum power (V _{mpp})	%/° C	- 0.38
NOCT (Nominal Operating Cell Temperature)	° C	+ 47 ± 2

THERMAL CHARACTERISTICS POLYCRYSTALLINE		
Temperature coefficient of short circuit current α (I _{cc})	%/° C	+ 0.0825
Temperature coefficient of open circuit voltage β (V _{oc})	%/° C	- 0.4049
Temperature coefficient of maximum power γ (P _{mpp})	%/° C	- 0.4336
Temperature coefficient of current at maximum power (I _{mpp})	%/° C	+ 0.10
Temperature coefficient of voltage at maximum power (V _{mpp})	%/° C	- 0.38
NOCT (Nominal Operating Cell Temperature)	° C	+ 47 ± 2

TOLERANCES				
Working temperature	° C	° F	- 40 ~ + 85	- 40 ~ + 185
Dielectric Isolation Voltage	Volts		3,000	
Relative humidity	%		0 ~ 100	
Wind resistance	m/s		60	
	kg/m ²	Pa	245	2,400
	lbs/feet ²		491.56	
Mechanical load-bearing capacity	kg/m ²	Pa	551	5,400 (IEC)
	lbs/feet ²	Pa	75.2	3,600 (UL)
Fire resistance	Clase		C	

MEASUREMENTS PERFORMED IN ACCORDANCE WITH STANDARD TEST METHODS EN 60904-3 AND ASTM E1036, CORRECTED TO STANDARD TEST CONDITIONS (STC)		
Air quality/Spectral distribution	AM	1.5 ASTM G173-03e1 (2,008)
Luminous intensity/Radiation	W/m ²	1,000
Cell temperature	° C	25

MEASUREMENTS PERFORMED IN SOLAR SIMULATOR	
Class	AAA (according to IEC 60904-4)
Power measurement uncertainty is within	± 3 %

STRUCTURAL CHARACTERISTICS	
Cells	High efficiency cells with anti-reflective layer of Silicon Nitride.
Electric conductors	Flat Copper (Cu) bath in a Tin (Sn) and Silver (Ag) alloy, which improves weldability.
Welding	Of cells and drivers in sections for stress relief.
Laminate	Composed of ultra-clear tempered glass on the front, thermostable, EVA encapsulant embedding cells and electrical insulation on the rear formed by a tempered glass.
Junction box	Hoses and quick connectors with anti-error. Include bypass diodes, interchangeable thanks to the wiring system has no welds, all electrical contacts are made by pressure, thus avoiding the possibility of cold welding.

CHARACTERISTICS OF WORK	
- The power of solar cells vary in the output of the production process. The different power specifications of these modules reflect this dispersion.	
- Cells during the early months of light exposure, may experience a degradation photonics could decrease the value of the maximum power of the module up to 3 %.	
- The cells, in normal, operating conditions, reach a temperature above the standard measurement conditions of the laboratory. The NOCT is a quantitative measure of the increase. NOCT measurement is performed under the following conditions: radiation of 0.8 kW/m ² , temperature 20° C and wind speed of 1 m/s.	
- The electrical data reflects typical values of the modules and laminates as measured at the output terminals at the end of the manufacturing process.	



MOUNTING RACKS

LINEAR MOUNTING SYSTEMS

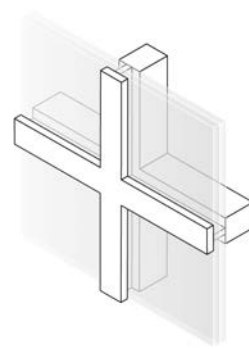
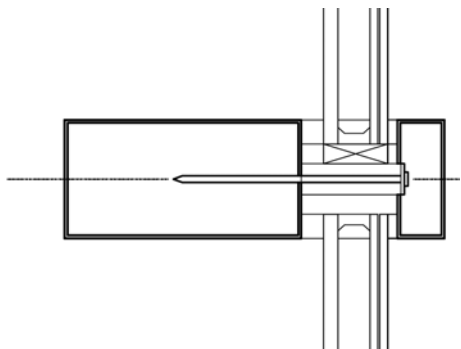
MULLION-TRANSOM FAÇADES

Mullion-transom constructions consists of vertical mullions and horizontal transoms. The mullions transfer the main loads and the transoms act as horizontal bracing. The solar modules are set in this framework structure as fill elements. Clamping rails are fitted from the outside as linear fixings for the modules.

The circumferential profiles, however, can shade the solar modules and also result in the accumulation of dirt and snow. The module design should be adapted to take this shading into account. The costs for maintenance and cleaning should also be taken into account, if applicable, particularly for roofing applications.

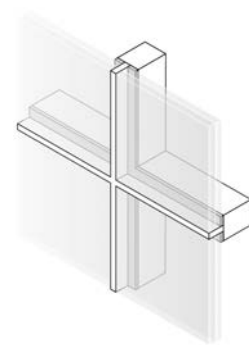
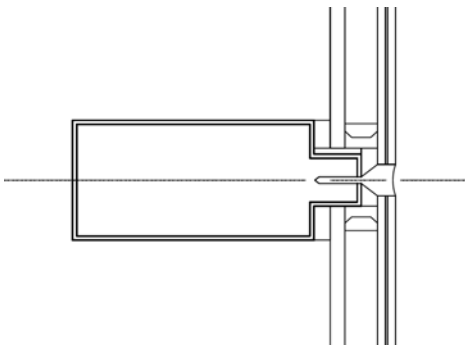
The dimensions of the façade grid vary from project to project and customised solar modules are usually required.

Mullion-and-transom façades count as “warm” or thermally insulating façades. Consequently, not only must the profiles be thermally separated, but the U values of the fill elements must be correspondingly low. For this reason, PV modules are often integrated in a thermal insulation glazing structure.



STRUCTURAL SEALANT GLAZING (SSG)

With structural sealant glazing façades, the solar modules are fixed in place on a metal frame by means of circumferential load-transferring bonds. This produces façades with a homogeneous and smooth appearance. Furthermore, SSG façades have no external protruding parts, which means that shading and dirt traps are avoided.





POINT-FIXING SYSTEMS

Particularly delicate designs can be achieved using point-fixed façade systems. Typical point-fixing systems are clamp fixings, drilled glass panes with drilled spot fixing, and undercut anchor fixing systems.

Although point-fixing systems cause hardly any shading in comparison to frame systems and are less prone to accumulating dirt, they can only be used with a few types of solar module.

Since holes drilled in glass must maintain a minimum offset from the edge of the pane and since drilled spot fixing always shade part of the module, the only solar modules that can be used here are those that allow cut-outs to be made in these areas in the module design and permit drilled panes to be used independently of the cell production.

DRILLED SPOT SYSTEMS

Drilled spot fixing are construction components that are used for point-fixing glass panes. They comprise two metal discs and a bolt that is inserted through a drilled cylindrical hole in the glass pane to connect the two discs. These circular pads must measure at least 50 mm in diameter and be offset from the edge of the glass by 12 mm.



CLAMP FIXING

Clamp fixings are U-shaped brackets that fit around the edge of glass panes and dispense with the need to drill holes in the glass. The fixings must overlap the glass by at least 25 mm and the clamped area must be greater than 1,000 mm².





UNDERCUT ANCHOR FIXINGS

Undercut anchor fixings are mechanical point-fixings that remain invisible, since the glass is not drilled right through. This allows more efficient use of the PV surface area. These fixings generate higher stresses due to the reduced contact area of their cylindro-conical drilled holes, which means that toughened glass, semi-tempered glass or laminated safety glass must be used.

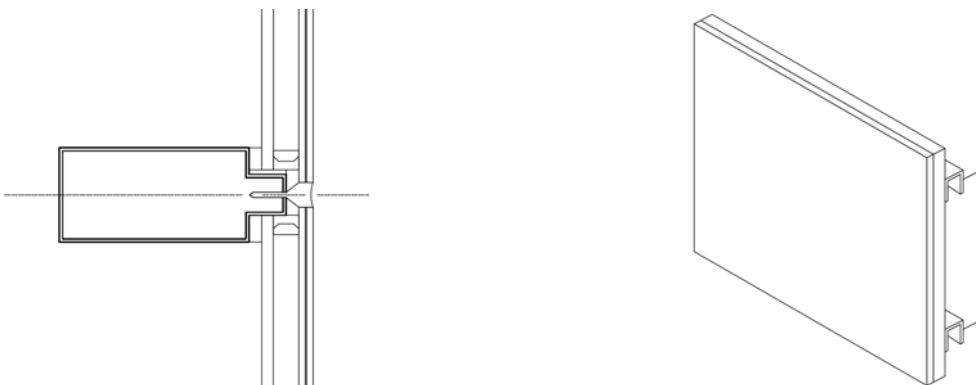


VENTILATED CURTAIN WALL SYSTEMS

The function of the cladding of ventilated curtain wall systems) is to provide weather protection and to serve as an architectural design element. This outer cladding is fixed to a rear load-bearing wall using a fixing system (agraffes and/or rails).

A layer of air between the load-bearing wall (or the insulation layer attached to it) and the building envelope ventilates the solar modules from the rear and can be used for laying electrical components and sockets.

Many different types of material, such as plaster, ceramic tiles, bricks, glass or metal can be used for this kind of construction. Façades can thus be created using a wide variety of material combinations together with PV modules. Above all, ventilated curtain wall systems are taken into consideration in energy efficient façade renovation projects.





APPLICATIONS

FACADE

Integration of photovoltaic modules in buildings can be accomplished in many different ways and results in a wide range of solutions.

The facades provide a first glimpse of the building the visitor. It is the means often used by architects and designers to convey the idea of the building and the wishes of the customer through a language of forms and colors. If you are interested in designing a futuristic, sophisticated and green image, photovoltaic materials will help greatly.



Solar Innova modules integrated photovoltaic technology used in the BIPV installations are multifunctional. That is, in addition to generating electricity, also meet all the requirements demanded by conventional facades weather protection and acoustic agents, heat insulation. On the other hand, represent an innovation aesthetic character regarding conventional facades.

Currently we discern two types of plants on facade:

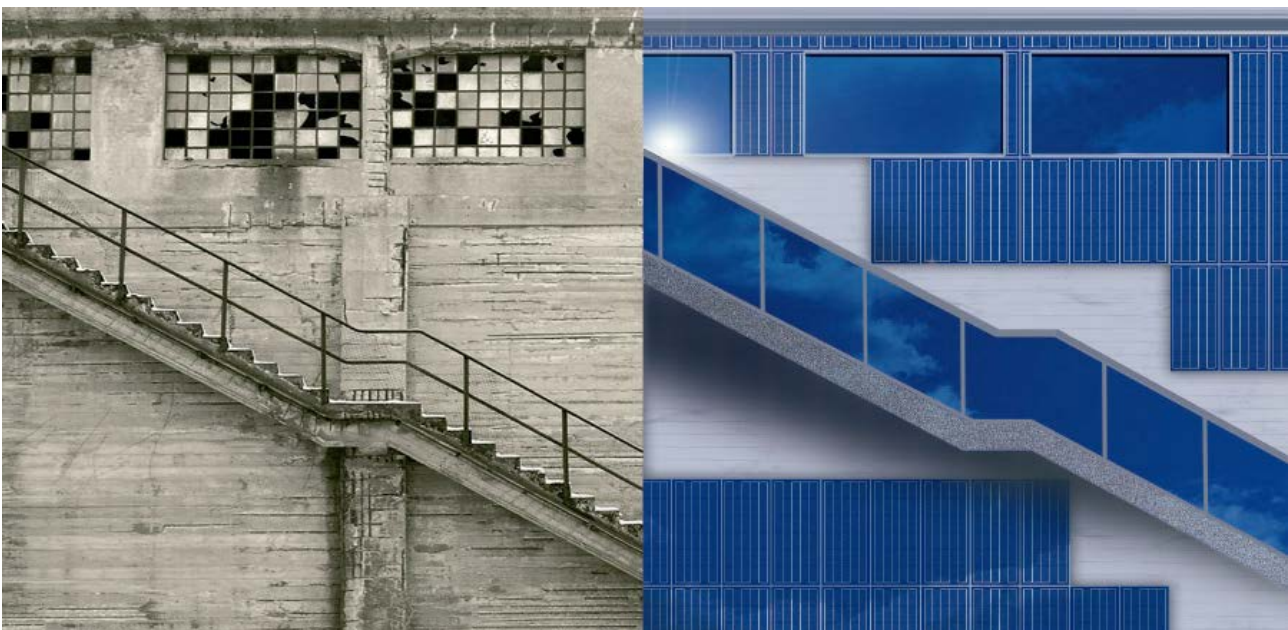
- The first one is the integration of conventional PV modules already built a facade. Directly engage by traditional fastening systems, and is not necessary to provide the weather protection panel. With this rehabilitations are achieved dated obtaining also a business opportunity to integrate economically active element.
- The second possible form of integration is to configure the building facade using photovoltaic modules as building material. The panels become an integral part of the structure of the building and as such, must provide the necessary strength characteristics and protect against external agents.



The fact that the photovoltaic modules can be used both with or without rear facades ventilation, such balustrades or attics, provides more freedom of design and allows attractive façade conducting surface at a uniform exterior finish.



Regarding the architectural design, the façade becomes a very neat and tidy, thanks to precision fit is achieved between the panels, a rare design difficult to achieve with other materials aesthetics.





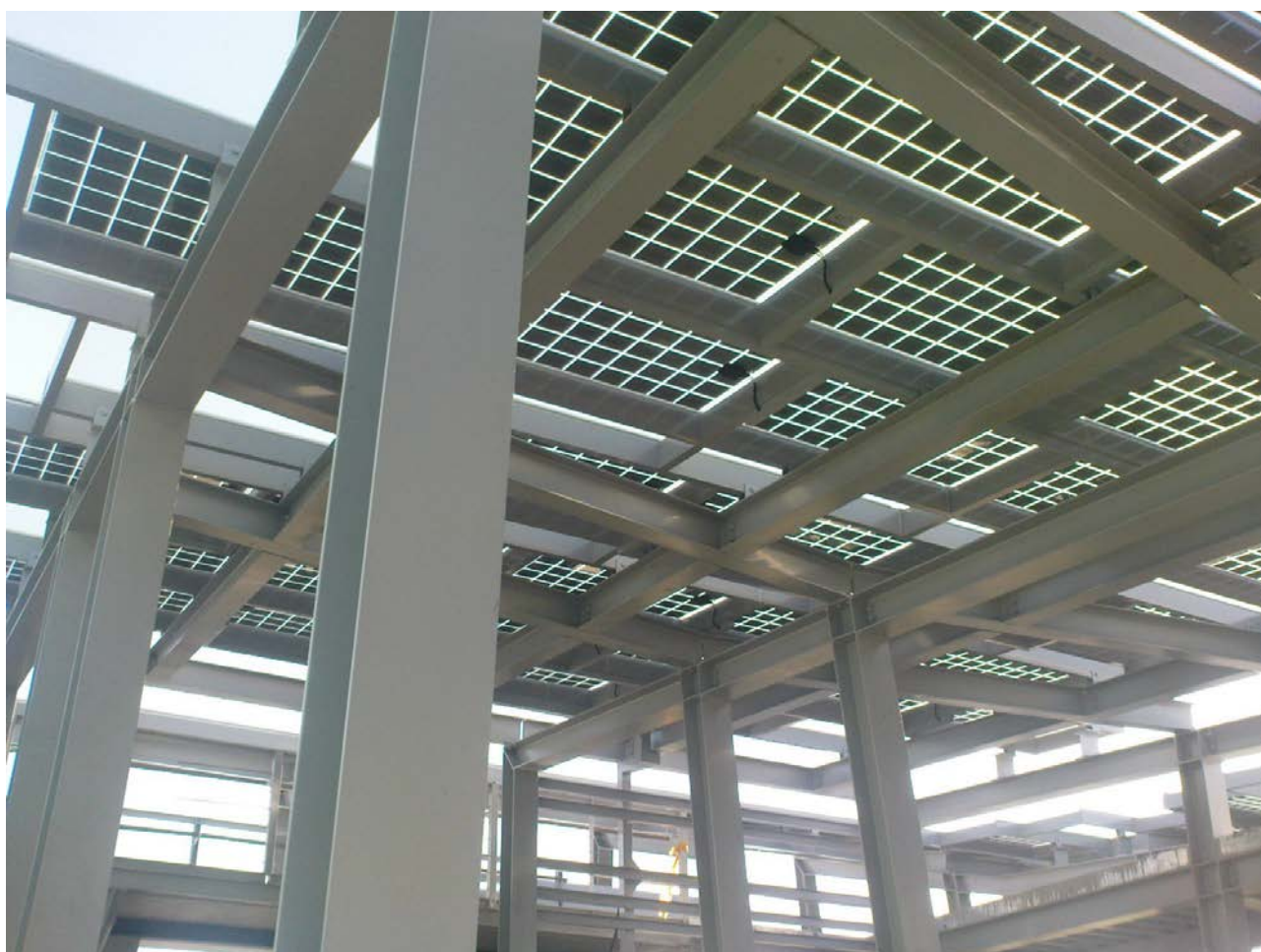
ROOFTOPS

Our panels are integrated in many applications in the form of a glazed ceiling.

Solar Innova photovoltaic glasses integrate perfectly in the buildings, preserving their aesthetics. This is thanks to the great variety of configurations possible in size, color, transparency, shape, etc.

By incorporating existing roofs, energy saving levels can only be achieved by new buildings.

In photovoltaic roofs, ecology blends with habitability and efficiency, resulting in environmentally friendly buildings that take care of the people who inhabit them.





SKYFLIGHTS

Skylights are ideal places in buildings to integrate photovoltaic systems, given their location on deck and horizontal or slightly inclined layout, which allows to have important surface radiation free of obstacles that can cast shadows to the panels, being able to maximize incident solar radiation, at the same time that they fulfill a double function of illumination and of the interior spaces.

The photovoltaic systems that are preferably used in this type of applications are semitransparent, since these, apart from providing electricity and protection against external agents, allow the passage of light inside the building.

With the Solar Innova modules of integration in skylights, impressive effects are achieved in addition to adopting a remarkable sense of spaciousness, by adding natural light to any room.

As semitransparent cover serve as thermal, solar, anti-glare and weather protection, in addition to providing a selective use of natural light. Large surfaces with optimized inclination angles also ensure high solar yields.

The Solar Innova skylights will allow you to obtain extraordinary results in any building, dazzling spaces and environments with great visual strength. The use of BIPV systems in skylights also provides a touch of exclusivity and elegance.





BALCONY

Photovoltaic balconies allow to take full advantage of this part of the surface of an apartment or a building exposed to sunlight and at the same time, are a way to improve their appearance.

It is often characterized by an exceptional elegance, for which they become architectural elements that try to emphasize instead of hiding the cells that produce energy.

The photovoltaic module is a component element of the bottom of the balcony railing. We use photovoltaic laminate safety glass having the same physical and structural characteristics than a traditional panel, but with almost unlimited design possibilities, applicable to both new buildings and balconies and balconies of apartments or existing buildings.

To make the balconies and balustrades we use transparent photovoltaic glass or semi-transparent colored cells, typically mono or polycrystalline. These have an irregular texture which usually improves the visual appearance of the terrace.





GREENHOUSE

The greenhouses are enclosures in which temperature, humidity and other environmental factors are kept help to promote agricultural crops. They are always located in open areas where they receive large amounts of direct solar radiation.

The greenhouses commonly used in agriculture, have an arc section and are located longitudinally north-south to reduce excessive radiation during mid-day. The overall result in a cultivation system is characterized by an optimal temperature profile avoiding peaks that may be harmful.

Solar Innova greenhouses are calculated and constructed to resist both the weight of its own roof with photovoltaic modules and other loads such as rain, wind and snow.

The metallic structure in Solar Innova greenhouses is obtained by repeating a base module whose floor and elevation dimensions have been designed specifically so that the installation of the photovoltaic system is completely fit. Its crystal and metal structure is perfect for the integration of solar panels and from an aesthetic point of view it does not have any impact in the surrounding environment.

We have several possibilities to meet different needs:

- Multi-shed roof: This structure is specially indicated for large surfaces, it avoids diminishing the greenhouse effect and brings the possibility of producing electricity, maximizing the productivity of crops.
- One-side roof: This model allows the total coverage of the surface for the installation of the photovoltaic system and, therefore, it permits to obtain a great production of electricity.
- Shed roof: Similar to the previous one but with one of the sides of the cover without covering to allow greater luminosity in case it is necessary for the crops.





PARKING

Solar Innova has developed a solution consisting of Photovoltaic Parking structure where an installation of photovoltaics guarantees on-site energy generation.

The design is based on a parking module for two cars with integrated photovoltaic on the cover 8° inclined with respect to horizontal, with variable azimuthal orientation relative to the depending on the specific needs of the field where it is located.

The aesthetic sense of this solution seeks maximum possible energy production and maximum protection from adverse conditions, such as rain, snow or wind weather.

The cover has a minimum slope, able to smoothly evacuate rainwater or snow and that also is versatile in any orientation.





PVNB-PHOTOVOLTAIC NOISE BARRIER

Photovoltaics is expanding into new market segments.

One promising approach is the exploitation of the potential of integrating photovoltaic modules in noise barriers. The photovoltaic noise barriers (PVNB), as they are commonly referred to, enable effective noise abatement to be combined with the simultaneous production of renewable energy.

Integration of PV modules into sound barriers along motorways and railways is a interesting alternative to building integration. Photovoltaic noise barriers (PVNB) along motorways and railways today permit one of the most economic applications of grid-connected PV with the additional benefits of large-scale plants and no extra land consumption. Just as in the case of buildings, no land area is consumed and the supporting structure is already in place.

Traffic noise has been recognised by the World Health Organization as a major factor contributing to environmental pollution. Besides causing annoyance, it has significant negative health impacts on populations living close to road infrastructure.

Besides helping to reduce greenhouse gas emissions into the atmosphere, adoption of PVNB carries a range of other positive economic, social and environmental benefits.





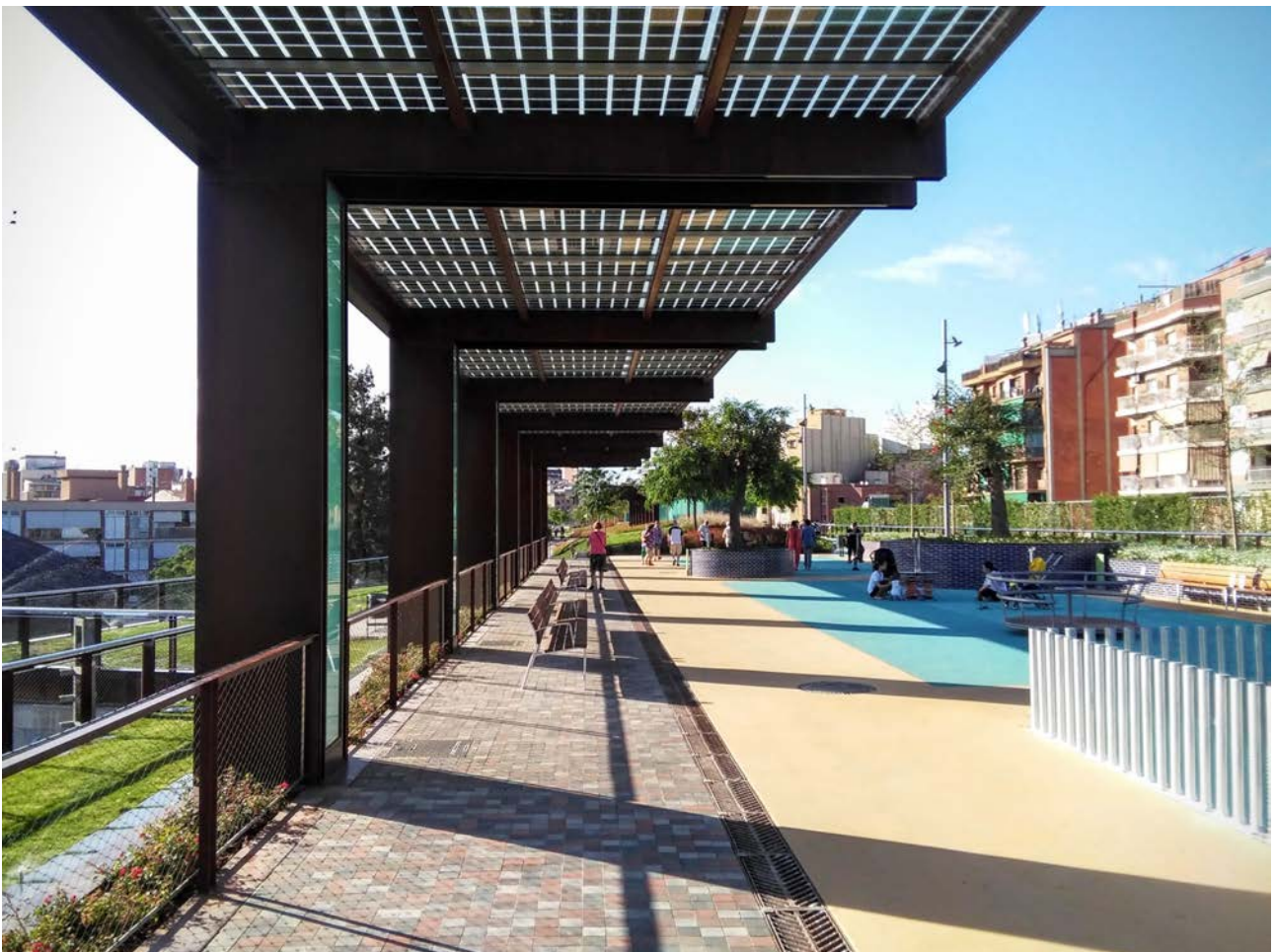
PERGOLA

Photovoltaic pergolas are an alternative way to replace the materials traditionally used in construction to generate shadows.

One of the great advantages of photovoltaic glass BIPV Solar Innova is acting as a filter for ultraviolet and infrared radiation, both harmful to health, in addition to providing buildings clean and free energy from the sun.

These facilities have several aspects:

- To contribute to the awareness of the public broadcasting the commitment to the use and promotion of renewable energies.
- The integration of renewable energies in urban areas.
- Capitalize unused areas.
- Demonstrate that the rational use of energy can be made profitable economically.





EAVES

Solar Innova offers products and solutions adapted to the needs of the construction sector, providing Architects and Engineers the possibility of incorporating the photovoltaic installation into the aesthetics of the building.

BIPV photovoltaic panels are a perfect solution for use in the formation of eaves, since they constitute a range of active technological glasses that have the property of generating electrical energy and can be used both in new buildings and in renovations.

These types of solutions are perfect to unite design and functionality, thus merging design and electrical installation. The eaves are transformed thanks to the panels into integral elements of the building's electrical installation.

The use of BIPV panels in the formation of eaves, allows not only to achieve the desired effect with the glass, but also simultaneously a solar control and an electrical production is carried out.





FLOOR

With the photovoltaic floor, sustainability and architecture come together to create unique spaces where we can generate free electricity without sacrificing the useful space it occupies.

The possibilities for integration are multiplied by being able to personalize this product with a multitude of colors and textures.

The photovoltaic floor is passable and non-slip, complies with the anti-slip regulations, supports 400 kg in the punctual load tests and offers an efficiency similar to the rest of constructive solutions.

The photovoltaic floor is very attractive, can be integrated into any project, without sacrificing design or aesthetics, while combining passive elements (avoiding CO2 emissions) with active elements (power generation) considerably reducing the impact of the building on the environment.

The solutions of Solar Innova are multifunctional since they combine active and passive properties, giving numerous advantages to the buildings that incorporate them.





PAVEMENT

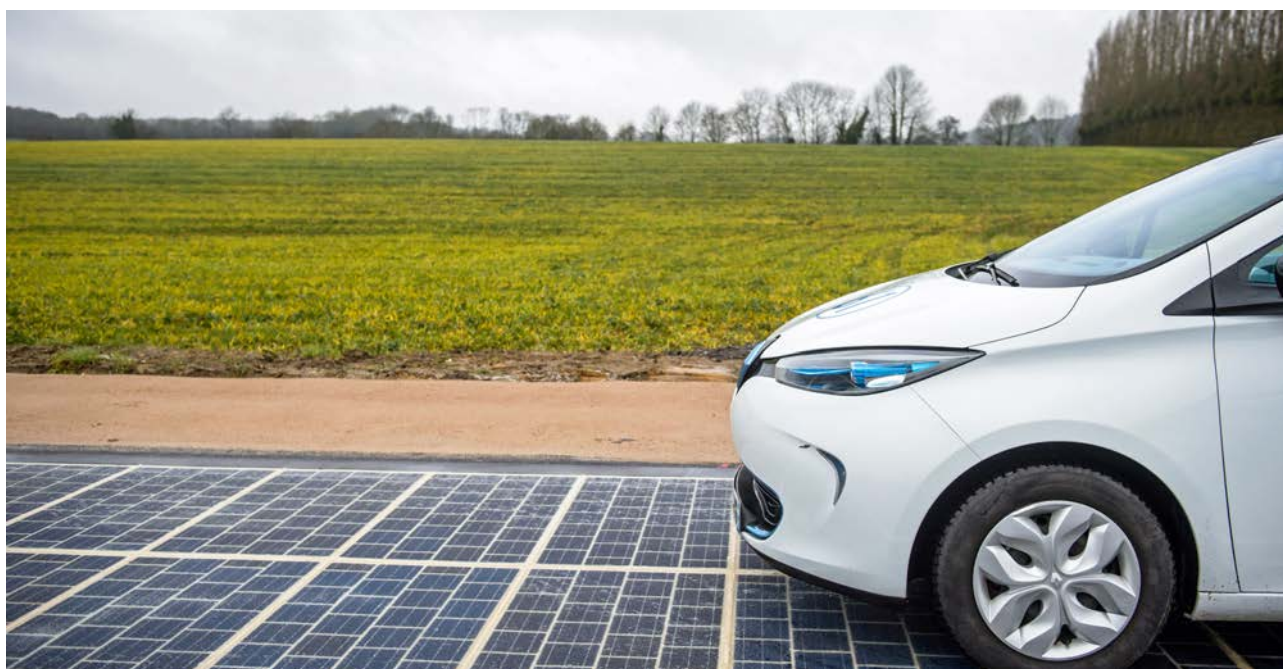
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WARRANTIES OF QUALITY



Solar Innova products are made with the highest quality components and the latest technology, thanks to the excellent factory equipment and control of the entire manufacturing process. In addition, our products offer excellent design and finishes.

Solar Innova has a wide range of photovoltaic solar panels that cover all market needs both feeding operation as isolated facilities. Besides offering panels that develop, manufacture and market, we give you and your company the opportunity to advise you on everything you may require, through our engineering department.



The effectiveness and excellence in all our manufacturing processes are the main guarantee that ensures the highest quality solar modules Innova.

Our production factory (certified according to ISO 9001, ISO 14001 and OHSAS 18001) meets stringent quality requirements that our organization has set: full supervision in each individual phase of the production process.



The CE or European Conformity is a European brand for certain groups of services or industrial products. It relies on the directive 93/68/EEC, 2002/95/EC, 2004/108/EC and 2006/95/EC. It was established by the European Community and the testimony by the manufacturer that the product meets the minimum legal requirements and technical security of the Member States of the European Union.



All our panels are manufactured under strict quality control and classification. Certificates IEC 61215 and IEC 61730 and characterization reports made in testing laboratories based on these standards, certify that all of our panels successfully pass the tests that have been and are suitable for use in any type of installation.



The MCS (The Microgeneration Certification Scheme) certification is a system of EN45011, which certifies the Solar Innova PV modules for use in photovoltaic systems in the UK.

The MCS is a set of internationally recognized quality assurance demonstrating the quality and reliability of products certified to exacting standards.

The MCS certificate involves evaluation of products, manufacturing processes, materials, procedures and staff training. It is also a requirement to market photovoltaic market in the UK within the program of government financial support.



Standard UL 1703 refers photovoltaic panels that meet the National Electrical Code (NEC) and the National Fire Prevention Association (NFPA) in the United States of America.

The American National Standards Institute ANSI/UL 1703 covers North American requirements for the design and testing of PV modules on the rating of the safe electrical and mechanical operation throughout their expected lifetime. The tests also demonstrate that the efficiency of the panels is tested and confirmed to reach 90 % or more of the power indicated by the manufacturer.



A photovoltaic module is recyclable day today to 80% by an adequate treatment in conscious recover raw materials, thus contributing to saving natural resources.

Most of the materials that make up a photovoltaic module can be recovered and reused at the end of life of modules, reducing significantly the amounts destined to become waste.

Solar Innova panels are within the regulatory requirements of toxicity based on Toxicity Characteristic Leaching Procedure (TCLP) testing and are not considered hazardous waste.

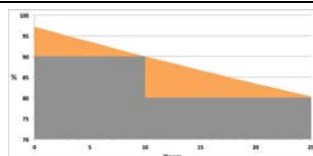


Solar Innova has obtained in its factory a multitude of distinctive quality independent standardization bodies and control, demonstrating continued compliance with high standards of safety and quality in their products.

Outstanding quality, reliability above average and superior performance distinguish the Innova Solar modules. For this to continue to keep well, the modules are regularly a series of thorough tests and trials not only in the R & D and factory quality, but also through independent certification institutes.

In Solar Innova, production efficiency and supreme quality contribute decisively to the high degree of international competitiveness.

Guarantee
12/25
Years



Manufacturing defects: 12 years

Performance:

Minimal Rated Power (%/Years)

90 % at 10 years,

80 % at 25 years.



Producing high-quality PV modules requires much precision in selecting all the materials individually. Our commitment to precision goes beyond manufacturing right through to delivering the products to our customers. We offer all the knowledge about our products to distributors, technicians and installers, with which we have close cooperation for long-term sustainable growth. All of our products are manufactured on our own production facilities and are subject to the highest quality standards. In our own laboratory we test modules to ensure compliance with all international standards and to ensure stable quality and performance of our products.



The strictest quality management is applied throughout the complete production sequence to a visual, micro-optical, mechanical, and electrical final inspection continuously insuring the premium quality of photovoltaic panels. Solar Innova guarantees you faultless module delivery and avoids drops in performance as a result of mechanical damage through proper module packaging. All modules are manufactured on our own production facilities at our headquarters and delivered from there to our worldwide subsidiaries. Solar Innova takes over the entire logistics to the end customer thus guaranteeing the traceability of the modules. We monitor the production process and flow of each module and ensuring the high quality of our modules.



Solar cells directly convert sunlight into direct current electrical energy and the generator are of the module. The quality of cells directly influences the characteristics of a solar module is therefore essential silicon composition used.

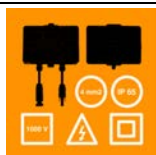
Solar Innova cells used exclusively highly efficient with minimal variations in the process of optimizing the production reproducibility of the separation of cells. Is a determining factor for the quality of the cell constant for stable profits. The high resistance multipliers and fill factors used cells provide a good source of energy radiation especially low.

Each cell is checked, and classified electrically calibrated prior to interconnection to optimize the behavior of the module.



Prismatic tempered glass with the following characteristics:

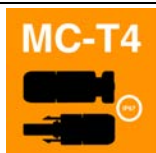
- ✓ Microprism surface structure.
- ✓ High transmissivity.
- ✓ Low reflectivity.
- ✓ Low iron.



Our PV modules are equipped with junction boxes for solar modules DIN V VDE V 0126-5 is used as an interface between the solar cells and photovoltaic system.

Our boxes are sealed and are ready for the elements with degree of protection IP67, which provides the insulation against moisture, inclement weather, dirt and ultraviolet radiation.

Inside are installed bypass diodes to protect the PV modules if they are under shade.



Our PV modules are equipped with connectors and sockets MC-T4 100 % compatible with the connectors and sockets used to connect electrical systems. Only MC-T4 connector or compatible and special solar cables may be used to lengthen the cables connected to the module. These must meet the electrical requirements of the interconnection design.



Solar Innova offers its products for maximum performance photovoltaic sure of a good quality product Over the course of their lifespan, of 25 years or more, photovoltaic modules are subjected to severe environmental conditions. Come hail, snow or heat, they need to continually deliver peak performance in order to achieve maximum profits. In order to achieve this, the use of high-quality components is crucial. At Solar Innova we only use the best materials and first-class, weatherproof components from certified suppliers and market leaders. At Solar Innova each delivered component is checked intensively, ensuring long life and high yields.

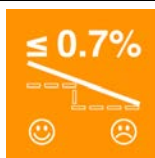


All Solar Innova modules are characterized by a positive tolerance of 0/+5 Wp of rated power, which guarantees high energy yield over the life, and resistance to the return current, which minimizes material needs Interconnection and time.

This quality standard is implemented by Solar Innova cell use grade "A" of high efficiency.



The ideal conditions for a photovoltaic system is blue sky and sunshine. Unfortunately for solar these are not the most common conditions. About two-thirds of the average annual radiation is in the range of weak light. Weak light describes the intensity of radiation that is considerably lower than 1000 W/m². Of course, a photovoltaic system produces electricity anyhow, however the current yield decreases. Solar Innova modules have superior weaklight performance with an above average efficiency, generating you extra yeild in these conditions.



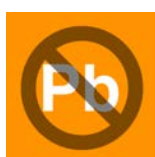
Each solar cell loses performance when being exposed to the sun. Solar Innova modules are characterized by a very low degradation securing you a permanently stable yield. The use of high-quality raw materials ensures the low degradation of the nominal power of our modules, particularly at the beginning of the operating life. For this reason, we can offer a 25 year linear performance guarantee. In the first year, Solar Innova guarantees a performance of at least 97% of the nominal power. In the following 24 years, Solar Innova guarantees a maximum performance reduction of 0.7% of the nominal power per year. With this performance bond, Solar Innova guarantees quality and performance from its own production and provides you with security in your investment.



Our modules require no or very little maintenance due to its own configuration: no moving parts and cells and their internal connections are encapsulated in several layers of protective material.

You should make a general inspection 1 or 2 times a year to ensure that the connections between panels are tight and free of corrosion.

In most cases, the action of rain eliminates the need for cleaning of the modules, but if necessary, simply using water and a mild detergent.



An innovative and eco-friendly step in manufacturing has enabled Solar Innova ignore all the lead normally required in the welding process, which has significantly reduced the lead content in the module.

The result is an even more respectful of the environment with the same performance and reliability product.

All these features help our modules to achieve the environmental objectives for residential users, businesses and governments looking to reduce their carbon footprint and save on energy costs.

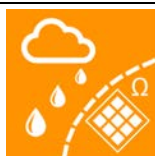
As part of the commitment of Solar Innova with the environment, we are not only making modules even more respectful of the environment, but we are also implementing best practices information integrating sustainability into our operations.



With a special electro-luminescence test, a type of X-ray, Solar Innova ensures 100 % cell quality. By examining all cells and finished laminates for any internal damage, micro-cracks, hot spots, soldering errors and other imperfections, which are not visible to the naked eye, are eliminated.



In photovoltaics, the hot-spot effect refers to an overheating of a specific area of a solar module which can result in a fire in extreme cases. Solar Innova executes a 100 % test of all cells by applying a reverse current. This specially developed and defined procedure, allows us to identify potentially defective hot-spot cells and reducing the risk of incidents occurring.



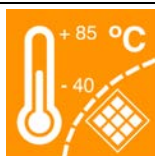
Conventional solar systems inherently have differences in voltage between the system framework and solar cells. These differences can lead to unwanted leakage currents which reduce the capacity of the cells and can cause a loss of yield of 20 % or more. This effect is called Potential-Induced Degradation (PID). The use of high-quality encapsulation materials and state-of-the-art plant technology at Solar Innova ensures a consistent production of PID-resistant modules.



Excessive snow pressure is actually one of the most important damage categories for photovoltaic systems, alongside storm damage and damage due to theft, overvoltage, hail or fire. The problem: Especially on sloping roofs, the snow load on photovoltaic systems is unevenly distributed. In fact, the snow slides down to the bottom part of the module frame, causing extreme loads on the modules and mounting parts here. The consequence: "This causes an increased occurrence of serious damage especially to the frame and glass surfaces of the modules – and not just in mountainous regions, but also in flat areas".



All our photovoltaic modules have been tested to meet Class C fire resistance and eligible for installation on roofs Class A, as determined by UL Standard 1703.



To eliminate premature fatigue and deformation of the material, our products are regularly tested to assess their weather resistance in wet and cold conditions and extreme temperature changes.

Solar Innova pv modules have been tested for resistance to different temperatures to test their endurance and proper operation in temperature ranges from -40 to +85° C.



Generating electricity using solar PV panels does not produce greenhouse gases directly. But emissions are associated with other parts of the panels life cycle: manufacturing and transporting them, for example.

The main components of solar PV panels are made from crystalline silicon. Manufacturing these components is an energy-intensive process that represents a high percentage of the total energy used to make solar panels. The exact carbon footprint of any particular solar panel depends on many factors, including the source of the materials, the distance they have to be transported and the energy source used by the manufacturing plants.

The carbon footprint of a solar photovoltaic (PV) panel (the average level of greenhouse gas emissions it is responsible for over its lifetime) is about 72 grams of carbon dioxide-equivalent per kilowatt-hour of electricity generated (gCO₂e/kWh).

In Solar Innova we optimized all these concepts to minimize the carbon footprint of our products.



INTERNATIONAL CERTIFICATES



All our PV modules are produced in a environment ISO 9001, ISO 14001 and OHSAS 18001.



All our PV modules are designed, manufactured and approved for use in the environment of the European Union with the CE marking.



All our PV modules are designed and manufactured according to IEC/EN 61215 and meet the qualification standards of safety of photovoltaic modules IEC/EN 61730 Class A (Class II).



All our PV modules are designed and manufactured in accordance with the rules MCS 010-1.2 and MCS 005-2.3.



All our PV modules are designed and manufactured in accordance with ANSI/UL 1703.





To meet these international standards have been used high quality materials and durability. Moreover Solar Innova has established a series of rigorous quality control at every stage of the production process and final inspection of the output of all manufactured modules.

- Directive 2006/95/EC of the European Parliament and of the Council, of 12 December 2006, on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

- EN 1863-1, Glass in buildings. Heat strengthened soda lime silicate glass. Part 1: Definition and description.

- EN 1863-2, Glass in building - Heat strengthened soda lime silicate glass. Part 2: Evaluation of conformity/Product standard.

- EN ISO 12150-1, Glass in building. Thermally toughened soda lime silicate safety glass. Part 1: Definition and description.

- EN ISO 12150-2, Glass in building. Thermally toughened soda lime silicate safety glass. Evaluation of conformity/Product standard.

- EN ISO 12543-1, Glass in building. Laminated glass and laminated safety glass. Definition and description of component parts.

- EN ISO 12543-2, Glass in building. Laminated glass and laminated safety glass. Laminated safety glass.

- EN ISO 12543-3, Glass in building. Laminated glass and laminated safety glass. Laminated glass.

- EN ISO 12543-4, Glass in building. Laminated glass and laminated safety glass. Test methods for durability.

- EN ISO 12543-5, Glass in building. Laminated glass and laminated safety glass. Dimensions and edge finishing.

- EN ISO 12543-6, Glass in building. Laminated glass and laminated safety glass. Appearance.

- EN 12600, Glass in building. Pendulum test. Impact test method and classification for flat glass: Impact test classification 1B1, as a result, the product and the production process are CE compliant according to EN 12543, part 1 to 6.

- EN ISO 12758, Glass in building. Glazing and airborne sound insulation. Product descriptions and determination of properties.

- EN 14449, Glass in building, Laminated glass and laminated safety glass, Evaluation of conformity/Product standard.

- EN 50380, Datasheet and nameplate information for Photovoltaic Modules Specifies data sheet and nameplate information for non-concentrating photovoltaic modules.



RECYCLED

Solar Innova, continuing with its program of continuous improvement and efficiency in terms of Quality and Environment is involved in the recycling of photovoltaic modules.

Solar Innova goes one step further in their awareness of environmental issues, giving your product a seal which makes it doubly green and providing customers a viable solution for those modules that have reached the end of its useful life.

The objective is the collection and recycling of photovoltaic modules at the end of its life installed in the EU and EFTA countries.

From Solar Innova is providing clean, renewable energy through the most powerful natural resource, the sun, but want to close the circle and give, through the recycling of modules, a clean out the final destination of its modules.

The photovoltaic modules contain materials that can be recovered and reused, either new PV modules or other new products. Recycling industrial processes exist for both thin film and silicon for modules. Materials such as glass, aluminum, and a variety of semiconductor materials, are valuable when recovered.

Solar Innova modules have a lifespan of 25 years, require minimal maintenance and are a low CO₂ to the atmosphere together when the time comes for them to be discarded will be collected for recycling.

Recycling not only benefits the environment by reducing the volume of waste, but also helps reduce the amount of energy needed to provide raw materials and therefore the costs and environmental impacts of the production of photovoltaic modules.





SERVICES



Solar Innova is constituted by a team of highly qualified and specialized in renewable energy commitment to the implementation of clean energy to enable sustainable growth and a better future for all, not forgetting the fair return on its investors and customers.

The main advantage that report **Solar Innova** services comes from its professional and specialized management, which allows obtaining higher and safer returns, reducing risks, optimizing and streamlining processes and, above all, avoiding hassles and concerns to their clients. Have the same advantage, any company or person with a small investment, you will have access to investments in renewable energy, inexhaustible and clean.

Solar Innova, born with the firm purpose of contributing to a more sustainable future. Energy saving is the first way to combat the changes that are happening on our planet.

Alternative energy, now fully consolidated as a viable way to preserve the environment, is the only solution for eliminating pollution and CO2.

The world needs systems based on solar power with improved quality and efficiency. This is the definitive answer to a paradigm shift cleaner energy, sustainable and economically.

Besides thinking about how to produce clean energy, we must learn to make rational use of energy as a priority.

Full customer satisfaction is our commitment, and he devoted one hundred percent of our time and effort. We monitor daily performance and quality in products and services.

We have a rigorous internal quality control in order to offer the customer the best service.



DEALERS



We want to make sure your solar experience is fully satisfactory. This is why we have selected highly skilled dealers and installers around the world. Our Official Dealers and Installers will provide you with a professional installation job and a high-level customer service.

Consistent with our commitment of pushing forward existing quality requirements, we have drafted a Quality Charter for dealers and installers, that defines a series of rules aimed at guaranteeing the best quality of service to homeowners choosing Solar Innova products. Having signed our Quality Charter, Official Dealers and Installers prove to share the same vision of quality as us, and take responsibility for providing their clients with a better service.

Our Official Dealers and Installers have gone one step further, formalized by the signature of Solar Innova Letter of Commitment. Having your Solar Innova products installed by an Official Installer, you can enjoy the benefits of your home photovoltaic system with absolute peace of mind.

We want solar energy to be recognized as a prime choice for the generation of electricity and we believe the satisfaction of each and every of our customers is the best way to reach this goal.





INTERNATIONAL OFFICES



EUROPE

SPAIN

Paseo de los Molinos, 12-Bajo

03660 – NOVELDA
Alicante

T: +34 965075767

F: +34 965075767

info@solarinnova.net

ASIA

CHINA

Room A03, No. 333-2
YanXin Road
214174 - WUXI
Jiangsu

T: +34 965075767

F: +34 965075767

info@solarinnova.net

<http://www.solarinnova.net>

