

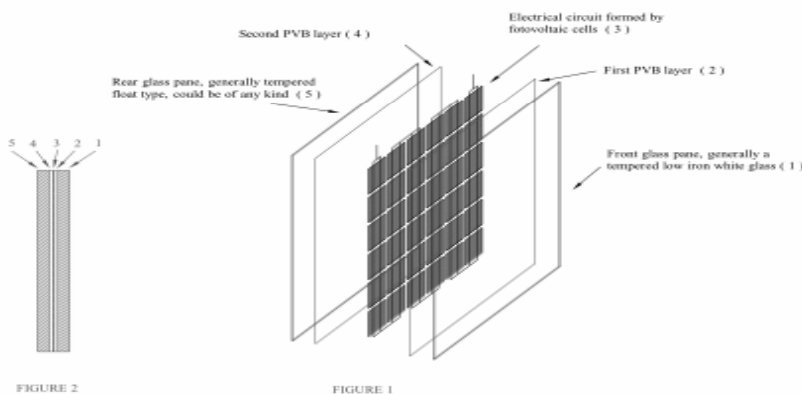


## Construction characteristics

VIDURSOLAR photovoltaic modules comprise two layers of laminated toughened glass, between which the photovoltaic cells are encapsulated. The transparency of the module depends on the distance between the cells. The composition of the VIDURSOLAR photovoltaic module is as follows:

- Front pane: 5mm low iron tempered safety glass with polished edges.
- Interlayer: PVB 2 x 0,76mm for encapsulating the cells.
- Rear pane: 5mm float tempered or semi-tempered security glass with polished edges.

The VIDURSOLAR photovoltaic module offers maximum resistance against breakage and detachment due to the PVB (poliviny butyral) used as the interlayer. This bonding medium is traditionally used in safety glazing for its high performance characteristics in shear and flexibility. VIDURSOLAR photovoltaic modules are especially suited to use in roof glazing applications.



## Electrical characteristics

The design of the electrical performance is carried out in accordance with the client's specifications. Under this process the type of cells, their density and setting out on in the PV module is finalised.

On the data sheet that accompanies the delivered product the following basic electrical data are indicated:

- Nominal power
- MPP current
- MPP voltage
- Short circuit current
- Open circuit voltage
- Temperature coefficients
- Insulation voltage: 1000 V

All the above mentioned data have a tolerance of +/- 5%.





## Design possibilities

The design of VIDURSOLAR photovoltaic elements is project specific and according to the applicable regulations for the support of the glass and the fixing system to be used. The design of the glass for its strength and span should be undertaken by the competent engineer for each project.

VIDURSOLAR PV-modules are custom-made according to the architectural specifications for the project.

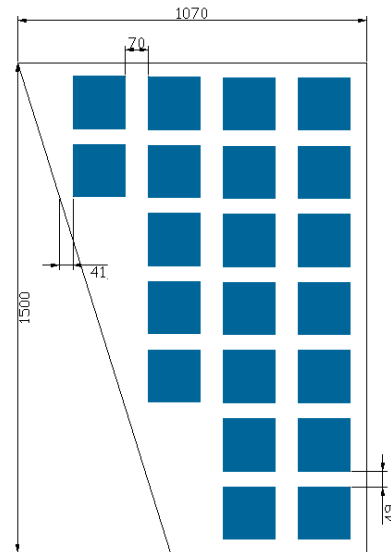
The maximum dimensions for rectangular modules are 160cm x 260cm, the minimum is 22cm x 26cm (one cell with connection). For safety a 30 mm minimum distance between the edge of the module and the cell or electrical tapes applies.

The standard glass thickness is 5mm although 6mm and 8mm can be produced.

The shape of the module is completely flexible, it can be produced as triangular, circular, trapezoidal, etc. It cannot be curved in profile.

To achieve improved thermal and acoustic insulation, a photovoltaic glass can be manufactured as an double glazed unit. Air cavities of 10, 12, 16 or 20mm are available with the inner pane made from a variety of compositions in thickness and design (laminated, low-e, coloured, etc...).

Specially designed PV glass laminates with the front and rear pane of differing dimensions can be produced for structural glazing and other specialist applications.

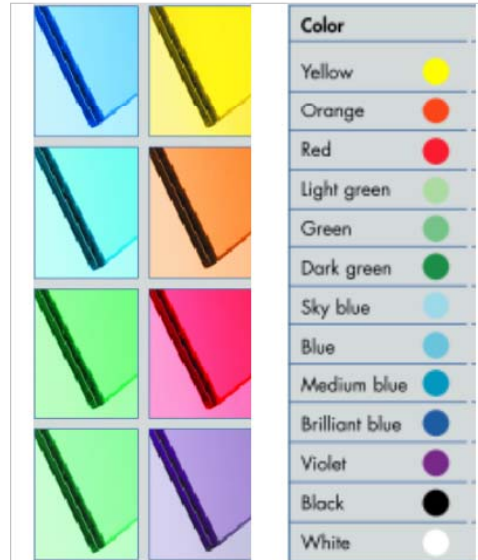




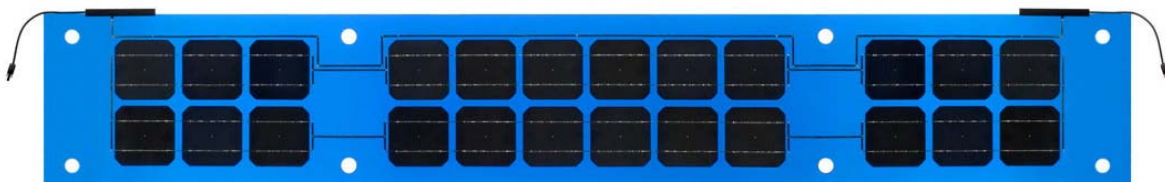
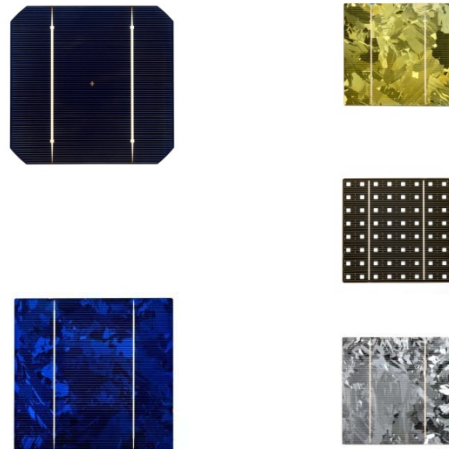
## Design possibilities

VIDURSOLAR offers diversity in creating almost limitless architectural effects by graphical glass treatment or the introduction of coloured interlayers.

- Screen printing on the front, inner or on both glass panes. Combinations of screen-printing and photovoltaic cells and the ability to simulate cells (dummies) by screen-printing in areas where solar radiation does not justify real photovoltaic cells.
- Coloured or acid etching, both with translucent colour interlayers (PVB) or with opaque vitrified enamel.
- Variable cells, poly or mono-crystalline of several colours. Perforated semi-transparent cells that offer intriguing and creative options for the architectural designer.
- The cell size is usually 156mm x 156mm. Coloured or perforated cells are usually of 125mm x 125mm.
- The transparency of the module is dependant upon the degree of solar protection or light transmission that is required. This is achieved by varying the distance between the cells, the cell type or the treatment/type of the inner pane.



Colour range of translucent colour PVB



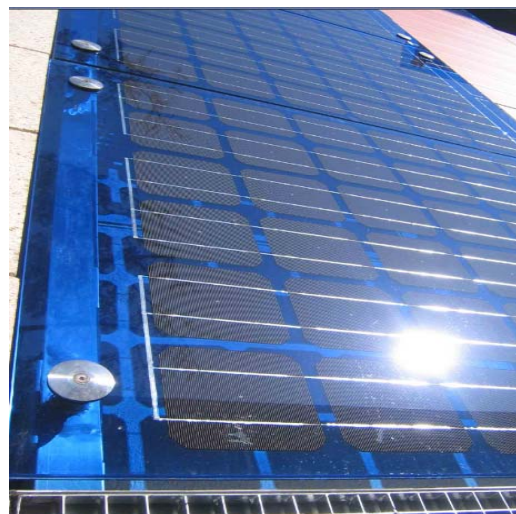


## Design possibilities

For the connection of the individual photovoltaic modules which create the installation, each panel has an electrical connection terminal. In the VIDURSOLAR photovoltaic modules, the location of these terminals is completely flexible and adapted to the needs of the individual project. There are two basic types of electrical terminals:

- A rear junction box fixed to the rear of the glass. The connection between the PV modules is simple and independent of the support system. However the junction box is visible from the inside of the building.
- Where mounting is to be undertaken on a conventional frame an edge terminal can be mounted on the edge of the glass. All cabling is then run within the cavity of the spanning support profile and is not visible.

The PV modules are manufactured according to the support system that is to be used which can include holes for 'spider' support system prepared as specified.







# VIDURSOLAR

## Quality

VIDURSOLAR relies on the large experience of the brand VIDUR in manufacturing tempered and laminated safety glass.

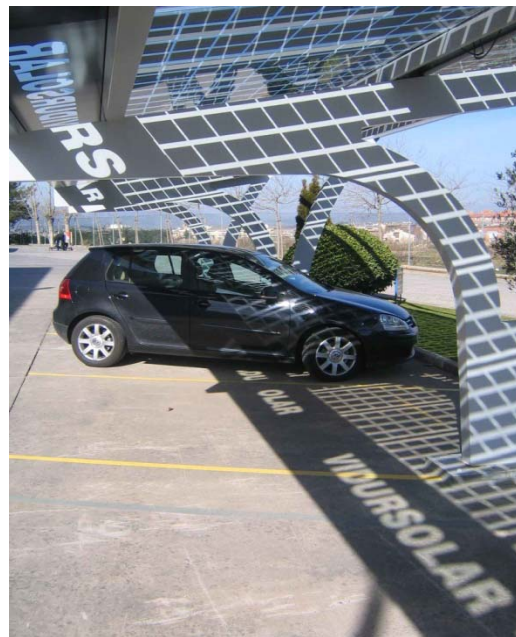
Perfectly controlled high-tech fabrication processes managed according to ISO 9001:2000 guarantee high quality of our products.

Our service is focused on the client in order to satisfy his needs with quick and reliable solutions.



## Norms and certificates

- In compliance with the Spanish electrical low voltage regulation.
- CE marking – construction product. Our modules have passed the tests according to the norm EN 14449 and can be denominated “laminated safety glass”.
- In compliance with norms EN 12150, EN 12600, EN 12543 :1-6.
- Design and production based on the norms EN 61215 and IEC 61730 (certification in process).



## Warranty

VIDURSOLAR photovoltaic elements are covered generally by a warranty of 5 years for fabrication and material defects. A minimum of 80% of the power output is guaranteed for 20 years (warranties of special glasses to be consulted – shapes, insulating units, colour effects, etc. )





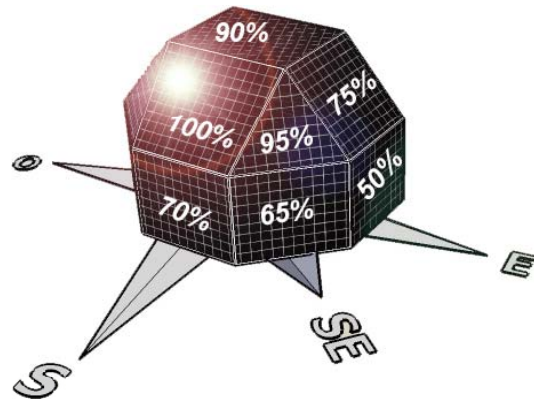
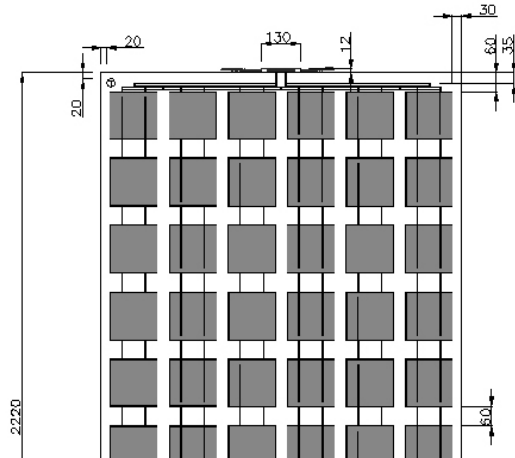
## Planning

The specifications of the modules are prepared according to the client's individual requirements.

VIDURSOLAR offers a comprehensive service in the design and research of global photovoltaic solutions to be used in creating innovative architectural concepts.

For energy output optimisation the inclination and orientation of the PV field must be taken into account and shadows avoided as far as possible.

In addition to generating electrical energy, Photovoltaic glass also embraces a solar protection function as the cells block the direct solar rays thereby reducing significantly the building's thermal gain. The g-value (solar factor) of photovoltaic glass is always identified as it is linked to the transparency of a photovoltaic module and in turn to the power that can be gained.



Percentage of electrical generation with respect to the ideal in Central Europe (100%: inclination 40°, orientation south)

Type	Trasparency	Power per m2	g Factor	Cells/m <sup>2</sup> *
laminated 5+5	10%	120 Wp	0,25	36
air chamber 5+5/12/5			<0,22	
laminated 5+5	30%	90 Wp	0,33	28
air chamber 5+5/12/5			<0,3	
laminated 5+5	50%	70 Wp	0,41	20
air chamber 5+5/12/5			<0,38	

\* 156mm x 156mm cells,approximately

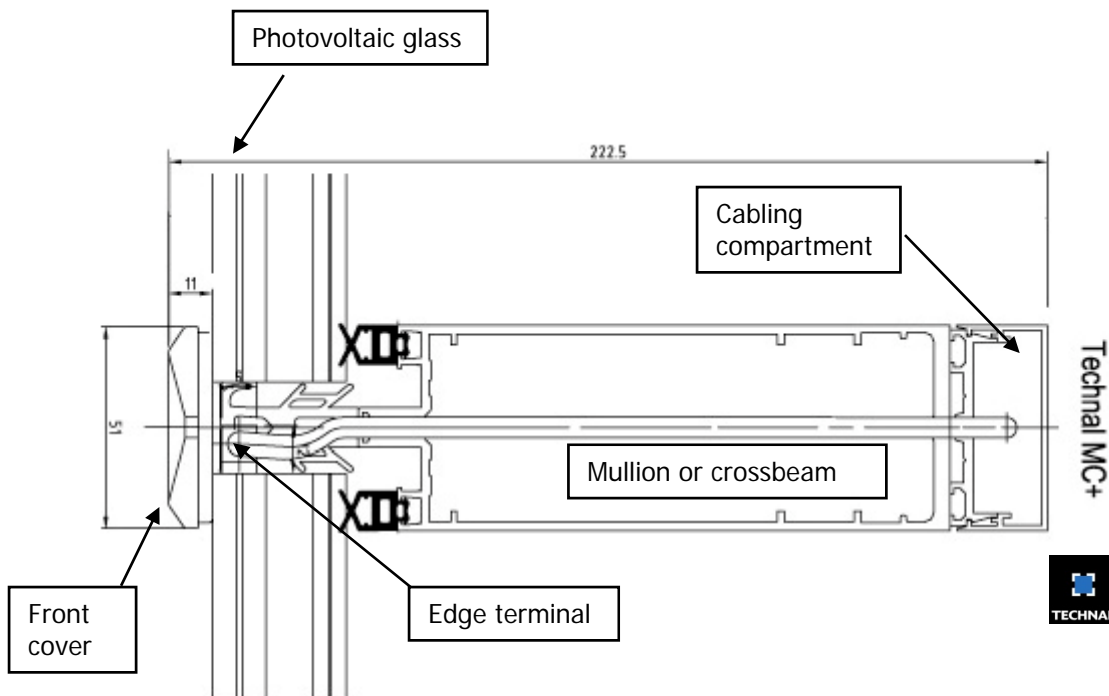
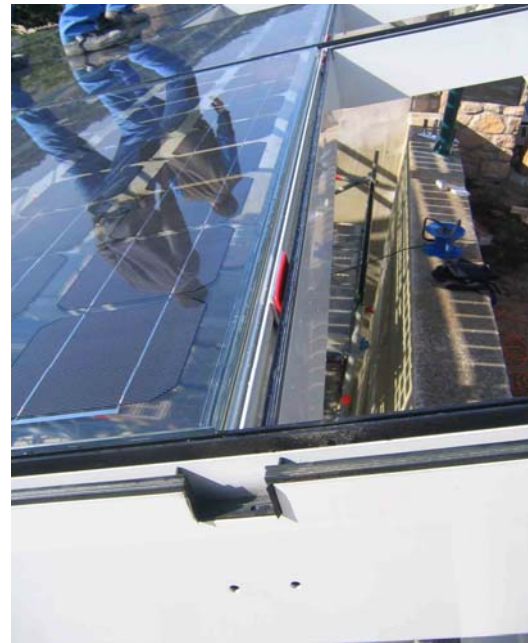


## Installation

VIDURSOLAR photovoltaic elements are suitable for mounting in any traditional glazed façade or roofing system, either by linear fixing or by point fixing with spider systems or similar.

Furthermore, they are installed as any conventional glazing unit, taking into account the norms and safety measures applicable to construction glass mounting.

The coordination of the cabling and electrical connection of the photovoltaic glasses have to be taken into account.





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