

ICOSUN[®] an eco-activ^e solution



Low profile and lightweight

No roof penetration or supporting framework

Secure installation

Flexible amorphous silicon technology

Low light operation

Energy from a natural resource

Aesthetic roofs with PV elements

It is estimated that every hour there is enough solar energy falling onto the Earth to fulfill the annual energy demand of the world! Flat roof construction and the development of flexible thin film photovoltaic (PV) laminates provide the ideal combination for harnessing this energy from currently unutilised roof space in a discreet and secure method providing both long term energy production and waterproofing performance.

Feed In Tariffs (FITs)

From April 2010, the government introduced a system of feed-in-tariffs (FIT's) to incentivise small scale, low carbon electricity generation by providing "clean energy cash back" for householders, communities and businesses.

FIT's will consist of two elements of payment made to the "generators" of the electricity and paid by the licensed electricity suppliers:

- **Generation Tariff** – paid for every kilowatt hour (kWh) of electricity generated, and paid regardless of whether the electricity is used on site or exported back to the local electricity network.

- **Export Tariff** – metered electricity generated and sold back to the local "electricity supplier" either at a guaranteed rate or alternatively sold on the open market.

Additional savings will be made as the energy generated can be utilised within the building and will therefore not have to be purchased from the local electricity supplier.

Advantages of ICOSUN®

- **Lightweight and Low Profile** – ICOSUN® PVL modules weigh less than 5kg/m² and because they are bonded directly to the waterproof membrane, have an extremely low profile meaning that they are not visible above the roof line and also provide little wind

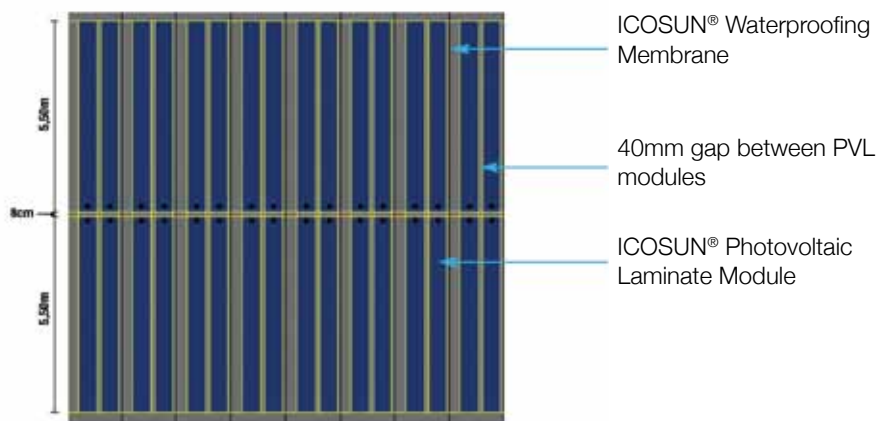
resistance in exposed locations.

- **No Roof Penetrations from Supporting Framework** – there is no need to penetrate the waterproofing membrane or to have any supporting framework, which could otherwise lead to imposed roof loading and water ingress issues over time.

- **Simple and Secure Installation** – the ICOSUN® system allows the waterproofing membrane to be fully installed first and the PVL modules are easily bonded into position as a secondary operation. This process allows the installer to work in such a way that he does not need to work over the top of the PVL modules risking damage and has the security of a fully sealed and waterproof roof beneath.

- **Flexible Thin Film Amorphous Silicon Technology** – the durable





Typical Layout of the ICOSUN® system



PVL module uses flexible laminate technology which allows it to follow the shape of the roof making it ideal for most situations including barrel roofs.

- **Low Light Operation** – multi layer cell design allows ICOSUN® PVL modules to work more efficiently at lower light levels without the need to be oriented towards the sun. They are also less affected by fluctuations in temperature.

Waterproofing System

- **UV resistant polyolefine modified bitumen membranes**
- **Smooth surface for optimum bonding between cells and membrane**
- **High mechanical resistance**

The UV resistant Icopal waterproofing

membrane is made from a polyolefine and bitumen compound with a complex dimensionally stable polyester/glass reinforcement providing high mechanical resistance and stability. The smooth upper surface of the membrane allows for optimum bonding of the PVL modules. Systems can be supplied as a single layer or multiple layer build up determined by the waterproofing guarantee required. The ICOSUN® Top S membrane is supplied in lengths of 6m and 11.60m specifically to suit the PVL modules.

Membranes

ICOSUN® Membranes can be applied as one or two layer systems on all of flat or sloping roof types and are suitable for new construction and refurbishment.

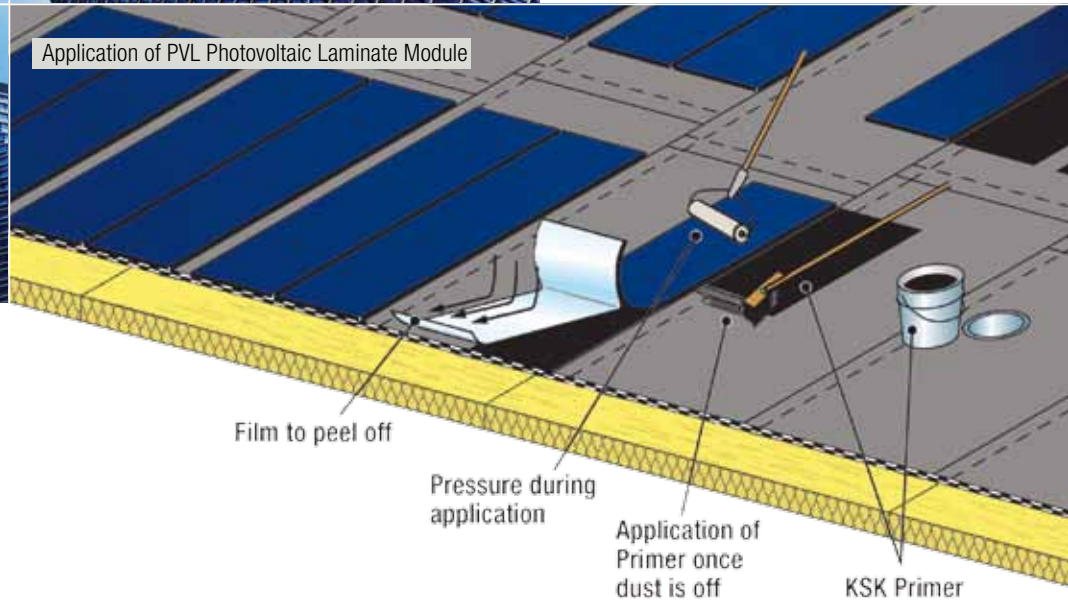
- **ICOSUN® Top S** – polyolefine modified bitumen torch applied capsheet.
- **ICOSUN® Base FM** – polyolefine modified bitumen underlay specifically designed for mechanical fixing.
- **ICOSUN® Universal ZK** – a self adhesive / heat activated polyolefine modified bitumen membrane for use as a single layer or as a capsheet in a built up system with hot air welded laps.
- **ICOSUN® Universal** – a fully adhered single layer polyolefine modified bitumen membrane bonded with Icopal spray applied adhesive and hot air welded laps.

Accessories

- **WM20 Wings** – supporting base for raceway, including fins to protect connection terminals.

Sold in boxes of 60 units





- **WM20 Raceway** – extruded PVC duct and cover.

Sold separately in 6m lengths

- **KSK Primer** – applied to surface of ICOSUN® membrane before application of PVL modules.

Sold in a 4.5litre tin.

- **WM20 Glue** – nitril rubber based glue to secure WM20 base channel to ICOSUN® waterproofing membrane.

600ml cartridges sold in boxes of 12.

Important points to consider during Specification and Installation

- Roof slope should be designed to 1:40 minimum to ensure no ponding water and effective cleaning of the PVL modules.
- Maximum roof slope 40 degrees.

- Plan the location of the PVL modules to avoid shade from upstands, chimneys, nearby buildings, trees etc.
- Define the energy scheme based upon the usable roof space available.
- In retrofit situations ensure stability and rigidity of the existing waterproofing system.

Flexible ICOSUN® pololefine modified bitumen waterproofing.



Icopal technical services are on hand to assist by checking your plans or to carry out roof condition surveys and PVL assessments for you.



ICOSUN® an eco-activ solution



How do Photovoltaic Cells (PV's) Work?

Photovoltaic cells convert light from the sun into electricity. In the presence of sunlight an electric field is created between two oppositely charged semi-conductors, which cause a Direct Current (DC) of electricity to flow. The greater the light intensity, the greater the flow of electricity. The Direct Current is then converted using an inverter to produce Alternating Current (AC) which can either be used immediately, or sold back to the National Grid.

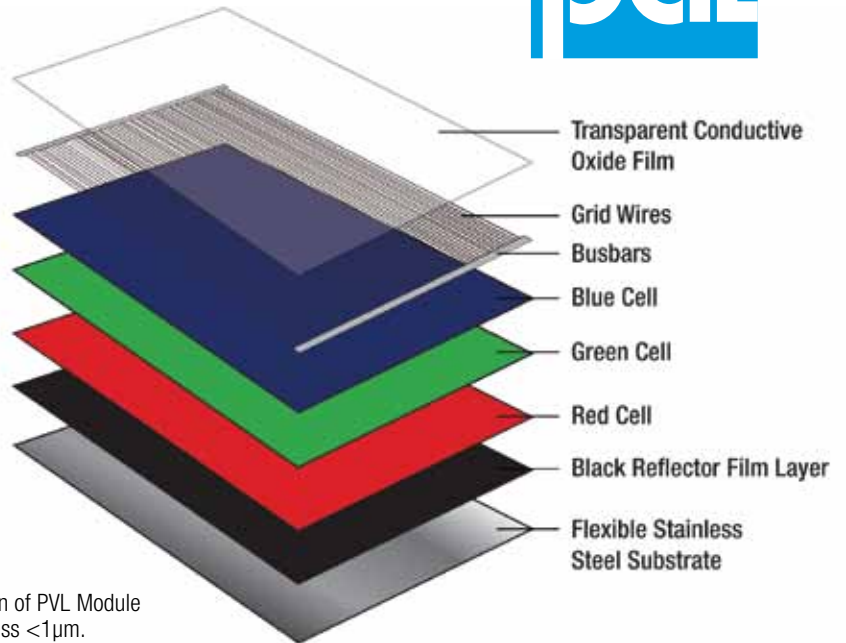
ICOSUN® – PVL Photovoltaic Laminate Module

- Suitable for all roof types
- Self cleaning cells
- High energy yield

The ICOSUN® PVL module consists of a flexible, thin-film amorphous-silicon photovoltaic cell which has the ability to generate electricity with low levels of natural light compared to rigid cell systems.

It is also able to work more efficiently at higher temperatures and follow the shape and form of the roof structure.

WM20 Raceway



Cross section of PVL Module
Total thickness <math>< 1\mu\text{m}</math>.

Application

The PVL module has a self adhesive underside which is easily and securely bonded to the surface of the primed ICOSUN® membranes.

- **Maximum Power Output (Pmax)**
PVL136 - 136W and PVL144 - 144W
- **Production tolerance +/- 5%**
- **Roll Weight 7.7kg**
- **Roll Length 5.486m**
- **Roll Width 0.394m**

Technical data

- **20 Year Warranty on Power Output at 80%**
- **High Temperature and Low Light Performance**

Based upon UK average conditions 1sq.m of ICOSUN® PVL Module can produce 45-55 kWh/yr.

Examples of installation			
Type of PVL module	Installation	Operating power	Dimensions of Icosun Top S waterproofing membrane
2 PVL 136 or 2 PVL 144		272 Wc** or 288 Wc*	1 m x 6 m
4 PVL 136 or 4 PVL 144		544 Wc** or 576 Wc*	1 m x 11,60 m

*Laminating of 3 cell-layers - **Measuring unit of the operating power (Watt peak value).

Icopal, founded in 1876, operates worldwide and has 35 production facilities and more than 90 offices in Europe, North America and Asia, Icopal is Europe's leading manufacturer of products for the protection and waterproofing of building constructions, particularly roofing materials and waterproof membranes.



Inspiration
Motivation
Creation