Durable, energy efficient photovoltaic roofing systems
IKO is a worldwide group of companies with extensive experience and specialist technical knowledge.

IKO is a leader in the design, manufacture and installation of proven roofing and waterproofing systems.

The IKO Group was founded in 1952 in Calgary, Canada and offers customers across international markets a comprehensive range of waterproofing, roofing and insulation materials.

- A global leader in the manufacture and supply of waterproofing and insulation
- Customers in more than 70 countries
- Over 30 factories worldwide.

IKO Europe
- Established as a leading roofing, waterproofing and insulation supplier in Europe
- Factories in the UK, Ireland, Belgium, France, Holland and Slovakia
- Distribution centres and sales offices in Germany, Poland, Czech Republic, Slovakia, Hungary, Romania, Ukraine and Russia.

Continued success
At IKO, we believe that the foundation for continued success and longevity of our company is based on several key attributes:

- The knowledge of our people
- Top quality products
- Outstanding customer service
- Continuous innovation
- Excellence in manufacturing.

Our mission is to further strengthen and expand our offer through continuous development, innovation and technological advancement. We strive to remain the first choice for architects, specifiers and installing contractors throughout the world into future generations.

IKO in Europe
Why specify IKO solar?

A changing world
As the world pays more attention to the damage being caused by burning fossil fuels, renewable sources of energy, such as solar power, are becoming increasingly popular.

Photovoltaic (PV) roofing systems convert natural sunlight energy into electrical current. In recent years, rapid advances in technology have enabled photovoltaic systems to be produced which are both more efficient and less expensive. These trends are making high performance, cost-effective photovoltaic roofing solutions more accessible than ever before.

IKO Solar energy roofs - beyond simply waterproofing
The IKO Solar roof offers far more than just durable waterproofing protection for the building beneath it. It also plays a crucial role in energy generation and conservation.

IKO Solar provides the building owner with an attractive opportunity to create clean, renewable electricity that can be either utilised by the building itself, or sold back into the national grid for a return on investment.

Peace of mind from the name you can trust
As market leaders in roofing and waterproofing solutions, IKO is dedicated to providing specifiers and building owners with an unrivalled choice of innovative roofing solutions.

IKO has carefully selected four powerful photovoltaic systems to perfectly complement its leading range of roof waterproofing membranes.

IKO Solar systems include solutions for both new build and refurbishment applications and offer some of the most efficient energy production available in the market today.

Supporting your commitment to environmental responsibility
By investing in an IKO Solar energy roof and by taking measures to avoid wasting energy and water, you will set an important example to both your personnel and the community in which you operate. This will demonstrate that social responsibility and care for the environment are not simply hollow concepts within your organisation.
Feed-in tariffs

New government legislation has recently been introduced to offer an incentive for domestic and non-domestic property owners to change from traditional fossil fuels to renewable energy sources.

The feed-in tariff system has been introduced by the Department of Energy and Climate Change for solar installations up to 5MW, with a minimum lifetime of 25 years. More commonly called the ‘clean energy cash back scheme’, the feed-in tariff will give domestic and non-domestic users a payment per every kWh of energy generated by a photovoltaic installation.

As a further incentive, an additional payment of 3p per kWh will also be made to users whenever electricity is exported back to the Grid.

The scale of the incentive for solar PV is dependent on the size of the system, whether it is a new build or retro-fitted and whether it is building-integrated or stand alone. Furthermore, feed-in tariffs are only offered on MCS-accredited PV systems which have been fitted by an MCS accredited installer. All of IKO’s PV systems provide this important peace of mind.

Tariff levels for solar PV will apply for 25 years and are shown in the below table.

Feed-in tariffs applicable to photovoltaic roof installations

<table>
<thead>
<tr>
<th>Scale tariff*</th>
<th>Level for new installations in period (p/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.4.10 to 31.3.11</td>
</tr>
<tr>
<td>4 kW (new build)</td>
<td>36.1</td>
</tr>
<tr>
<td>4 kW (retrofit)</td>
<td>41.3</td>
</tr>
<tr>
<td>&gt;4-10 kW</td>
<td>36.1</td>
</tr>
<tr>
<td>&gt;10-100 kW</td>
<td>31.4</td>
</tr>
<tr>
<td>&gt;100 kW-5 MW</td>
<td>29.3</td>
</tr>
</tbody>
</table>

*Tariffs will be inflated annually

The scheme will be reviewed after March 2013
Roof engineering: phased plan

Phase 1
IKO approaches every project from the perspective of a sound, waterproof roof foundation. This is necessary in order to be able to guarantee a solid basis for your investment.
A. Audit of the physical construction features of the building and, more specifically, the roof. Existing roofs will be thoroughly inspected. A roof assessment is an essential component of the audit.
B. Preliminary study of the energy consumption of the building (Optional).

Phase 2
All the elements that make up the roofing system are seamlessly integrated, and you will only need a single contact person for the entire roofing package.
You will receive a complete file with specifications, layout plan and output calculations. The IKO roof engineering team will supervise the project and manage the file.

Phase 3
IKO provides a 20-year guarantee on the design, product and installation of the roofing system.
A. Guarantee for the installation of the roof waterproofing system. It is always essential to consult an IKO accredited contractor when carrying out work on the roof.
The installation is carried out by authorised roofers. The roof expert is the one person who has an overview of the complexity of the waterproofing and the installation of the insulation, and his expertise will minimise the risk of damaging the roof.
The site follow-up and site inspections offer additional security.
B. Guarantee on the installation of the solar modules. The installation of the modules will only be carried out by trained and authorised installers.

Phase 4
Through IKO’s supply chain partners, you will receive a guarantee that the system will still yield a minimum of 80% of the rated output after 20 years of service*. Acceptance and commissioning of the energy roof.
Finally, MCS accredited contractors will make the necessary connections and put the system into operation.
* Subject to proven maintenance being carried out.

Example of IKO Solar payback period – return on investment
IKO Solar F - flexible, lightweight system

1. **IKO Solar F thin-film modules**
IKO Solar F is a thin-film photovoltaic module comprising of amorphous silicon (a-Si) in the form of a flexible strip that is adhered horizontally onto the waterproofing system. This system is typically installed onto roofs with a pitch of at least 3°.

2. **Your choice of IKO waterproofing system**
Spectraplan TPE is a single ply membrane with a unique formulation containing both thermoplastic (TP) and elastomeric (E) properties. It is durable, environmentally friendly and offers flame-free application as membrane laps are homogenously welded using hot air.

IKO reflect is a heat and sunlight-reflecting white bituminous roofing membrane which helps to reduce temperature fluctuations on the roof. The white top layer creates an additional light halo above and below the IKO Solar PV system, thereby increasing the efficiency and performance.

The white PU coating also allows rain water to be used for sanitary purposes and garden irrigation.

IKO Polimar is a liquid applied roofing system. It is cold-applied, seamless and provides a lasting barrier to water penetration. IKO Polimar systems do not embrittle, are highly resistant to sunlight and are suitable for a wide range of roofing applications.

Dimensions (per unit)
Length: 5500mm
Width: 400mm

Weight (per module)
Approx 3.5kg/m²

Performance Characteristics (twin-module)
Rated Power (Pmax): 288Wp
Production Tolerance: ± 5%

Standards
UL 1703 Listed to 600 VDC
Meets IEC 61646 requirements

3. **IKO Enertherm PIR insulation**
With its lambda value of up to 0.023W/mK, IKO Enertherm is a highly thermally efficient board that stands out from other insulation materials.

Enertherm is a fire resistant insulation that does not melt. The light, but highly compression-resistant board provides the roof with additional rigidity and accessibility. Regular checks and maintenance on the roof can therefore be carried out in safety.
Features and benefits of IKO Solar F

**Lightweight, versatile system**
Thanks to a weight of only 3.5 kg/m², IKO Solar F modules can be fitted to all types of roofs. They are suitable for light steel roof constructions, large span areas and renovations, and do not require any ballast or secondary fixation.

The low weight of the IKO Solar F modules allows for simple integration into the desired project without requiring considerable modifications to either the roof construction or to the building itself.

**Performs well in low light areas**
The triple-junction technology that enables the modules to capture the red, green and blue light spectra makes the collection of both direct sunlight and diffuse light possible. This results in a better output where there is weaker light incidence, shading, clouding or soiling, or if the positioning of the modules is not quite ideal. As a result of the finely meshed structure of the ‘bypass’ diodes, no current interruptions will occur if an individual cell breaks down.

**No roof penetrations required**
The installation of IKO Solar F modules does not require either ballast or roof penetrations that could be potentially damaging to the waterproofing system.

Furthermore, the system is only ever installed by IKO certified roofers. Their extensive waterproofing knowledge and respect for the roofing membrane will help to ensure a successful and long operating life for your investment.

**Adhered flat onto the roof surface**
IKO Solar F modules integrate discreetly with the building and its environment. The architectural appearance of the building does not change, and there is no need for an additional building permit.

As the modules are installed flat onto the roof sheeting, they are not susceptible to problems associated with high winds. This is of particular benefit for high buildings, or for roofs situated in coastal areas.

**Additional protection for the roof**
IKO Solar F modules are all weather resistant and dirt-repellent. This makes them ideal for re-using grey water for sanitary purposes and garden irrigation.

In addition the durable, transparent polymer layer contributes directly to the fire resistance of the roof, and also provides additional protection against mechanical damage to the waterproofing membrane (e.g. hail).

Another advantage of being installed flat onto the roof surface is that the effective PV module area is also considerably higher, as no areas are shaded by vertical panels. In this way, an optimum power output can be attained per square metre of roof covered.

Introducing IKO Solar M – Ideal for Retro-Fit Applications

The IKO Solar M system consists of IKO Solar F modules applied to an aluminium plate canted by 11 degrees.

This lightweight system is ideal for retro-fit applications, and can be mounted onto most common waterproofing membranes using an innovative and patented butt-strap joint system.

- No roof penetrations
- Minimal surface load (6kg/m²)
- System inclination of 11°
- Fast installation
- Ideal for retro-fit and large industrial roofs
IKO Solar T – Efficient Cylindrical Elements

1. **IKO Solar T cylindrical PV elements**
   IKO Solar T comprises thin-film cylindrical PV elements (CIGS) which are loose laid onto the roof. The system comes with all of the mounts, grounding connectors, lateral clips, and fasteners required to build a standard array.

2. **Your choice of IKO waterproofing system**
   **Spectraplan TPE** is a single ply membrane with a unique formulation containing both thermoplastic (TP) and elastomeric (E) properties. It is durable, environmentally friendly and offers flame-free application as membrane laps are homogenously welded using hot air.

   **IKO reflect** is a heat and sunlight-reflecting white bituminous roofing membrane which helps to reduce temperature fluctuations on the roof. The white top layer creates an additional light halo above and below the IKO Solar PV system, thereby increasing the efficiency and performance.

3. **IKO Enertherm PIR insulation**
   The white PU coating also allows rain water to be used for sanitary purposes and garden irrigation.

   **IKO Polimar** is a liquid applied roofing system. It is cold-applied, seamless and provides a lasting barrier to water penetration. IKO Polimar systems do not embrittle, are highly resistant to sunlight and are suitable for a wide range of roofing applications.

   **Permaphalt** polymer modified asphalt with a solar reflective coating finish is a proven, durable waterproofing system which can integrate perfectly with the IKO Solar T System.

   Enertherm is a fire resistant insulation that does not melt. The light, but highly compression-resistant board provides the roof with additional rigidity and accessibility. Regular checks and maintenance on the roof can therefore be carried out in safety.

   **Dimensions (per unit)**
   - Length: 1800mm
   - Width: 1200mm

   **Weight (per unit)**
   - Approx 16kg/m²

   **Performance characteristics**
   - Rated Power (Pmax): 173-182Wp
   - Production Tolerance: ± 4%

   **Standards**
   - UL 1703 Listed to 600 VDC
   - Meets IEC 61646 requirements
Features and benefits of IKO Solar T

High efficiency per m²
The IKO Solar T system has been specifically developed to optimise the photovoltaic capacity of flat reflecting roofs. IKO roofing membranes reflect up to 90% of the solar radiation, thereby maximising the efficiency of the photovoltaic installation by more than 20%.

IKO Solar T even captures diffused light when the weather is cloudy.

Does not damage your roof
The IKO solar T elements are installed loose onto the reflecting roof surface. As a result, no roof penetrations or heavy ballast are required, and there are no wind load issues. This considered approach helps protect the roof waterproofing system, ensuring that your investment benefits from a long service life.

Maximum rooftop coverage
Unlike some other systems, IKO Solar T achieves effective energy generation even when mounted horizontally and spaced closely together. This application makes it possible to double the amount of roof surface that can be covered.

Furthermore, a partially-shaded panel still generates electricity from the unshaded modules.

The IKO Solar F system is particularly suitable for smaller, more awkward shaped roofs. Its PV elements work well around roof obstacles and over obstructions such as cables, whilst also providing quick and easy access for rooftop maintenance.

Long lasting performance
IKO Solar T elements are hermetically sealed and designed to reliably produce power for more than 25 years. For additional piece of mind, there is a gas-leak tight glass-to-metal seal at the ends of each element to prevent cell degradation due to moisture.

Keep panels and roofs cooler
IKO Solar T allows natural air circulation through its cylindrical elements, reducing the temperature of the installation and improving its overall energy efficiency.

Furthermore, as hot air cannot be trapped against the roof surface, the IKO Solar T system can reduce temperature fluctuations of the roof, and contribute towards the internal comfort of the building.

Quick and easy to install
The entire IKO Solar T system is delivered in one package, and can be installed quickly and easily. This eliminates the need for expensive labour costs and also ensures that roofing works can be completed quickly with minimal disruption.

A further benefit is that the system can be installed independently of the waterproofing membrane, and in virtually all weather.
IKO Solar X – Versatile Crystalline Panel

1. **IKO Solar X PV panels**
   The IKO Solar X system consists of high performance crystalline panels which are securely weighted down using ballast. The panels are positioned in a frame which is engineered with drainage holes and grounding hole on four sides.

2. **Your choice of IKO waterproofing system**
   **Spectraplan TPE** is a single ply membrane with a unique formulation containing both thermoplastic (TP) and elastomeric (E) properties. It is durable, environmentally friendly and offers flame-free application as membrane laps are homogenously welded using hot air.

   **IKO reflect** is a heat and sunlight-reflecting white bituminous roofing membrane which helps to reduce temperature fluctuations on the roof. The white top layer creates an additional light halo above and below the IKO Solar PV system, thereby increasing the efficiency and performance.

3. **IKO Enertherm PIR insulation**
   With its lambda value of up to 0.023W/mK, IKO Enertherm is a highly thermally efficient board that stands out from other insulation materials.

   Enertherm is a fire resistant insulation that does not melt. The light, but highly compression-resistant board provides the roof with additional rigidity and accessibility. Regular checks and maintenance on the roof can therefore be carried out in safety.

**Dimensions (per unit)**
- Length: 1640mm
- Width: 992mm
- Depth: 50mm

**Weight (per module)**
- Approx 23kg/m²

**Performance Characteristics**
- Rated Power (Pmax): 230Wp
- Production Tolerance: -1%/+3%

**Standards**
- UL 1703 Listed to 600 VDC
- Meets IEC 61215 requirements
Features and benefits of IKO Solar X

**Exceptional power output**
The high quality manufacture of IKO Solar X helps ensure long-term, reliable performance. The panels utilise crystalline, high-efficiency silicon cells in an optimal configuration to yield a higher power output per module. This helps optimise use of available solar energy, quickly maximising your return on investment.

**Cost-effective PV solution**
In addition to offering efficient energy generation, installation costs for IKO Solar X are also considerably lower than for many other photovoltaic systems. To secure a rooftop array with ballast, aluminium profiles can be quickly and easily clicked into the specially formed recess. This makes the IKO Solar X system both highly effective and truly affordable.

**High wind resistance**
Thanks to its unique aerodynamic design, IKO Solar X can be secured with as little as 20kg ballast per m2, and can withstand high wind loads with tilt up to 30°.

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**Versatile applications**
IKO Solar X crystalline panels are ideally suited to large roof constructions where the roofing membrane is either new or recently applied.

However, thanks to its versatility, the IKO Solar X system is also suitable for retro-fit applications and can be installed onto virtually any type of roof waterproofing membrane.

**Aesthetically pleasing finish**
The dark blue appearance of IKO Solar X cells, combined with the stylish aluminium module frames, allow the system to blend in with the building’s architecture and complement the aesthetics of the overall roof finish.

**Proven track record**
Crystalline panels such as IKO Solar X have been used on many successful projects around the world. And, as with all of IKO’s photovoltaic systems, IKO Solar X is only installed by trained and accredited installers.

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**High quality manufacture**
IKO Solar X is made using high quality materials, including high performance EVA, triple-layer back sheet and high transparency, low-iron impact-resistant tempered glass.

The system has also been rigorously tested to withstand the harshest weather conditions, including hail, ice and extreme heat.

The durability and longevity of the IKO Solar X system is comparable to virtually any other photovoltaic system in the market. Their lifespan is in excess of 25 years, and upon completion of the installation a warranty is issued guaranteeing at least 80% power output for 25 years,

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For more information, visit [www.ikogroup.co.uk](http://www.ikogroup.co.uk).
Durable, sustainable waterproofing: a solid basis for your solar investment

Installing energy-saving and energy-generating systems on a roof give it added value. Effectively the roof ‘works harder’ and becomes more than just a waterproof covering.

However an energy-saving roof does not solely consist of the photovoltaic panels – these are just one element. All building materials and components should complement each other, as well as harmonise with the structure itself. Important considerations include the roof’s function, the installation method and the service life, as well as meeting regulations for thermal performance, fire integrity and reflective capacity.

IKO is proud to be able to offer the widest range of waterproofing options which are suitable for use with photovoltaic systems.

Spectraplan TPE and IKO Polimar are versatile waterproofing solutions which can be used with any of the IKO Solar systems. In addition, Permaphalt polymer modified mastic asphalt with solar reflective paint finish is ideally suited for use with IKO Solar T and IKO Solar X, particularly in retro-fit situations.

Hard-wearing ECO single ply membrane.
- Environmentally-friendly and recyclable
- Compatible with many other types of roof coverings
- High service-life expectations and high resistance against wind loads
- Clean rain water discharge
- Roll dimensions 20m x 2.05m, thickness 1.2mm
- Weight 1.3kg/m²

IKO Solar

Durable, heat-reflecting white bituminous roofing system.
- Heat-reflecting, aesthetic, energy-saving and hard-wearing waterproof roofing sheet
- Increases the thermal comfort of the building
- Increased durability of the roofing package due to the temperature reduction
- Excellent solar reflectivity (81.5%)
- Roll dimensions 6.5m x 1.0m, thickness 3.0mm
- Weight 4.0kg/m²

IKO Reflect

High performance liquid applied waterproofing system.
- Extremely versatile, cold applied and seamless waterproofing
- Rapid, clean and safe installation
- Reduced levels of fumes, CO₂ emissions and noise
- Outstanding solar reflectivity (82.0%)
- Finished membrane thickness 2mm
- Weight 2.75kg/m²

IKO Polimar
IKO roofs - working in harmony with nature

IKO is committed to the environment and is at the forefront in developing sustainable and energy-saving products for the construction industry.

Through its global investment in research and development, IKO is proud to offer its sustainable roof engineering concept, which embraces a range of innovative solutions that blend perfectly with its market-leading waterproofing systems:

- Photovoltaic roof systems that harness the power of the sun and natural daylight to provide clean, renewable energy.
- Innovative roof garden systems that enhance aesthetics, improve air quality and help control storm water run-off.
- Eco-friendly PIR insulation offering outstanding thermal properties and increased comfort for the building occupants.

Energy Roofs • Living Roofs • Active Roofs
Which IKO Solar photovoltaic system is right for me?

The IKO Solar range comprises of four carefully selected photovoltaic energy roof options which each have their own unique characteristics.

When selecting the right IKO Solar solution for your project, there are a number of important design considerations that must be taken into account. For example, some systems are better suited to retro-fit than others, the minimum roof area required may vary and the type of deck construction will have a bearing on the maximum loading weight that can be designed in.

The table below highlights the main factors that should be taken into account, and details how each of the IKO Solar systems compare. For further guidance on system selection please contact our Technical Services Team on 0844 412 7228.

<table>
<thead>
<tr>
<th>Lightweight roof structures</th>
<th>IKO Solar F</th>
<th>IKO Solar T</th>
<th>IKO Solar M</th>
<th>IKO Solar X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low pitch roof/</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>high risk of standing water</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Building orientation critical</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Minimum roof area</td>
<td>&gt;400</td>
<td>&gt;50</td>
<td>&gt;400</td>
<td>&gt;300</td>
</tr>
<tr>
<td>Attachment method</td>
<td>Adhered to</td>
<td>Loose laid</td>
<td>Loose laid and secured with membrane strap</td>
<td>Loose laid</td>
</tr>
<tr>
<td>Weight (kg/m2)</td>
<td>3.5</td>
<td>16</td>
<td>6</td>
<td>10/23</td>
</tr>
<tr>
<td>PV technology</td>
<td>Thin film (a-Si)</td>
<td>Thin film (CIGs)</td>
<td>Thin film (a-Si)</td>
<td>CHRY (Poly/Mono)</td>
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<tr>
<td>Allowance needed for shadowing</td>
<td>N/A</td>
<td>N/A</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Suitability for retro-fit</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Which system will perform the best?

Each IKO Solar photovoltaic option has distinct benefits to offer in terms of electrical output. IKO Solar F and IKO Solar M utilise triple-junction technology which allows for better energy generation in low light conditions, and enables the system to perform effectively over a longer period of time during the day. Meanwhile, the cylindrical design of IKO Solar T and the high efficiency crystalline cells utilised by IKO Solar X enable these two systems to provide a higher Watt Peak output during main sunlight hours.
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