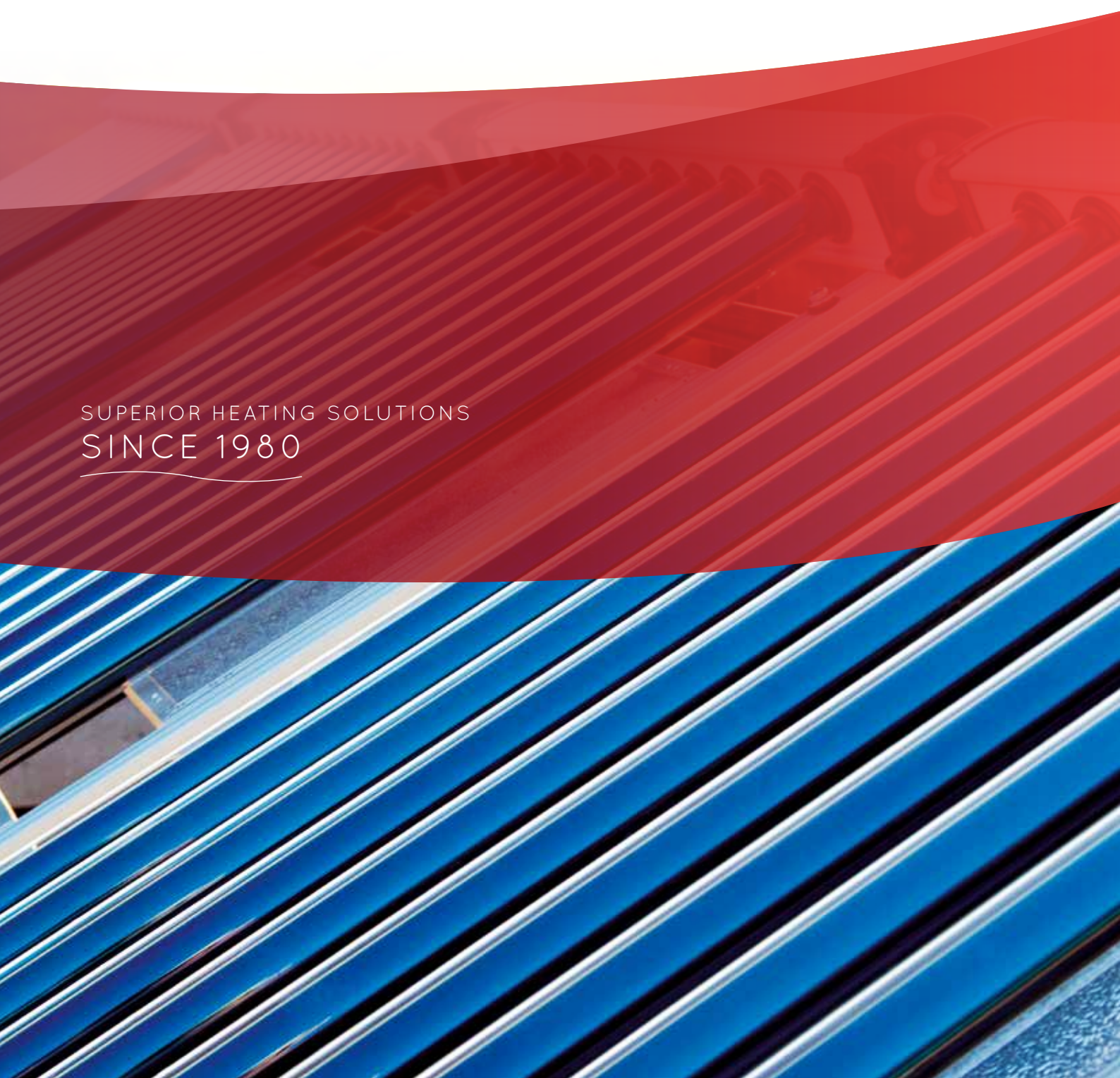


Envirosol™

Flat Panel & Heat Pipe Solar Thermal Systems

SUPERIOR HEATING SOLUTIONS
SINCE 1980



Firebird

Firebird Products Ltd are market-leading manufacturers of heating products with a proven track record built on the global supply of heating systems. Established in Ireland in 1980, the Firebird name has become synonymous with performance, quality and innovative design.

At the forefront of technology, Firebird are committed to providing cost-effective, energy-efficient heating solutions that not only meet, but easily exceed today's stringent legislative requirements. Historically an oil-fired boiler manufacturer, the product range has been expanded to include air source heat pumps, biomass boilers & stoves, solar thermal systems and under floor heating systems.

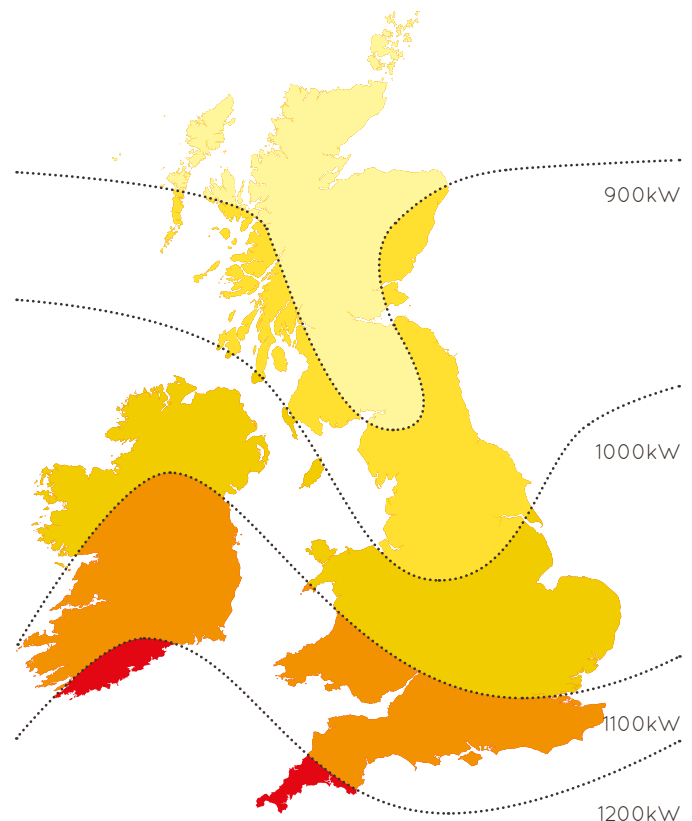
Solar Thermal Systems

Solar thermal systems work on the basis of transforming solar irradiation into heat (solar gain) which is used to provide free hot water or space heating. As solar irradiation is absorbed from both direct sunlight (40%) and diffuse sunlight (60%), a solar thermal system is perfectly suited to the British climate as it will produce energy, even on cloudy and cold days.

A solar thermal system can work independently if there is sufficient solar gain, but also has the flexibility to work in conjunction with another heat source when solar gain is reduced.

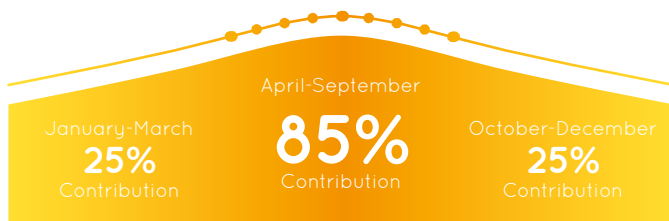
The Benefits

- Cost-effective water heating option – provides a good return on investment
- Reduces energy bills
- Can provide up to 60% of domestic hot water annually
- Idea for the UK climate – absorbs solar gain even on cloudy days
- Eligible for domestic RHI payments
- Zero emissions renewable heating solution – reduces carbon footprint
- The easiest renewable technology to integrate with an existing heating system
- Hybrid options available with Firebird boilers & Air Source Heat Pumps
- Low maintenance
- Suitable for new build and renovation projects
- On-roof, in-roof and flat roof mounting options
- Flat panel and heat pipe solar collector options
- Established renewable technology
- 5-year warranty*
- MCS approved



Domestic Hot Water Heating

A solar thermal system can deliver up to 60% of the annual domestic hot water requirements for the average UK household. This renewable energy source not only reduces energy bills and dependence on fossil fuels, but ultimately a property's carbon footprint – saving in excess of a tonne of carbon dioxide (CO₂) per annum.



- During the summer months a solar thermal system can produce most, or all of the domestic hot water required.
- In spring and autumn, solar thermal systems can significantly reduce the amount of energy required for water heating by partially heating the water in the hot water cylinder.
- During the winter months solar thermal systems generally provide a low contribution as the days are short and the solar irradiation is weak.



Space Heating

Solar thermal systems can be used to make a contribution towards the space heating of a property via an underfloor heating system. This should be designed in conjunction with the domestic hot water system.

Swimming Pools

Solar thermal systems can also be used as a cost-effective way of heating, or contributing towards the heating of a swimming pool. Collector efficiencies of greater than 75% can be achieved particularly when using Heat Pipe Solar Collectors (see p12).

Commercial & Agricultural Applications

With a quick return on investment, commercial solar thermal systems are ideal for meeting high hot water demands in hotels, guest houses, dairy farms, commercial and food preparation premises.

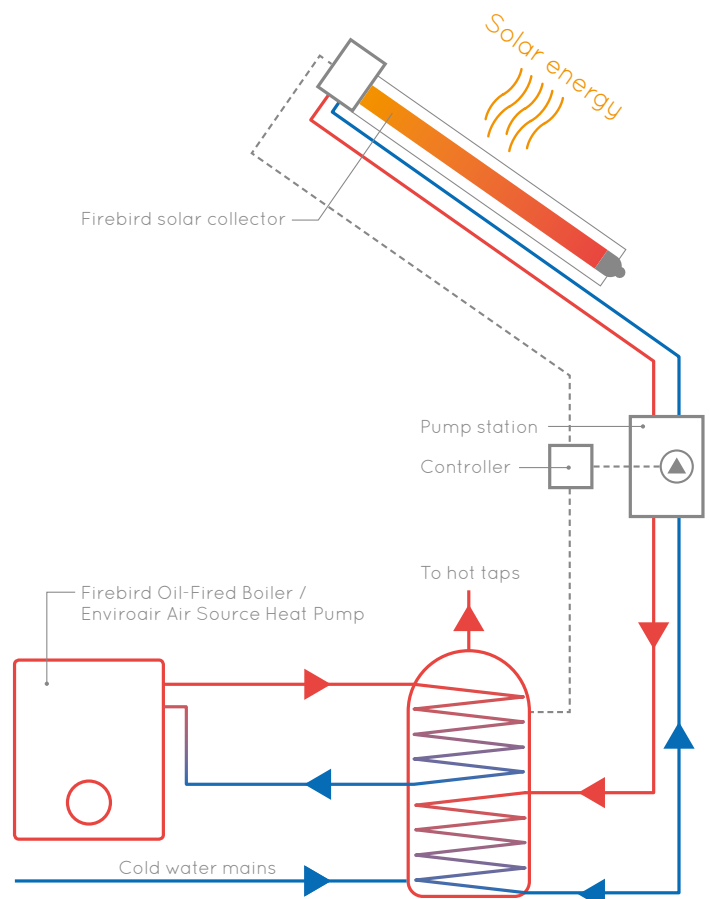
Domestic Renewable Heat Incentive

The domestic Renewable Heat Incentive (RHI) scheme was set up by the UK Government in 2014 to help meet planned CO₂ reduction targets by encouraging the uptake of renewable heat technologies. Following changes to this scheme implemented in September 2017, homeowners installing a solar thermal system will be eligible to receive increased tariffs of 20.66p/ kWh paid quarterly over a seven year period (providing the system is installed by an MCS accredited installer). To further encourage the uptake of renewable technologies a VAT rate of 0% for new build applications and 5% for retrofit also exists. For further information on the Renewable Heat Incentive please contact Firebird Products Ltd or visit www.ofgem.gov.uk

How Does a Solar Thermal System Work?

Solar collectors are used to absorb the energy (irradiation) from the sun which heats a glycol based antifreeze liquid running through a series of pipes. This liquid is pumped through a pipework loop by a pump station, from the collector to the hot water cylinder, where the heat is transferred to the water. This continuous process heats the water to the desired temperature where it is stored until required.

Typical solar collector system including solar collector, hot water tank, and pipework loop.



What do I Need to Take into Consideration

The following points should be taken into consideration when exploring the suitability of a property for the installation of a solar thermal system:

Do I have space for a larger hot water cylinder?

A solar thermal system requires a dedicated cylinder, with a purpose-designed coil, to allow maximum heat transfer of renewable energy into the stored water. Solar coils are much bigger than traditional boiler coils because the hot water travelling through the coil is at a lower temperature. Therefore a greater surface area is required to transfer the heat to the stored water.

It is also important that the temperature differential between the top and the bottom of the cylinder is maximised so the solar thermal system can always contribute towards the heating demand of the property. To facilitate this, the design of a solar thermal cylinder is larger and taller than a standard hot water cylinder.



Is a solar thermal system compatible with my existing heating system?

Most conventional boilers and renewable heating options are compatible with a solar thermal water heating systems and can easily be installed to create a hybrid heating system. Combination boilers however, which don't require a separate hot water cylinder, would be unsuitable.

What size system will I need?

The size of system (the number of collectors and water cylinder capacity) required, is determined by the number of occupants and their daily hot water requirements at 60°C.

As a general rule of thumb, 1m² of solar collector surface area is required for each person living in a property; so for an average 3-4 bedroom house 2 collectors would be required. As the average person uses approximately 50 litres of hot water each day, a standard 4 bedroom house would require a 200 litre hot water cylinder.

No. of Persons	No. of Collectors	Tank Size (Litres)
2-4	2	200
4-6	3	300

Guide to Solar Thermal Systems available from Firebird.

Design Considerations

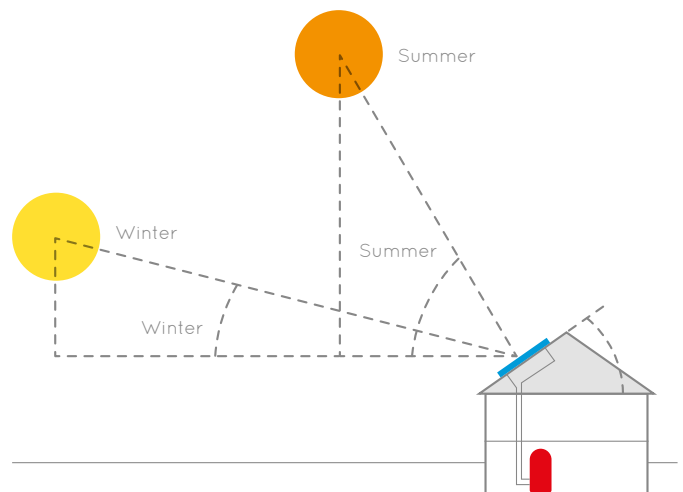
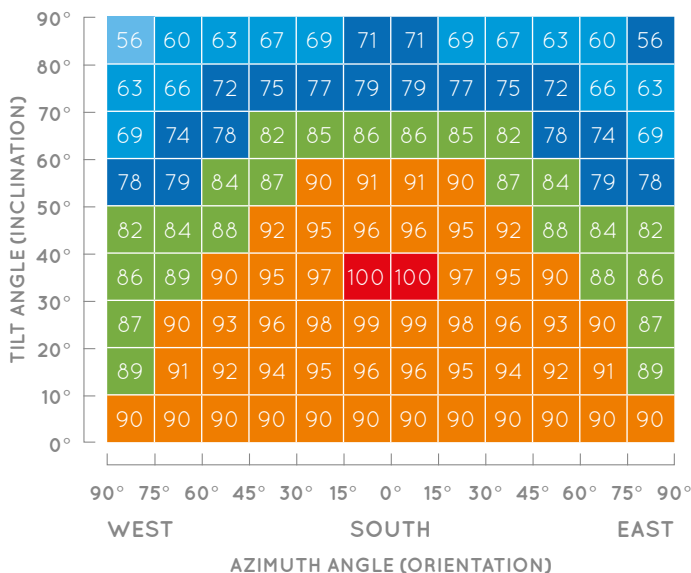
Orientation

A south-facing roof with an incline of 30° is the optimal location for solar water heating; but a solar thermal system can be installed at any angle, whether wall mounted or on a flat roof. On a south-east or south-west facing roof the output may be up to 10% lower and up to 20% lower on east and west facing roofs. On an east-west facing property it is advisable to place a solar collector on each side of the roof to maximise the amount of solar irradiation received throughout the day.

Angle of Inclination

The angle of inclination for a solar thermal system is the angle between the roof / ground and the solar collector. As the angle of the sun relative to the horizon varies from summer and winter the optimum angle for a solar collector is between 20° and 45°. The Firebird EnviroSol™ range of solar collectors however have been tested at various tilt angles and are effective at angles between 15° and 75°.

Solar Energy capture vs Array Orientation & Tilt



Wind Loads

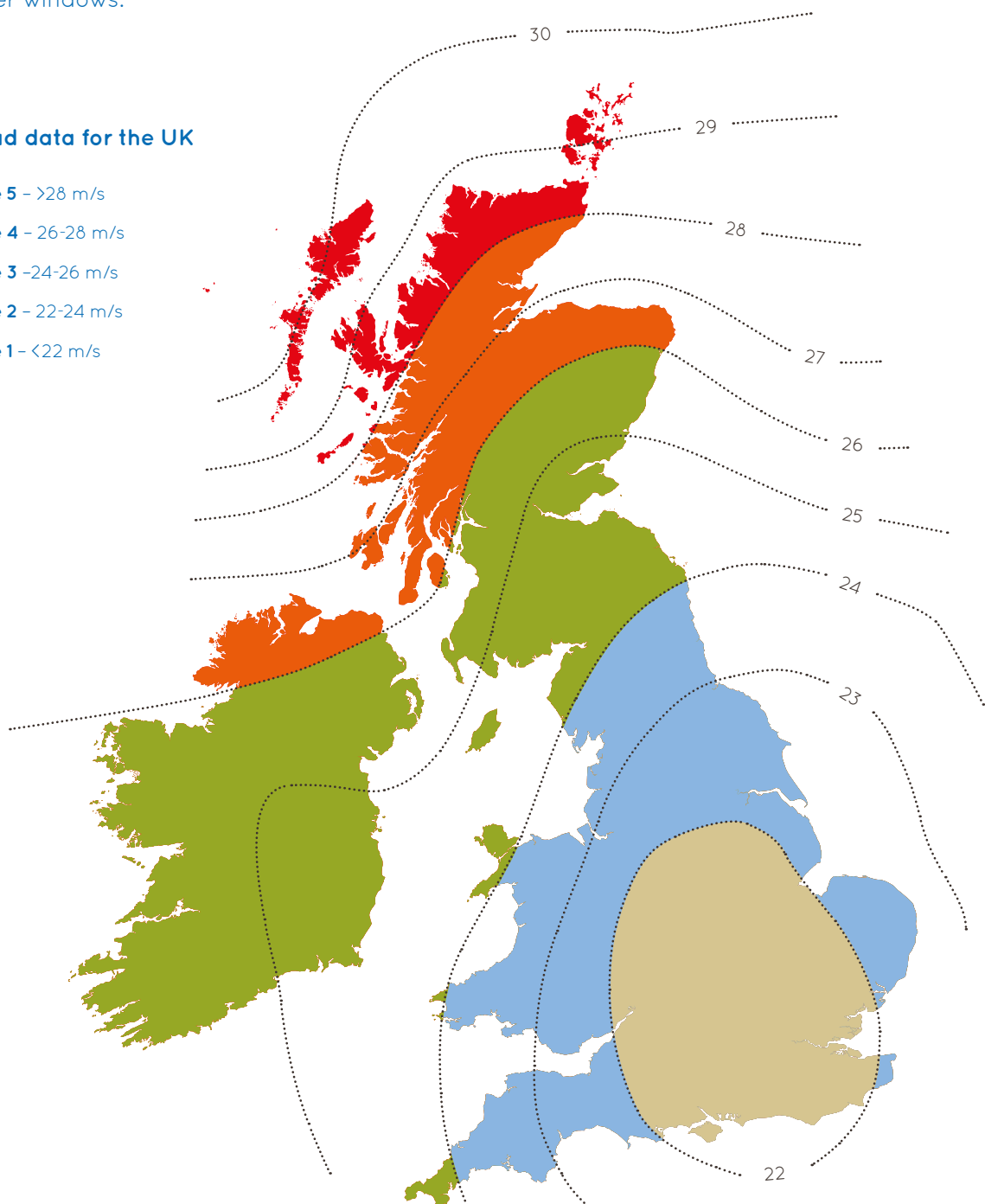
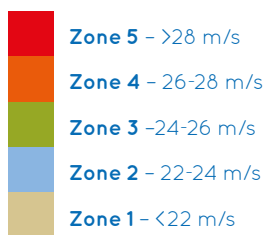
The Firebird Envirosol™ solar collectors and fixing bracket systems are designed to meet the requirements of all UK wind zones. However in high wind load areas, for example excessive heights or very exposed areas, additional fixing brackets may be required.

To minimise the effect of wind load on the solar collectors, it is recommended that they are not installed within 0.5 metres of the roof edge, ridge, eaves or projections such as parapets, chimneys or dormer windows.

Shading

Obstructions which result in shading can considerably reduce the performance of a solar thermal system. When carrying out the site survey it is essential that consideration is given to the proposed location of the collectors and any likely obstructions.

Wind load data for the UK





Envirosol™ Flat Panel Collectors

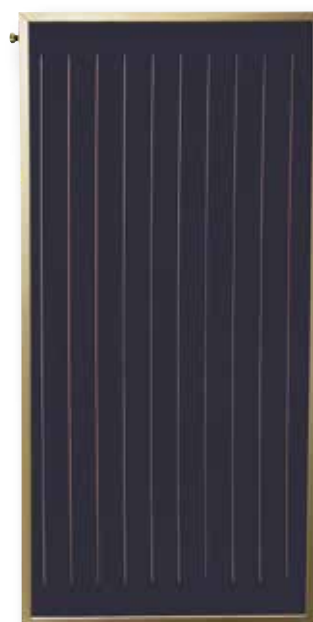
Envirosol™ CPK7210-N Flat Panel Collector

Firebird's Envirosol™ CPK7210-N Flat Panel Collector is one of the most efficient collectors in the world, with an optical efficiency of 81.8%. One of the unique features of the Envirosol™ CPK7210-N is that the collector base is extruded from a single aluminium sheet thus removing the need for welds, joints or glueing at the corners.

Other features:

- Special tempered solar glass
- Absorber is constructed from a single sheet of Tinox™ selective absorber coating
- Heat transfer pipes behind the absorber are ultrasonically welded along the entire length to ensure optimal heat transfer
- 50mm of mineral wool insulation

Product Code	Product Description
SOL100FPC	Envirosol™ CPK7210-N Flat Panel Collector



Envirosol™ Flat Panel Solar Collector Kits

The Envirosol™ solar kits include collector(s), roof mounting fixtures for pitched roof, controller, pump station, anti-scald mixing valve, air vent & isolating valve, glycol solar anti-freeze and 2 x 1m flexi pipe fittings.

Product Code	Product Description
FLAT PANEL ON-ROOF	
SOL950FKT	Flat Panel On-Roof Kit – 1 Panel for pitched roof
SOL951FKT	Flat Panel On-Roof Kit – 2 Panels for pitched roof
SOL952FKT	Flat Panel On-Roof Kit – 3 Panels for pitched roof
SOL953FKT	Flat Panel On-Roof Kit – 1 Panel for flat roof
SOL954FKT	Flat Panel On-Roof Kit – 2 Panels for flat roof
SOL955FKT	Flat Panel On-Roof Kit – 3 Panels for flat roof
FLAT PANEL IN-ROOF	
SOL922TRG	Flat Panel In-roof Kit for Tiled Roof – 2 Panels
SOL923TRG	Flat Panel In-roof Kit for Tiled Roof – 3 Panels
SOL922SRG	Flat Panel In-roof Kit for Slate Roof – 2 Panels
SOL923SRG	Flat Panel In-roof Kit for Slate Roof – 3 Panels





Envirosol™ Heat Pipe Collectors

Envirosol™ TZ58-1800 Heat Pipe Collector

The Envirosol™ TZ58-1800 Heat Pipe Solar Collectors offer an optimum performance to price ratio. The tubes are highly efficient due to a round shaped absorber design so that they capture the solar energy throughout the day.

Other features:

- High build quality – aluminium manifold design, nickel plated condenser head, borosilicate glass.
- Manifold can be installed initially and the tubes added later during commissioning (avoiding the lifting of heavy items onto the roof).
- Reinforced mounting kit manufactured to Firebird specification.

Envirosol™ TZ58-1800 Heat Pipe Solar Collector

Includes roof fixtures (Pitched on-roof mounting kit)

Product Code	Product Description
SOL820VTS	20 Tube Heat Pipe Set
SOL830VTS	30 Tube Heat Pipe Set
SOL174FRK	Flat on-roof mounting kit (20 Tube Set)
SOL172FRK	Flat on-roof mounting kit (30 Tube Set)

Envirosol™ TZ58-1800 Heat Pipe Solar Collector Kits

Includes solar collector, roof fixtures, expansion vessel, glycol, solar controller and pump station.

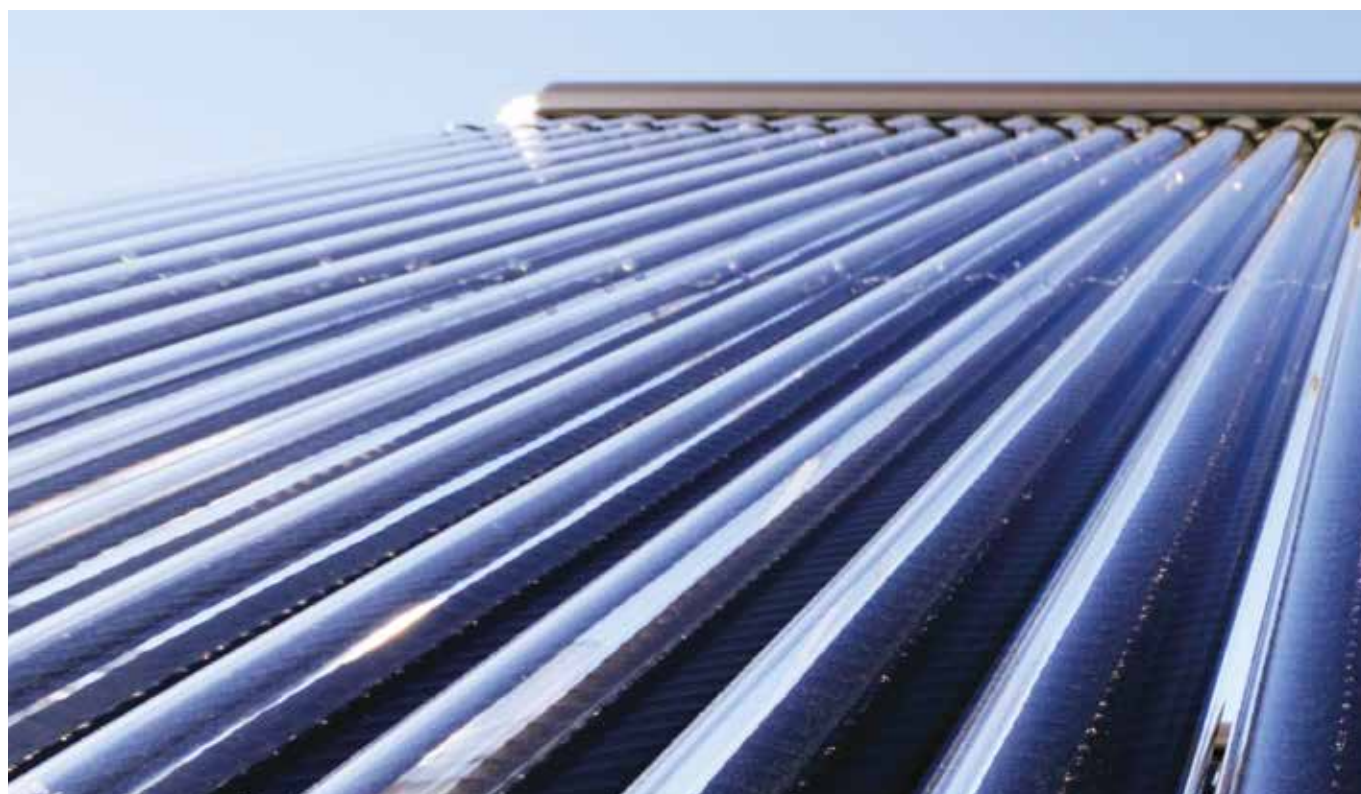
Product Code	Product Description
PITCHED ON-ROOF KIT	
SOL822KIT	20 Tube Heat Pipe Kit
SOL832KIT	30 Tube Heat Pipe Set
SOL842KIT	40 Tube Heat Pipe Kit
SOL852KIT	50 Tube Heat Pipe Kit
SOL862KIT	60 Tube Heat Pipe Kit
FLAT ON-ROOF KIT	
SOL822KIT X 1, SOL174FRK X 1	20 Tube Heat Pipe Kit
SOL832KIT X 1, SOL172FRK X 1	30 Tube Heat Pipe Set
SOL842KIT X 1, SOL174FRK X 2	40 Tube Heat Pipe Kit
SOL852KIT X 1, SOL174FRK X 1, SOL172FRK X 1	50 Tube Heat Pipe Kit
SOL862KIT X 1, SOL172FRK X 2	60 Tube Heat Pipe Kit



Technical Specification

		Envirosol™ CPK7210-N Flat Panel	Envirosol™ TZ58-1800 Heat Pipe	
			20 Tube Set	30 Tube Set
Outer dimensions:	Height [mm]	2038	2020	2020
	Width [mm]	1039	1825	2655
	Depth [mm]	98	155	155
Tube dimensions	Diameter [mm]	-	58	58
	Length [mm]	-	1800	1800
Weight	[kg]	38	78	115
Gross collector area	[m ²]	2.11	3.507	5.005
Aperture area	[m ²]	1.88	1.867	2.791
Max operating pressure	[bar]	10	6	6
Stagnation temperature	[°C]	216	200	200
Angle of inclination permitted		15° to 75°	15° to 75°	15° to 75°
Performance data*				
Zero-loss collector efficiency	η_0	74.1%	73.4%	73.4%
Collector heat loss coefficient, a1	[W/m ² K]	3.705	1.529	1.529
Collector performance ratio, a2	[W/m ² K ²]	0.015	0.0166	0.0166
Absorption		> 95%	> 94 %	> 94 %
Emission		< 5%	< 7%	< 7%
Annual energy yield	[kWh/m ²]	> 525	> 525	> 525

*All based on aperture area.

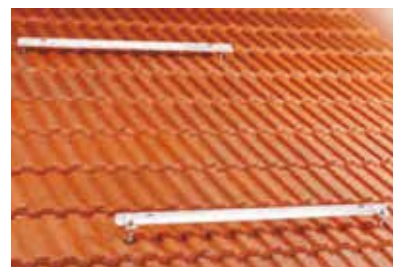


Fixing Options

Pitched – On-Roof Installation

All Firebird Envirosol™ solar collectors can be installed on a normal slate or tiled roof using our weatherproof aluminium mounting frame kits. Mounting kits are constructed from robust materials and come with easy to follow instructions. Mounting kits for Envirosol™ CPK7210-N Flat Panel collectors are available for double and single collector configurations. Mounting kits for Envirosol™ TZ58-1800 Heat Pipe Solar collectors are supplied for sets of 20 and 30 tubes.

Product Code	Product Description
SOL101FMT	On-roof Mounting Kit – 2 CPK7210-N Flat Panel Collectors
SOL103FMT	On-roof Mounting Kit – 1 extra CPK7210-N Flat Panel Collector
SOL822KIT	On-roof Mounting Kit – 20 TZ58-1800 Heat Pipe Solar Collector
SOL832KIT	On-roof Mounting Kit – 30 TZ58-1800 Heat Pipe Solar Collector



Pitched In-Roof Installation

An in-roof installation kit is available for Envirosol™ CPK7210-N Flat Panel Collectors. Note that in-roof installation is not possible with Envirosol™ TZ58-1800 Heat Pipe Solar Collectors. With an in-roof kit the collectors are set lower on the roof giving a more aesthetically pleasing finish. Our in-roof kit comes with side, top and bottom flashings, collector mounting rails, coach bolts, rubber seals and installation instructions. Available in double and single collector configurations – for tiled and slate roof constructions. For slate roofs, order SOL513SRS and either SOL511TRF or SOL512SRS.

Product Code	Product Description
SOL511TRF	In-Roof Mounting Kit Tile Roof – 2 CPK7210-N Flat Plate Collectors
SOL512TRF	In-Roof Mounting Kit Tile Roof – 1 extra CPK7210-N Flat Plate Collector
SOL513SRS	In-Roof Soaker Kit Slate Roof – Soakers Only



Flat Roof Installation

If Envirosol™ solar collectors have to be installed on a flat roof or surface, then a flat roof mounting kit is required. Flat roof kits are available for all collectors and come with mounting frame, coach bolts, rubber seals and installation instructions. Available in double and single collector configurations.

Product Code	Product Description
SOL102FMT	Flat Roof Kit – 2 CPK7210-N Flat Panel Collectors
SOL104FMT	Flat Roof Kit – 1 extra CPK7210-N Flat Panel Collector
SOL174FRK	Flat Roof Kit – 20 TZ58-1800 Heat Pipe Solar Collector
SOL172FRK	Flat Roof Kit – 30 TZ58-1800 Heat Pipe Solar Collector



Solar Controllers & Pump Stations

Controller

The Firebird solar controller ensures the efficient operation of the solar system, managing the efficient transfer of the solar energy from the collectors to the water storage tank. The controller is easy to use and displays key system data at the touch of a button, i.e.:

- Collector temperature
- Upper and lower tank temperatures
- Activation of solar circulating pump
- Hours of operation
- Alternative arrangement layouts
- Pump speed efficiency
- Emergency safety shut-off
- Additional antifreeze functions
- Easy-to-use holiday function
- Anti-legionella control

In addition the controller has a second available relay that facilitates features such as:

- Back-up heat source available for central heating or immersion connection
- Timer setup for back up heat source heating
- Surplus energy usage



Pump Station

The Firebird solar pump station houses the key plumbing components for a solar system including solar circulating pump, non-return gravitational valves, flow rate regulator, pressure relief valve, connection for expansion vessel as well as filling points.

Product Code	Product Description
SOL405CTR	Deltasol SLL Controller
SOL545PMP	Twin Line HE Pump Station



East / West Controller & Pump Station

For East / West installations, you will require the Deltasol SLL controller and two twin line HP pump stations.

Product Code	Product Description
SOL405CTR	Deltasol SLL Controller
SOL545PMP	Twin Line HE Pump Station x 2

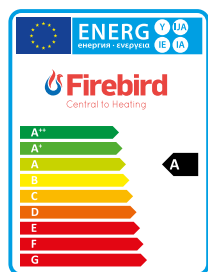


Envirocyl™ Water Storage Cylinders

The Envirocyl™ solar twin coil cylinder is used to store hot water heated by the solar system. The cylinder has two internal coils; the solar circuit provides heat through the lower coil while the back-up heating system (boiler / air source heat pump) will heat the hot water via the upper coil.

Envirocyl™ solar water storage cylinders are manufactured from premium quality stainless steel and include an electric immersion as standard.

Product Code	Product Description
SOL215ITK	Twin Coil Solar Envirocyl™ Cylinder – 210 litres
SOL255ITK	Twin Coil Solar Envirocyl™ Cylinder – 250 litres
SOL305ITK	Twin Coil Solar Envirocyl™ Cylinder – 300 litres



Other System Components

The following components may be supplied as standard on certain EnviroSol™ solar system kits.

Expansion Vessels

An expansion vessel is necessary to absorb the expansion of the solar fluid when high temperatures are reached in the solar collector. Currently available sizes are 24 and 35 litres.

Product Code	Product Description
SOL502EXP	24 litre Expansion Vessel
SOL503EXP	35 litre Expansion Vessel



Intermediary Vessels

Product Code	Product Description
SOL505EXP	Intermediary Vessel, 5 litre
SOL012EXP	Intermediary Vessel, 12 litre



Flexi Pipes, 1m

High grade 1m stainless steel flexi pipes which can be connected to the flow and return side of the collector array. This avoids having to make complicated pipe bends through the roof of the house. Fittings can be included to connect the pipe to the different solar collector types.



Product Code	Product Description
SOL402FPP	1m Flexi Pipe
SOL001ELB & SOL001FEM	Fittings for EnviroSol™ CPK7210-N Flat Panel Collector
SOL075ELB & SOL075TAP	Fittings for EnviroSol™ TZ58-1800 Heat Pipe Solar Collector

Accessory Kit – Expansion Vessel

Expansion vessel accessory kit includes check valve, wall bracket and 1 flexi hose.

Product Code	Product Description
SOL521PPK	Expansion Vessel Accessory Kit



Solar Antifreeze

The heat transfer fluid used in a solar circuit is normally a mixture of water and a polypropylene glycol antifreeze. The glycol antifreeze also contains an additive to protect against corrosion and evaporates at higher temperatures than water to allow higher system temperatures. Firebird recommends a 40% glycol to 60% water mix to ensure frost protection to circa -25°C.

Product Code	Product Description
SOL506FFL	Tyfocon L Antifreeze for EnviroSol™ CPK7210-N Flat Panel Collector
SOL507VFL	Tyfocon LS for EnviroSol™ TZ58-1800 Heat Pipe System



Stainless Steel Insulated Twin Pipe

Flexible pre-insulated twin pipe with UV protection sheath for linking collectors to solar tank. Saves considerable installation time and cost.

Product Code	Product Description
SOL010TWP	Insulated Twin Pipe DIN16 – 10m
SOL015TWP	Insulated Twin Pipe DIN16 – 15m
SOL025TWP	Insulated Twin Pipe DIN16 – 25m



Other System Components

Anti-Scald Mixing Valve

Anti-Scald (mixing) valve must be fitted close to the hot water outlet of the solar tank so that delivery to the taps does not exceed 48°C.

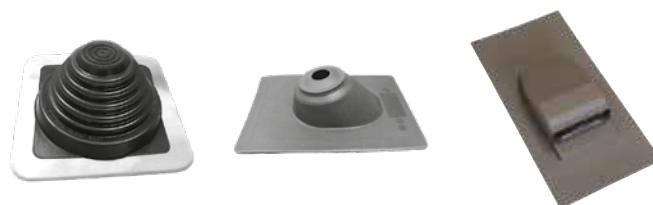
Product Code	Product Description
SOL504MIX	Anti-scald Mixing Valve



Pipe Flashing

The pipe flashings provide an aesthetically pleasing solution for passing solar flow and return pipes through the roof.

Product Code	Product Description
SOL509TRF	Pipe flashing – tiled roof
SOL510SRF	Pipe flashing – slate roof
SOL524VTL	Glidevale G1 Vent Tile (BBA/IAB Approved)



Air Vent

An automatic air vent should be fitted at the highest point in the solar circuit system in order to remove air from the system during commissioning. An isolating valve should be fitted before the air vent and isolated once the system has been commissioned.

Product Code	Product Description
SOL501AIR	Air Vent
SOL505STP	Isolating Valve



Accessories

Product Code	Product Description
SOL514FPC	Weatherproof Cover for EnviroSol™ CPK7210-N Flat Panel Collector
SOL000FPS	Solar Filling & Flushing Pump
SOL527RFR	Refractometer
SOL528CFL	Solar Cleaning Fluid, 500ml
SOL000BOV	Blow-off Storage Vessel
SOL010TSV	TSV Lightning Protection (for controller)
SOL526RLY	Auxillary Relay HR230 (for controller)



Firebird Support

Customer Service

Firebird pride themselves on offering the highest levels of customer service possible. The level of service provided is monitored on a regular basis to ensure customers' requirements are always met.



Technical Support

Based at Firebird's UK headquarters, the **Technical Hub** provides customers with a comprehensive technical support package which is designed to make the specification and installation process as simple as possible. For technical support please contact the Firebird Technical Hub on **01752 691177** or **technicalhub@firebird.uk.com**.



Quality

Firebird Envirosol™ solar thermal systems are manufactured in accordance with the highest quality standards including **ISO 9001:2008**. All products undergo rigorous testing procedures in accordance with the requirements of **BS EN 12975-1:2006+A1:2010** to ensure optimum performance and efficiency. Every product is designed to meet a specific requirement and has been manufactured using premium quality materials to precise standards and tolerances.



Warranty

Firebird Envirosol™ solar collectors are covered by a 5-year warranty* with all other solar components covered by a 2-year warranty. For further information, please contact Firebird Products Ltd.



Firebird Products Ltd

Phoenix House
Eastern Wood Road
Langage Industrial Estate
Plympton
Plymouth PL7 5ET



T: 01752 691177
F: 01752 691131
E: sales@firebird.uk.com

www.firebird.uk.com

This brochure was correct at the time of going to print. However, Firebird's policy is one of continuous development. The right is reserved to change specifications, colour, and prices of the models and items illustrated and described in the publication at any time. Whilst every care has been exercised in the production of this brochure, Firebird cannot accept any liability for errors or omissions. For current details always consult Firebird Products Ltd.

® Firebird is a Registered Trademark in the UK and Ireland. All rights reserved.