



## FAQ's - Solar Hot Water Heating

**Q What is a solar collector?**

A. A solar collector is the "panel" that converts energy into heat.

**Q How does a solar panel work?**

A. The sun's rays are absorbed by a special material, and this material becomes hot as a result. This heat is then used to heat the water in the solar circuit, which is then pumped to your hot water cylinder etc. Solar panels will even work on overcast days, because a large portion of solar radiation is not blocked by cloud cover.

**Q How much hot water will I get from solar energy?**

A. You will get approximately 60% of your hot water over a yearly from solar.

**Q How do I order a Firebird ENVIROSOL solar system**

A. Firebird solar systems are available from all leading heating and plumbing merchants nationwide. In order to offer our customers the widest choice possible systems can be order in kit form or as individual components.

**Q What does Firebird ENVIROSOL solar kit include**

A. Kits have been set up for 2 and 3 flat panel and vacuum tube systems. The kits include panels, roof mounting fixtures, expansion vessel, solar anti-freeze fluid, mixing valve, stop valve and an air vent, two 1m long flexible stainless pipe and the fitting to connect these pipes to the solar panels. Extra panels or tubes can be add to the order if necessary.

**Q What will the installer/plumber need to organize locally.**

A. Because each house installation will be different the person installing the solar system will need to supply pipe work, roof flashing and standard plumbing fittings. These should normally be available from heating and plumbing merchants

**Q How many panels will I require and what tank size do I need?**

A. System sizing is dependent on the number of persons living in a household and their daily hot water usage. As a rule of thumb 1m<sup>2</sup> of panel is recommended per person. On average a person uses 40 to 50 litres of hot water per day so a 200 litre tank would be sufficient for a 4-5 person household while a 300L tank should be used for a household with 6 or more persons.

**Q. Where do I mount my solar panels?**

A. Panels are generally mounted on your roof, either flush with your tiles/slates(integrated), or indeed above the tiles or slates (on-roof). Larger collector arrays can be ground mounted on tailor-made brackets if necessary.

**Q Can the panels be placed somewhere besides on the roof?**

A. Yes, the panels can be placed on a flat roof on a gable, or on the ground on a gable.

**Q. In what direction should my solar panels be facing?**

A. Your solar panel bank should face south or as close as possible to south, and should be “angled” at approximately 45 Degrees.

**Q What is inside the solar panels and pipes?**

A. The liquid that flows around the solar panels and pipework is a mixture of water and anti-freeze.

**Q Can the tubes be replaced?**

A. Yes.

**Q Do I need to use a backup heat source when I am using solar heating?**

A. You do need to use a backup heat source. Generally you can use a “twin” or “dual” coil cylinder to produce hot water. The twin coil cylinder has two coils, one for solar and one for solar and one for the other heat source (Boiler or heat pump etc). In this way, if the solar panels cannot produce enough heat, the primary heat source will make up the shortfall.

**Q. Can the ENVIROSOL solar system be used with a Combi boiler?**

A. Solar systems can be used in conjunction with some Combi boilers but customers MUST always consult the boiler manufacturer for specific instructions. Schematic drawings showing how to use an ENVIROSOL solar system in conjunction with a Firebird combi boiler are available from the Firebird Technical Department.

**Q. What are the dimensions of the Firebird panels?**

A. Dimension for both collectors are shown on Figures A and B

**Q. Will I need planning permission to install solar panels on my roof?**

A. We would always advise that you consult local planning regulations before installing a solar system. In March 2007 the Department of Environment introduced new legislation which gives favourable planning exemptions for solar and other renewable energies. Full details are available on the Department of Environment website [www.environ.ie](http://www.environ.ie)

**Q. Are the ENVIRSOL systems approved under the SEI Greener Homes scheme?**

- A. Yes. The approval numbers are;  
Flat panel = SEI-ST-196  
Vacuum Tube = SEI-ST-197

Phase II of the Greener Homes scheme - effective from 1<sup>st</sup> October 2007 - provides €250 per net m<sup>2</sup> for flat panel collectors and €300 per net m<sup>2</sup> for vacuum tube collectors (to a max of 6 m<sup>2</sup>). Following are the SEI grant levels for Firebird 2 and 3 collectors kits; These Grants are no longer available for new build, only existing for homes.

	Grant for 2 collectors	Grant for 3 collectors
Flat Plate	€ 899	€ 1,349
Vacuum tube	€ 954	€ 1,431

**Q. How do I go about applying for the SEI grant?**

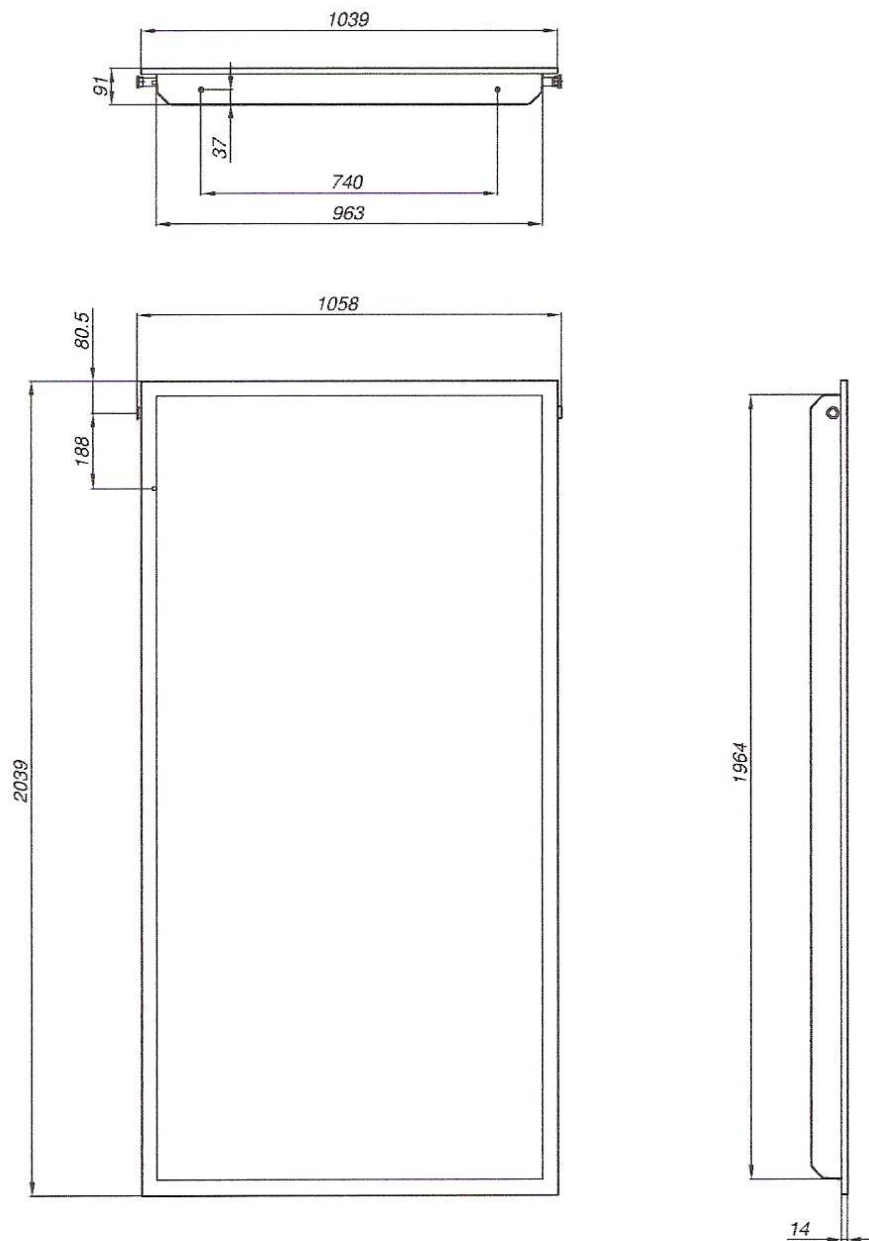
- A. Full details on the SEI Greener Homes grant scheme on how to apply for a grant are available on the SEI website [www.sei.ie/greenerhomes](http://www.sei.ie/greenerhomes). Customers should ensure that grant approval is received before proceeding with the purchase of the solar system.

**Q. What information will I need to complete the application?**

- A. Scheme Application Forms can be downloaded from the SEI website. Currently the form is a 9 page document requiring information about the house, owner, existing heating system and proposed solar system. The information relevant to the solar system is found on page 7. Figures C and D show sample forms for the ENVIRSOL flat panel and vacuum tube systems.

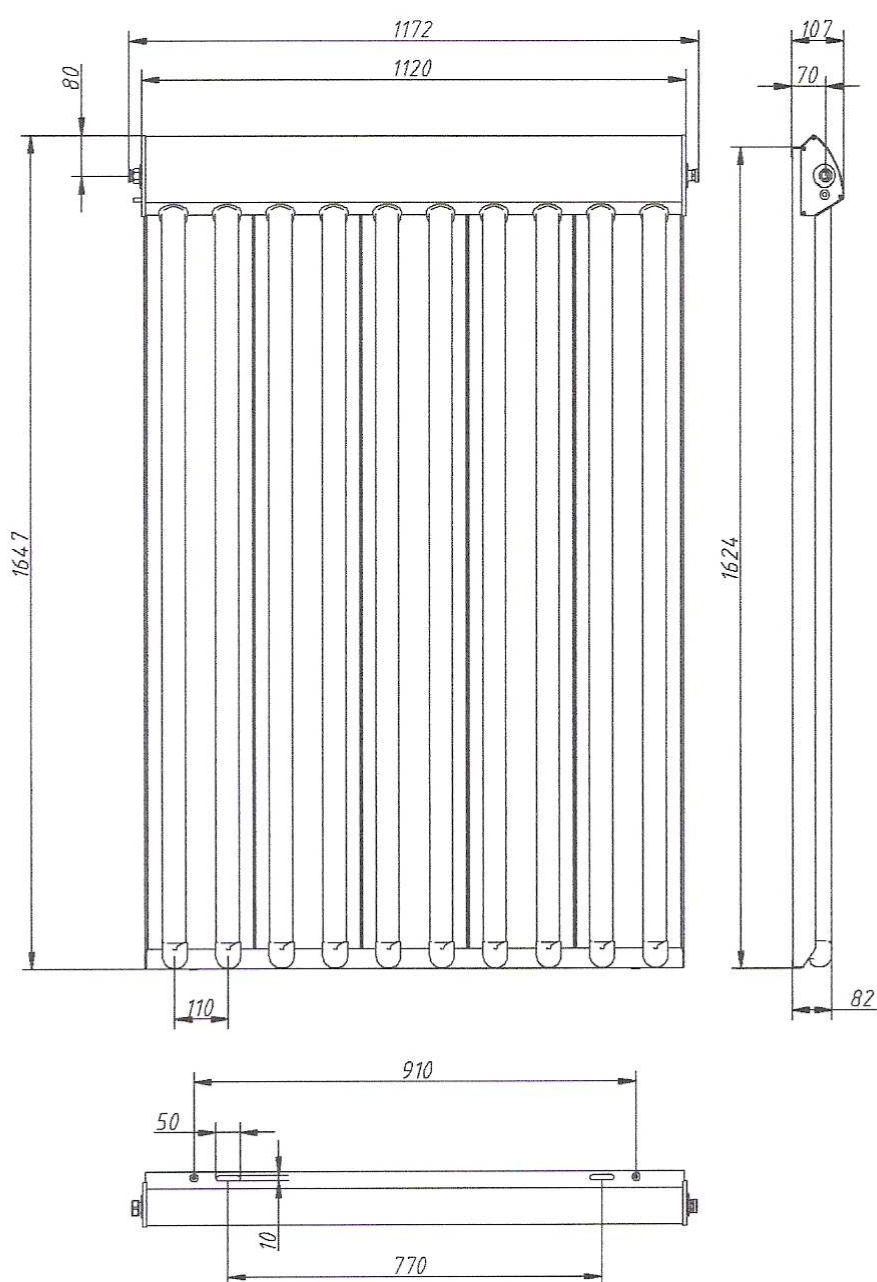
**Figure A: – Dimensions of Flat Panel Collector**

Technical data					
Gross area	m <sup>2</sup>	2,12	Weight	kg	39
Net area	m <sup>2</sup>	1,8	Contents	l	1,4
Apertur	m <sup>2</sup>	2,0	max. Pressure	bar	10




**Figure B: – Dimensions of Vacuum Tube Collector**

Technical data					
Gross area	m <sup>2</sup>	1,84	Weight	kg	31
Net area	m <sup>2</sup>	1,69	Contents	l	1,63
Apertur	m <sup>2</sup>	1,60	max. Pressure	bar	10



**Figure C: – SEI Information for Firebird Flat Panel Collectors**

Greener Homes Scheme Phase II  
Homeowner Application Form



**B.2 Solar Thermal – Proposed Installation**  
The assistance of an installer will be required in completing Section B.

**Installer Details:**

Installer Name:  Installer ID:

Note: Application MUST INCLUDE Installer ID. Application made without the SEI Installer ID will be returned to applicant as incomplete. See Scheme Application Success and Rights and Responsibilities.

**Intended Purpose (tick one)**

☐ Space Heating Only ☒ Hot Water Only ☐ Space and Hot Water

**Product Details:**

Registered Product - SEI Product ID:

Product Manufacturer:  Product Name:

Product Model:  Product Model Number:

Supplier:  Grant Unit Request (kW):

Please provide details of any previous solar thermal installations on the property, including the SEI Installer ID and the registered product name and model number.

**Product / System Details:**

Solar Collector Type ☒ Flat Plate €250 / m<sup>2</sup> ☐ Evacuated Tube €300 / m<sup>2</sup>

**SOLAR THERMAL (per m<sup>2</sup>; to maximum of 6 m<sup>2</sup>)**

No. of Collectors/Panels	per Collector	Grant Requested
Aperture area per panel	1.998 m <sup>2</sup>	€
***Total Aperture area	m <sup>2</sup>	Estimated annual energy yield
Total Surface Area of array	3.996 m <sup>2</sup>	7525 kWh

\*\*\*The grant is based on the Aperture area of the collector – please ensure you are applying for your maximum.

**Hot Water Storage**

Existing ☐ New ☐ Size: \_\_\_\_\_ litres

☐ Vented ☒ Unvented

☐ High vent ☐ High vent


☒ Low vent ☐ Thermal store

**Primary Circuit**

☒ Indirect ☐ Direct

☒ Sealed system ☐ Pumped drain-back


☐ Feed & vent ☐ Thermo-siphon



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**Figure D: SEI Information for Firebird Vacuum Tube Collectors**

Greener Homes Scheme Phase II  
Homeowner Application Form



**B.2 Solar Thermal – Proposed Installation**  
The assistance of an installer will be required in completing Section B.

**Installer Details:**

Installer Name:  Installer ID:

Please Application Form B2/2007/01/01. Application made on or after 15 December 2007 will be processed under the new rules. For further information please see the Application Guide and Registered Product List.

**Intended Purpose (tick one)**

☐ Space Heating Only    ☐ Hot Water Only    ☐ Space and Hot Water

**Product Details:**

Registered Product – SEI Product ID:

Product Manufacturer:  Product Make:

Product Model:  Product Model Number:

Supplier:  Rated Heat Output (kW):

Note: Application MUST INCLUDE the SEI Product ID found on the Registered Product List. Applications made without the SEI Product ID will be returned to applicant as incomplete. See Scheme Application Guide and Registered Product List.

**Product / System Details:**

Solar Collector Type    ☐ Flat Plate    €250 / m<sup>2</sup>  
    ☒ Evacuated Tube    €300 / m<sup>2</sup>

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**SOLAR THERMAL (per m<sup>2</sup>; to maximum of 6 m<sup>2</sup>)**

No. of Collectors/Panels	<b>Per Collector</b>	Grant Requested	€
Aperture area per panel	1.59 m <sup>2</sup>	Estimated annual energy yield	>529 kWh
***Total Aperture area	m <sup>2</sup>		
Total Surface (front) area	6.0 m <sup>2</sup>		

\*\*\*The grant is based on the aperture area of the collector – please consult your supplier if you are unsure.

**Hot Water Storage**

Existing: ☐ New: ☐ Size:  litres

☐ Ventd    ☒ Un-vented  
☐ Single vent    ☐ Triple vent  
☒ Dual vent    ☐ Thermosiphon

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**Primary Circuit**

☒ Indirect    ☐ Direct  
☒ Sealed system    ☐ Pumped drain-back  
☐ Feed & vent    ☐ Thermo-siphon



## Mounting Frame Options



Both flat plate and vacuum tube collectors can be mounted either...

- ❑ Directly onto pitched roof
- ❑ On flat roof or flat surface



1f.  
2f.

- ❑ Mounted in roof.  
(flat panels only)



3f.

### **Note:**

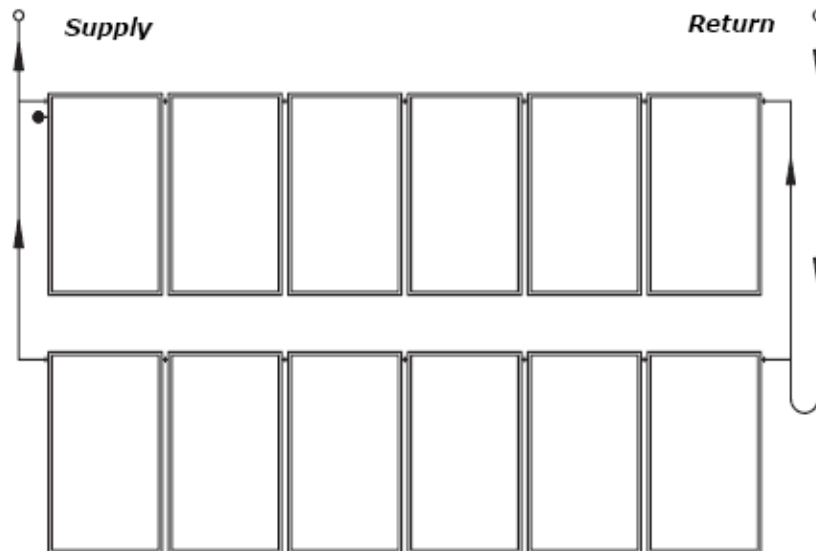
**Detailed Installation Instructions are supplied with each kit. Please refer to these when installing the respective collectors.**

If required prior to installation you may contact Firebird.



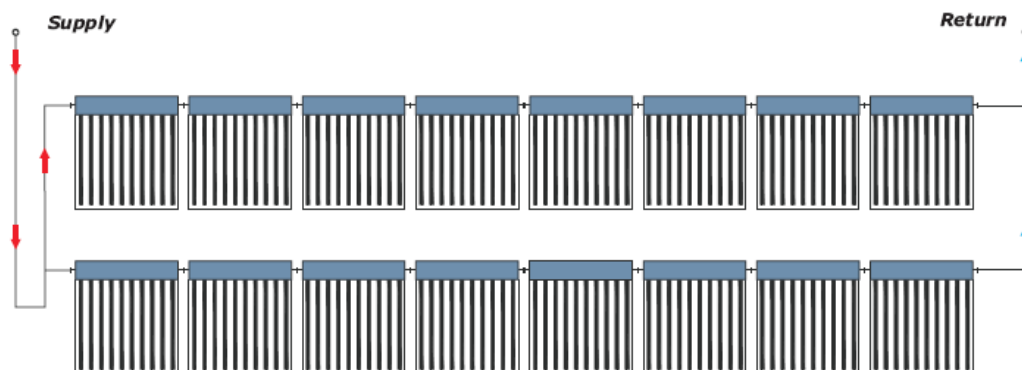
## Connecting Flat Panels to One Another

The diagram below is an example of how the collectors can be connected to one another. However, the actual connection may be different depending on structural conditions. A maximum of 6 collectors may be connected in a series! If a collector panel is made up of more than 6 collectors, the panel must be connected several times in parallel.



5f. **Connecting vacuum tubes to one another**

The diagram below is an example of how the collectors can be connected to one another. However, the actual connection may be different depending on structural conditions. A maximum of 8 collectors may be connected in a series! If a collector panel is made up of more than 8 collectors, the panel must be connected several times in parallel.



6f.

## COMMISSIONING

### Filling the Solar Loop

For safety reasons, you should only fill the collectors when there is no direct irradiation from the sun (or cover the collectors). Especially in regions exposed to frost, for flat plate collectors you should use a mixture of (FS) antifreeze with water (40% antifreeze which is readily mixed by Firebird). The solar thermal system should be filled and commissioned within one week of installation, because heat build- up in the collector (array) can damage the flat gaskets in empty systems. If this is not possible, the flat gaskets should be replaced before commissioning to prevent leakage.

- ❑ Ensure all components - isolating valves, pump valves - are open.
- ❑ Ensure that all drain valves are closed. Connect the filling device
- ❑ Fill system until system until all air has been expanded and system pressure is about 2 bar
- ❑ Inspect entire system for leaks
- ❑ Close automatic air vent if fitted.

Note: 40% proportion of antifreeze- freezing point:-22°C/solidification point: -26°C



1g.



2g.

### Bleeding

The system must be bled:

- ❑ On commissioning (after filling)
- ❑ 4 weeks after commissioning
- ❑ When necessary, e.g. if there are malfunctions

**Warning:** Risk of scalding due to hot heat transfer fluid.

Do not operate the bleeding valve unless the temperature of the heat transfer fluid is **< 60°C**.

The collectors may not be hot when you bleed the system! Cover the collectors and bleed the system in the morning if possible.

## Setting Pump Speed



3g.

The maximum recommended flow velocity in a pumped solar primary circuit is 1.5 m/sec. Flow rate is set to 0,2 - 0,5 l/min per m<sup>2</sup> of collector

- For 4m<sup>2</sup> of panels set the flow rate to about 2l/min
- For 6m<sup>2</sup> of panels set the flow rate to about 3l/min

## Checking Frost Protection

- Use a refractometer

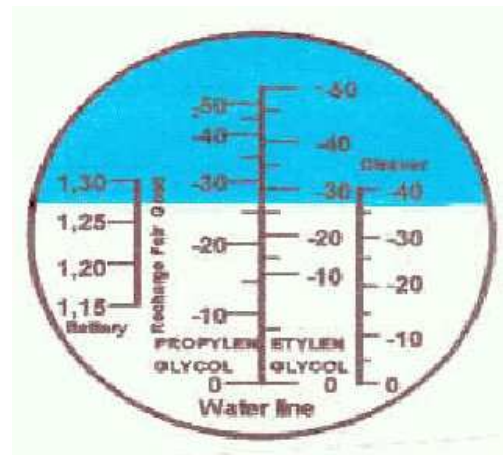


4g.

- Ensure level of protection to -25°C

% Antifreeze	Protection to
25%	-12 °C
30%	-16 °C
35%	-20 °C
40%	-25 °C

5g.  
6g.



## H. MAINTENANCE AND SERVICE

### **Note:**

- ❑ We recommend that the householder should occasionally check the charge pressure in the pressure vessel.
- ❑ As well as this the heat transfer fluid (glycol) should be checked every two years for anti-freeze and pH value.
- ❑ You should inspect the insulation of surface pipe work for damaging, degradation, and contamination due to exposure to the elements, birds, etc.
- ❑ Check that the flow rate has not been tampered with or changed.
- ❑ They may require a semi-annual washing if you are in a dusty location. For regular dust accumulations you can simply hose the modules off. If there are significant accumulations of tree sap or bird droppings you may need to use a sponge with a mild soap and water solution. You should keep leaves, branches and other debris off the top of the modules, and keep debris from accumulating under the modules. This accumulation could reduce cooling airflow under the modules, and could cause water to back up in a severe rainstorm. Although the tempered glass surface of the modules is quite durable, they will break if you walk on them. Any crack in a tempered solar energy module usually requires replacement of the entire module,