

Renewables

**THERMO****MAX**

Premium Solar Hot Water Solutions



*Energy to the Power of*

**Kingspan** **SOLAR**

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Over 25 years ago, we devoted ourselves to perfecting solar thermal vacuum tube technology that would generate hot water even on cold, wet and cloudy days. **We succeeded.**

# Renew your way of thinking with Kingspan Solar

04

## Thermomax - the original and still the best

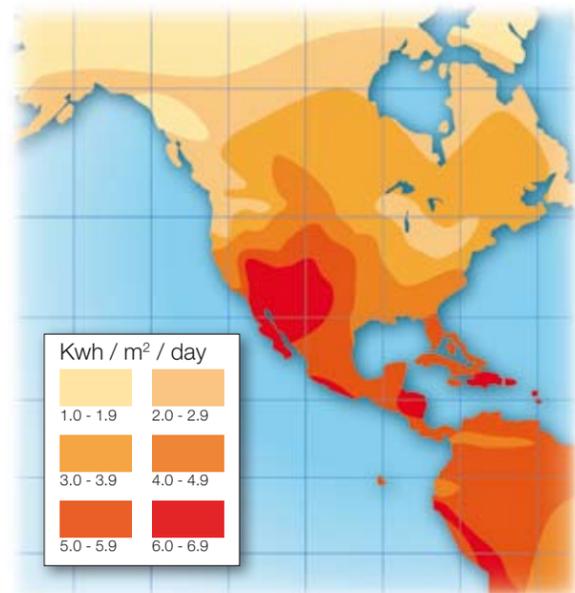
The Kingspan Solar range, from Kingspan Renewables Ltd, reflects our on-going commitment to a zero carbon lifestyle and a brighter future for us all. When it comes to creating efficient and cost effective energy solutions that address today's growing environmental concerns, the Kingspan Solar range of products leads the way. The Thermomax brand is the original and still the best vacuum tube collector in the world.

### Solar Energy for a Brighter Future

Solar energy is free, clean and safe. It is environmentally friendly and produces no waste or pollution. Using solar energy enables you to reduce your carbon footprint as well as your energy bills. Tax credit and grants are available through many Government initiatives.

The sun radiates enormous amounts of energy to the earth. In North America, the value of solar radiation received varies according to location. From the coastal regions to the mountains and the southern plains, our systems collect up to 80% of the available solar energy.

Amount of solar energy received in peak sun hours each day on an optimally tilted surface during the worst month of the year



### Solar Thermal Vacuum Tube Systems

Solar thermal technology transforms direct and diffuse solar radiation into useful heat using a solar collector. Each solar collector consists of a highly insulated manifold and a row of solar tubes. The vacuum inside each tube provides perfect insulation and therefore protects the system from outside influences such as cold and windy weather or high humidity. The vacuum technology ensures the most effective transfer of energy into heat, giving extra performance in comparison to traditional flat plate collectors and providing heat not only on warm, sunny days, but also in cooler, windy or humid conditions.

### Why Thermomax?

With over 25 years of experience, the Thermomax brand is firmly established as the world leader. Thermomax collectors are the premium product in the market, designed specifically for a North American climate. They provide a superior performance in all weather conditions.



Thermomax products were the first to receive the European quality mark for solar collectors - the Solar Keymark.



Thermomax collectors are certified under the Solar Rating and Certification Corporation (SRCC) based in Florida, USA.

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### Easy Installation

The unique 'plug and play' design of Thermomax solar collectors makes installation quick and easy. There is no need for heavy lifting equipment, as tubes can be carried onto the roof individually. Usually facing south, the collector is fixed to the roof by easy-fit roof brackets, which are simply fixed to the rafter.

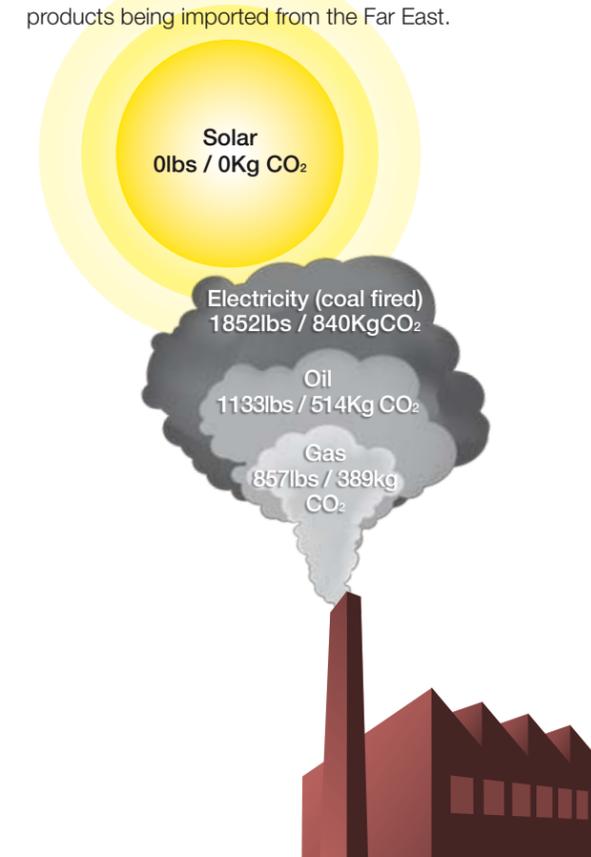
### A Positive Environmental Impact

Burning fossil fuels produces vast quantities of carbon dioxide, a major contributor to global warming. The average household with a Thermomax system installed can expect to generate approximately 6.2MMBTU / hr / yr or 1,836 kWh / year with zero emissions.

The diagram below illustrates the amount of CO<sub>2</sub> produced by oil, gas and 'coal fired' electricity to generate the equivalent 6.2MMBTU / hr / yr or 1,836 kWh.

### Manufactured in the UK and Ireland

Thermomax Products are manufactured in Wales and at the Kingspan Renewables headquarters in Northern Ireland. A full service package is offered including custom design, technical advice, training and sales support. Quality of our product is paramount to Kingspan's success. This differentiates us from the influx of inferior products being imported from the Far East.



### Performance and Savings

Thermomax products have been designed specifically to contribute heat even in cold, windy or humid conditions

Supplies up to 70% of your annual hot water needs - reducing dependence on increasingly expensive fossil fuels

Works from dawn until dusk and throughout the year

Rapid conductivity and transfer of energy into heat

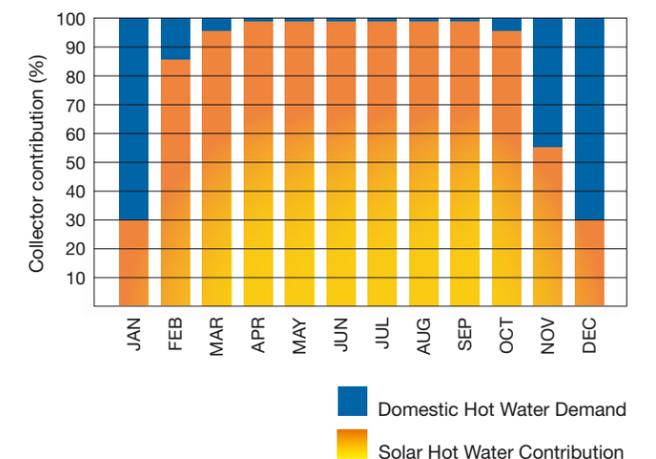
30% more effective than flat plate collectors

Average 25-year lifespan

High efficiency heat contribution able to provide additional heat for radiant space heating systems

### Solar Energy Contribution

The table below shows the typical annual percentage of hot water achieved using 34.3ft<sup>2</sup> / 3m<sup>2</sup> solar collectors, based in a coastal climate.



## Thermomax Collectors are effective for both Domestic and Commercial applications

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In addition to domestic hot water, the superior performance of a **Thermomax** vacuum tube collector can also provide central heating support for standard or under floor heating, specialised industrial hot water heating for high temperature applications and solar cooling.

### Domestic Installations

These range from typical, single module systems for domestic hot water to larger installations and systems designed to fit building constraints.



#### A typical domestic installation

This 21.5ft<sup>2</sup> / 2m<sup>2</sup> installation will provide domestic hot water for up to 3 people. Collectors are usually installed facing south and fixed to the roof using easy fit brackets.



#### Alternative installation

An example of how **Thermomax** collectors can be installed to suit any architectural requirements or building constraints. In this case, the collector acts as a canopy.



#### Larger installation, Port Townsend, WA

A typical domestic 64ft<sup>2</sup> / 6m<sup>2</sup> installation provides domestic hot water for 4 as well as assisting with low temperature radiant space heating during the off-seasons. Collectors are usually installed facing south and set to latitude for domestic only and latitude +15 for space heating assistance.

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### Commercial Installations

These range from small-scale water heating to large applications for solar cooling.



#### Wabasca Recreation Centre AB, Canada

This Northern Alberta system has 1518ft<sup>2</sup> / 141m<sup>2</sup> of collectors supplying pool, spas, showers and radiant floor heating for the pool deck and changing rooms.



#### Puget Sound Energy, Burlington, WA

This 387ft<sup>2</sup> / 36m<sup>2</sup> collector provides the Skagit Service Centre Administration Building with radiant floor heating, forced air preheat and domestic hot water.



#### Warehouse Installation, Buena Vista, CO

This 193.8ft<sup>2</sup> / 18m<sup>2</sup> Thermomax system provides seasonal heating for this 7000ft<sup>2</sup> radiant heated warehouse facility.



#### Solar cooling

This installation for a leading perfume designer in Paris, was Europe's first successful large scale installation of an air-conditioner working on absorption chillers and **Thermomax** vacuum tube collectors.

3230ft<sup>2</sup> / 300m<sup>2</sup> HP200 collectors supply hot water to the absorption chiller.

## Domestic Packages

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### Complete system solutions for domestic applications

These are the general steps that need to be followed in order to find a package that best suits your requirements. Our Kingspan Solar Solution team will work with you through these steps to help you make the correct choice.

There are three basic steps to consider:

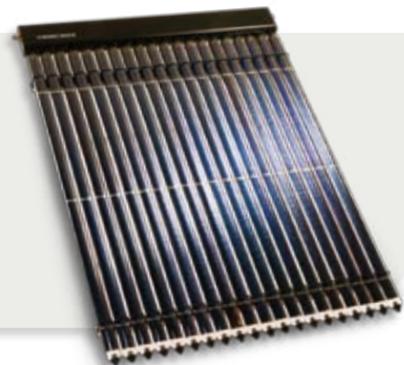
Step **1** Select and size tank type



Step **2** Choose the system size



Step **3** Choose collector position



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Step **1**

#### Select your tank

A twin coil hot water storage tank enables energy input from the hot water heating system to the top half of the tank and energy input from solar system to the bottom half of the tank. Kingspan manufacture a range of high quality, market leading tanks. We would recommend our stainless steel tank for use in a pressurized system.

#### Choose the correct size

This is dependent on your household's hot water demand, which is estimated at 13.2 gallons / 50 litres per adult / per day. Tank storage size is calculated at twice the demand. Therefore, we would recommend a 52.8 gallons / 200 litres tank for a one to two adult household and a 79.3 gallons / 300 litres tank for three to five adults.



Step **2**

#### Choose the system size

It is important that the solar system is correctly sized in relation to the number of occupants to maximize efficiency. As a guide, we would recommend 10 tubes 10.76ft<sup>2</sup> / 1m<sup>2</sup> per person. There are 2 basic collector sizes for domestic systems:

- 21.5ft<sup>2</sup> / 2m<sup>2</sup> collector for 1-2 adults
- 34.3ft<sup>2</sup> / 3m<sup>2</sup> collector for 3-5 adults



These sizes are based on ideal orientation. Please call technical support for further advice on sizing.

Infloor Inc. (United States):  
Toll Free: **1-(800)-608-0562**  
[www.infloor.com](http://www.infloor.com)

Thermomax (Canada & Northwestern USA):  
Toll Free: **1-(888)-923-9443**  
[www.solarThermal.com](http://www.solarThermal.com)

Step **3**

**Choose collector position**

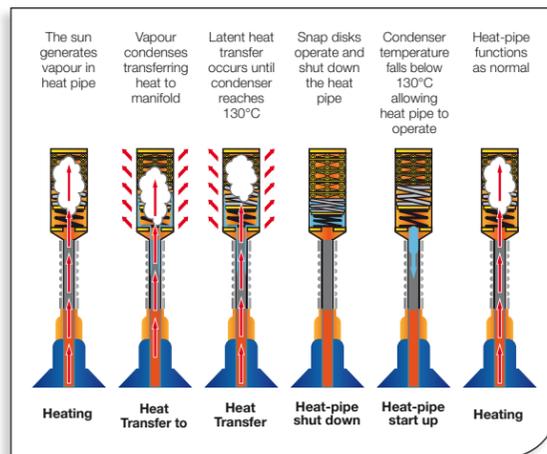
To get the most out of your solar system, it is imperative that you find the optimum position on the property. Between the best and worst orientation, annual energy contribution can be nearly halved. To get the best efficiency, the collector should be installed, facing due south at an angle of 30-40°, as demonstrated in the graph.

Any collector mounted with an angle equal to the latitude on an east or west facing wall or roof, will generate 80% efficiency of a perfect south-facing installation.

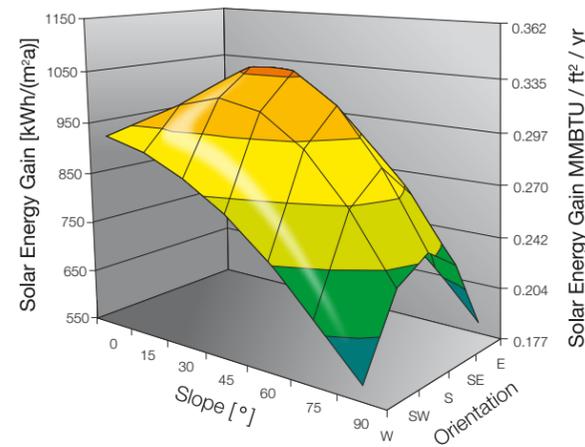
**HP200 Heat Pipe Collector**

The HP200 is one of the most established products on the market with an extremely efficient heat transfer. The HP200 sets itself apart with a temperature limitation safety device (shutdown at 266-275°F /130-135°C to prevent overheating). This premium solar collector is perfect for both domestic and commercial applications. Its dry system ensures ease both of installation and maintenance and is ideal for North American climates.

**The Thermal Cycle**



**How Collector Positioning Effects Solar Energy Production**



**Collector Positions**

- 1 Ideal slope 40°
- 2 Roof kit angled 40°
- 3 Elevated 20°

**The Full Package**

We have put together a number of packages which include everything you will require for your installation.

In addition to the collector and cylinder, each package includes:

- Dual stream pump station
- Expansion vessel
- Connections
- Antifreeze
- Valves
- Roof mounting kit
- Controller



**HP200**  
21.5ft² / 2m² HP200 with stainless steel tank

| Components                      | Size                    |
|---------------------------------|-------------------------|
| HP200 collector                 | 21.5ft² / 2m²           |
| Stainless steel, twin coil tank | 50-60 Gallons / 210 Ltr |
| Expansion vessel                | 4.8 Gallons / 18 Ltr    |
| Roof mounting kit               | ✓                       |
| Connection kit                  | ✓                       |
| Dual stream pump station        | ✓                       |
| Controller                      | ✓                       |
| Thermal fluid antifreeze        | 5.3 Gallons / 20 Ltr    |
| Thermostatic mixing valve       | 0.867" / 22mm           |

**HP200**  
32.3ft² / 3m² HP200 with stainless steel tank

| Components                      | Size                 |
|---------------------------------|----------------------|
| HP200 collector                 | 32.3ft² / 3m²        |
| Stainless steel, twin coil tank | 80 Gallons / 300 Ltr |
| Expansion vessel                | 4.8 Gallons / 18 Ltr |
| Roof mounting kit               | ✓                    |
| Connection kit                  | ✓                    |
| Dual stream pump station        | ✓                    |
| Controller                      | ✓                    |
| Thermal fluid antifreeze        | 5.3 Gallons / 20 Ltr |
| Thermostatic mixing valve       | 0.867" / 22mm        |

For further packages, please log on to:

United States  
[www.infloor.com](http://www.infloor.com)

Canada & Northwestern USA  
[www.solarThermal.com](http://www.solarThermal.com)

## Components

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**Thermal Fluid Antifreeze**



**Thermostatic Mixing Valve**



**Connection Kit**



**Pump Station**



**Controller**



**Collector**



**Water Tank**



**Roof Mounting Kit**



**Expansion Vessel**



For further packages, please contact:

Infloor Inc. (United States):  
Toll Free: **1-(800)-608-0562**  
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Thermomax (Canada & Northwestern USA):  
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[www.solarThermal.com](http://www.solarThermal.com)

## Roof Kits and Accessories

### Roof Kits

There are a number of roof kits available to enable you to achieve the optimum efficiency from the position of your collector.

- 1 Roof mounting kit
- 2 Flat roof frame or ground mount
- 3 Sloping roof 20° elevation or 70° wall mount



### Accessories

Below is a number of purposefully selected optional extras to enhance your system. We have also included a demonstration kit to enhance your solar business.

**Diverter Valves**



**Flush and Fill**  
(pump unit)



**Demonstration Kit**



**Microbubble De-aerators**



**Thermostatic Mixing Valve**  
(3/4" / 22mm)  
(1" / 28mm)



**Temperature Reducing Vessels**  
(1.3 - 3.2 Gallons / 5 - 12 Ltr)



**Expansion Vessels**  
(3.2 - 9.3 Gallons / 12 - 35 Ltr)



**Insulated Flexible Stainless Steel Pipework**  
(various lengths)



**Service Kit**

- Refractometer
- Digital pressure gauge
- PH test paper
- Compass

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## Understanding Your System

### Components and Applications

#### Key

- 1 Thermomax collector
- 2 Solar fluid transfer lines
- 3 Hot water tank

#### Applications

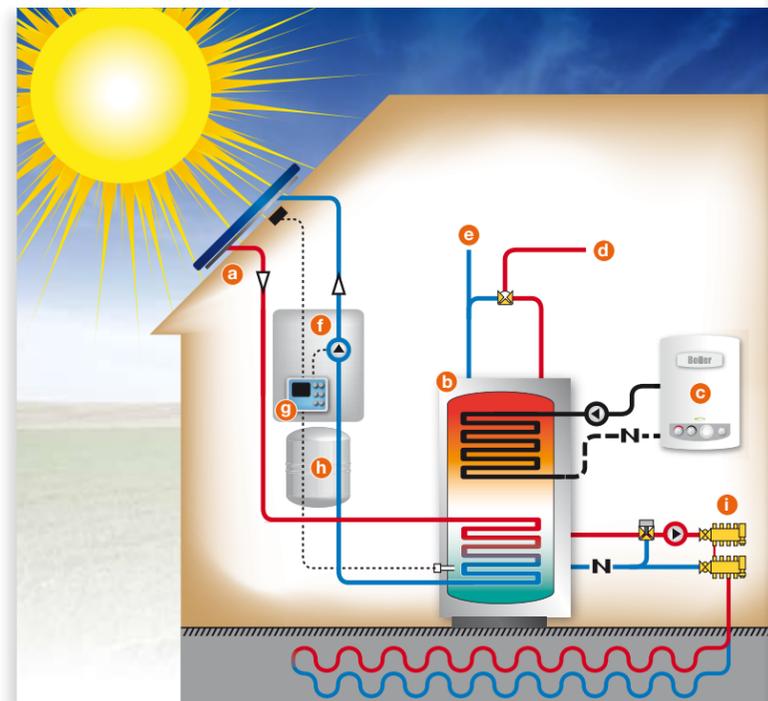
- 4 Bath/Shower/Tap
- 5 Under floor heating/Space heating
- 6 Washing machine/Dishwasher
- 7 Swimming pool



### A Typical Solar Installation

The diagram below shows a typical solar installation for domestic hot water with a twin coil hot water storage tank. This enables energy input from the central heating

system to the top half of the tank and energy input from the solar system to the bottom half of the tank.



#### Components

- a Solar collector on sloping roof kit. The connection kit connects the pipe work to the collector
- b Versatile tank design with additional connections for boiler backup, electric back up, and radiant floor heating
- c Boiler or other space heating device
- d Hot water out
- e Cold water in
- f Pump station used to circulate solar fluid between the collector and the tank
- g Controller uses temperature sensors to monitor heat differences between the collector and the water in the tank and switches the pump on and off accordingly
- h Expansion tank used to absorb the expansion of the solar fluid as the temperature rises in the collector and tank
- i Radiant floor heating system assisted by the solar energy

## Commercial Packages

### Commercial Installations

From a 55.8 ft<sup>2</sup> / 5m<sup>2</sup> installation on a guest house to 3230ft<sup>2</sup> / 300m<sup>2</sup> on a factory, the advantages of **Thermomax** solar systems are immediate, the most obvious of which is the saving on fuel bills.

With today's commercial and environmental pressures, a shift towards a green business philosophy is essential for survival. This competitive advantage not only strengthens the brand position but also brings economic and financial rewards. This is particularly relevant in hotels and leisure facilities, where solar energy attracts the rising number of 'Ecotourists'.

**All commercial installations will be different, which is why Kingspan Solar offer a FREE custom design service. This includes:**

- Assistance with the design of your project, producing solar simulation and full project based AutoCad schematics
- Recommendation of an accredited installer for the project through our network of installers
- The services of an on-site technical support engineer
- Commissioning of the **Thermomax** solar system to ensure it is working at 100% of its capability

### Applications

In addition to commercial hot water, the higher operating temperatures of **Thermomax** evacuated tube collectors make them suitable for the following applications:

#### Swimming Pools

To incorporate a swimming pool into the system, a heat exchanger is used between the pool water and the circulating water through the collector. A wound coil is used to give a large exchange area which allows a high volume of pool water to be passed through.

#### Solar Cooling

Huge potential for solar cooling exists, as the times of high cooling demand corresponds with the highest yields from the solar collector. Solar chillers use thermal energy to produce cold and / or dehumidified air. **Thermomax** collectors have been used in numerous solar cooling projects around the world.

#### Industrial Process Heat

**Thermomax** collectors can provide the heat needed in many industrial processes. They typically provide temperatures around 140 - 212°F / 60 - 100°C, which is perfect for many applications such as food processing, water desalination and industrial washing processes.



Changi Airport, Singapore. Largest solar thermal installation in South East Asia with more than 10,000 tubes.



Radiant floor heating using a gyp-crete application.

## Distribution

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### Network of Accredited Solar Installers

With a worldwide network of Kingspan Solar accredited installers on-hand to advise you on design, installation and grants, you can be confident that your investment in **Thermomax** solar vacuum tube technology will be an informed one.

Infloor Inc. (United States):

Toll Free: **1-(800)-608-0562**  
[www.infloor.com](http://www.infloor.com)

### Thinking of an installation on your home or small business?

Your nearest **Thermomax** distributor is never far away. Call our sales hotline and we will put you in touch with your nearest local supplier / dealer.

Thermomax (Canada & Northwestern USA):

Toll Free: **1-(888)-923-9443**  
[www.solarThermal.com](http://www.solarThermal.com)



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## FAQs

### Q: Does Solar only work when the sun is shining?

**A:** **Thermomax** solar vacuum tubes work all year round - and even in winter it will help to give you hot water because vacuum tubes absorb energy efficiently in all different weather conditions.

### Q: Where are the panels fitted?

**A:** Ideally to a south facing roof or slight deviations of about 30 - 40° from that. The inclination / pitch of the collector is equal to the geographical latitude. So if you live at 45° latitude north the ideal pitch is about 45°. Once again slight deviations are not a problem and will only slightly effect the solar yield.

### Q: What are the savings?

**A:** Up to 70% of your annual hot water and / or heating cost. Over time your savings will increase as the price of oil / gas / electricity and other natural fossil fuels will escalate in the future. Solar also reduces carbon dioxide (CO<sub>2</sub>) emissions - one of the largest single contributors towards global warming.

### Q: Do I need planning permission?

**A:** Normally only if the building is in a conservation area / listed building or under construction - but you should check with your local planning office. Our panels are environmentally friendly and aesthetically pleasing.

### Q: What does installation involve?

**A:** **Thermomax** collectors are light and modular and can usually be installed in one day. They easily attach to your existing structure via a roof kit.

### Q: Do they break easily?

**A:** The tubes are routinely tested and proved to withstand a load of .5 metric tonnes / 1102 lbs per m<sup>2</sup>. This is approximately 5 times the minimum mechanical load requirements of Solar Keymark and SRCC.

### Q: How will hail affect the tubes?

**A:** The tubes have been certified to stand the impact resistance test of DIN EN 12975-2: 2006 using ice balls.

### Q: What maintenance is required?

**A:** No collector maintenance is required. The glass tubes are round and perfectly smooth. They allow air to circulate around them and will not trap moisture or debris. A system check by a professional every three to five years should be sufficient.

### Q: Is there a solar system suitable for use on a large scale commercial building?

**A:** The collectors can be integrated with your existing system to provide hot water throughout the building for showers. In fact, anywhere large quantities of free hot water can be used. Hospitals, recreation centers, swimming pools are all suitable large scale commercial applications.

### Q: Is it possible to store heat gained?

**A:** Yes, the heat is stored in a twin coil solar tank usually for domestic hot water. However, the stored energy can also be used for space heating or to heat a swimming pool. It is also possible to combine the different applications.

### Q: What happens when I go on vacation?

**A:** A well-designed and sized solar system should provide you with the right amount of hot water for your household requirements. Even when going on vacation the system will still work, feeding the energy into the tank. This will just lead to a slightly higher tank temperature. The system is self-regulating - HP200 tubes have a memotron valve to switch them off at ≈ 275°F / 135°C.

### Q: Can I combine solar thermal with heat pumps, other renewables and radiant floor?

**A:** Yes, **Thermomax** collectors can be used with all forms of traditional or renewable heating systems without any difficulty, even if it means working at higher temperatures. Radiant floor applications work extremely well when used with **Thermomax**.

HP200

| Technical Specification HP200         |  |   |
|---------------------------------------|--|---|
|                                       | HP200 - 20                                 | HP200 - 30                                  |
| <b>Dimensions</b>                     |  |   |
| Absorber Area                         | 21.635ft <sup>2</sup> / 2.01m <sup>2</sup> | 32.518ft <sup>2</sup> / 3.021m <sup>2</sup> |
| Overall Dimensions                    | 78.9" x 55.8" x 3.8" / 2005 x 1418 x 97mm  | 78.7" x 83.7" x 3.8" / 2005 x 2127 x 97mm   |
| Width of Manifold                     | 55.8" / 1418mm                             | 85.7" / 2127mm                              |
| Length (Tube and Manifold)            | 78.9" / 2005mm                             | 78.9" / 2005mm                              |
| Depth                                 | 3.8" / 97mm                                | 3.8" / 97mm                                 |
| Aperture Area                         | 21.63ft <sup>2</sup> / 2.010m <sup>2</sup> | 32.52ft <sup>2</sup> / 3.021m <sup>2</sup>  |
| Fluid Volume (In Manifold)            | 0.32 Gallons / 1.2 Ltr                     | 0.45 Gallons / 1.7 Ltr                      |
| Inlet and Outlet Dimensions           | 0.75" / 22mm                               | 0.75" / 22mm                                |
| Weight (Empty)                        | 111lbs / 50.3kg                            | 160lbs / 75.1kg                             |
| <b>Mounting</b>                       |  |   |
| Recommended Inclination               | 30-70°                                     | 30-70°                                      |
| <b>Operating Data</b>                 |  |   |
| Efficiency                            | Based on Absorber                          | Based on Absorber                           |
| eta 0                                 | 0.792                                      | 0.778                                       |
| k1                                    | 1.25 W/m <sup>2</sup> K                    | 0.91 W/m <sup>2</sup> K                     |
| k2                                    | 0.0088 W/m <sup>2</sup> K <sup>2</sup>     | 0.01 W/m <sup>2</sup> K <sup>2</sup>        |
| <b>Test Report</b>                    |  |   |
| Performance Test Report               | BLG 10906                                  | BLG 11006                                   |
| <b>Quality Test Report</b>            |  |   |
| Flow Rate                             |  |   |
| Rated                                 | 0.71 gpm - 2.67 Ltr / m                    | 1.06 gpm - 4 Ltr / m                        |
| Minimum                               | 0.57 gpm - 2 Ltr / m                       | 0.79 gpm - 3 Ltr / m                        |
| Maximum                               | 1.32 gpm - 5 Ltr / m                       | 2.11 gpm - 8 Ltr / m                        |
| Maximum Operating Pressure            | 116 psi / 8 Bar                            | 116 psi / 8 Bar                             |
| Stagnation Temperature                | 331°F / 166°C                              | 362°F / 183.6°C                             |
| Heat Transfer Fluid                   | Water/Glycol                               | Water/Glycol                                |
| <b>Materials</b>                      |  |   |
| Absorber                              | Copper                                     | Copper                                      |
| Coating                               | Selective Coating                          | Selective Coating                           |
| Absorbance                            | 95%  | 95%   |
| Emissivity                            | 5%   | 5%  |
| Mounting Frame and Clips              | Stainless Steel, Aluminium, EPDM           | Stainless Steel, Aluminium, EPDM            |
| Glass                                 | Low Iron - Transm. 0.92                    | Low Iron - Transm. 0.92                     |
| Vacuum                                | Lower than 10 <sup>-8</sup> Bar            | Lower than 10 <sup>-8</sup> Bar             |
| Temperature Limitation (Memotron)     | 266 - 275°F / 130 - 135°C                  | 266 - 275°F / 130 - 135°C                   |
| Quality Certification / SRCC          | Yes  | Yes   |
| Quality Certification / Solar Keymark | Yes  | Yes   |

For specific sizing requirements, please contact our technical teams.



Solar heating is the natural way to reduce your energy bills and your carbon footprint. It doesn't have to cost the earth.



United States  
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Due to our continuing policy of development and improvement we reserve the right to alter and amend the specification as shown in this literature

