





## **Camel Solar**

Our philosophy is very simple at Camel Solar. The target of our solar thermal collectors is to have the highest coefficient of efficiency, maximize the energy produced by solar collectors, and consequently reduce operational energy costs.

The "clean energy" future will be a composition of technologies based on renewable energy sources such as solar, wind, water and biomass, which all play an increasingly important role in the new global energy economy.

Camel Solar brings you some of the most advanced solar thermal systems available on the market today through innovation, research and development.

We are experts in the renewable energy industry and have extensive experience designing and manufacturing top of the range heating and cooling technology.

We work closely with designers, developers and architects to focus on functionality, efficiency and style. Camel Solar's thermal systems harness the maximum solar radiation to power both commercial and domestic buildings.

#### **Consumer Benefits**

- Green energy source
- Sustainable and renewable
- Self-sufficiency
- Reduced energy bills
- Government incentives
- Require very little maintenance
- Reduced noise pollution
- Modern design features
- Higher Energy Performance Certificate (EPC) rating

#### **Product Features**

- · Patented selective coatings
- Patented absorber technology
- · New innovations in welding techniques
- Seamless and aesthetic design
- Cost-effective
- Easy to install
- Competitively priced
- Simple and reliable technology
- Automatic and controlled heat settings to work with existing systems



Camel Solar's patented formulas improve absorption and insulation to give the most effective results at affordable prices. Camel Solar's products can be used for different energy and building requirements, maximising the potential of renewable energy.





#### **Applications – Commercial and Domestic**

- Swimming Pools
- Leisure centres
- · Hotels and spa facilities
- Offices
- Schools
- Factories and Retail
- Residential Developments
- Breweries
- Dairies
- Solar Cooling

#### **Factors to Consider**

- Annual solar radiation
- Number of people relying on the solar thermal system
- Patterns of hot water usage
- Available space
- Roof/façade inclination
- Custom solutions available

The products are much more than functioning solar collectors, they are aesthetic design features.

Professionals can calculate how best to obtain the results you need at an affordable price, so that more people can access solar energy than ever before.

#### **Solar Energy**

Sunlight is by far the largest carbon-free energy source on the planet. Harnessing solar radiation can provide cost-effective, self sufficient energy and also significantly reduce CO2 emissions.

More energy from the sun strikes the Earth per hour than all other energy consumed on the planet each year, and all the known Earth reserves of coal, oil, natural gas, and uranium combined are more than 10 times smaller than the energy received from sunlight each year.

#### Solar energy can be harvested in two ways:

- 1. Solar thermal collectors transform solar energy into heat.
- 2. Solar PV modules directly convert the solar radiation into electricity.

The UK receives approximately 900-1200 kW/hrs solar energy per square meter of land area each year.

Using thermal collector systems, there is enough solar radiation in the UK to provide 50%- 60% of its domestic hot water requirements for a whole year.

There is enough direct and diffuse solar radiation to provide heating on cloudy days. In winter, solar energy can relieve the load of boilers or heat pumps, reducing the overall cost of energy bills through stored water.

Camel Solar's advanced technology systems have been developed to optimise solar energy insolation, absorption and transmission; making this renewable energy source a viable alternative.





## **Camel Solar Factory**

The factory was finished in September 2012.

The factory all together covers more than 2500 m<sup>2</sup>.

The factory has 4 floors:

- 1st floor is where the registers and absorbers are created.
- 2nd floor is where the assembly of the collectors takes place
- 3rd floor is the storage facility
- 4th floor is where the accessories associated with the collectors and raw materials are stored and extra storage if necessary.

The factory's hot water and heating is run by Camel solar Flat plate, Evacuated tube collectors and backup heat pumps.

There are 18 Flat plate collectors and 3 x 78 Evacuated tube collectors. The collectors are connected to a 7 m<sup>3</sup> storage tank which is located under the factory's first floor.

The hot water in the 7m<sup>3</sup> tank supplies the factories under floor heating in the offices and board room areas. The collectors are combined with two fan coil units which supply the production facilities with space heating.

The factory have also installed 9 facade units with a 200 litre tank. The tank is connected to another fan coil unit and has a backup heat pump adding to the space heating in the factory.

These systems together cover all the heating requirements for the building.





## **Camel Solar Full Plate Absorbers**

Using the latest technology, Camel Solar produces the newest absorbers without out visible welding lines and deformation of the absorber which is commonly seen in most solar thermal collectors.

The Camel Solar absorber uses ultrasonic welding technology. This IS done on the backside of the absorber. For the first time the heat transfer from the absorber Plate to the Copper register is a combination of conductivity and convection. This means the heat transfer is much better than the existing absorbers.

The characteristics and benefits of the Full plate absorber:

- The absorber is composed of 10 ultrasonically welded copper pipes.
- An aluminium absorber with a PVD (Physical vapour deposition) selective coating
- The new welding technique allows for an increase in the heat transfer and improves the co-efficient of efficiency.
- No waves and deformation allow for a very smooth absorber surface which means they are perfect for implementing onto roofs and facades.
- The absorbers can either be implemented in a flat plate collector or into a faced collector for mounting or replacing existing window panels.









This is Camel Solar's new Evacuated Tube Collector. The collector is composed of 10 evacuated tubes with highly efficient selective coatings. The Glass tube has a PVD (physical vapour deposition) selective coating inside enhancing the absorption of the tube.

Inside the glass tube are U type copper pipes. These pipes are welded to an additional absorber. This absorber has its own patented selective coating increasing the heat transfer to the copper pipes and intern to the heat transfer fluid.

The U type copper pipes join two separate manifolds which are carefully placed in an anodized aluminum box and insulated with a high density rock wall.

Combining the latest research and technology this is one of the most efficient collectors on the market today and has recieved Solar Keymark Certification.

The Collector is perfect for domestic, commercial and industrial applications with a stagnation temperature of 250°c. Clients are using these panels for swimming pool applications, heating pools past 30°c without any other form of energy.

### **Efficiency Curve**





1 - Aluminium Manifold I 2 - Rubber Seal I 3 - Thermal Sidewall Insulation I 4 - Absorber I 5 - Glass Tube Double Wall Vacuum I 6 - Hot Supply Manifold I 7 - Cold return Manifold



Manufactures	
Manufacturer	
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rupp	ublic of Macedonia
Type of Collector	CS Vacuum 10
Year of Production	2011
Dimensions of Collector	
Gross Area	1.60 m <sup>2</sup>
Aperture Area	0.95 m <sup>2</sup>
Absorber Area	0.81 m <sup>2</sup>
Technical Figures	
Collector Type	Evacuated Tubular Collector With Direct Flow
Length	1988 mm (Determined by Test Lab)
Width	807 mm (Determined by Test Lab)
Height	158 mm (Determined by Test Lab)
Material	Aluminium Frame + Manifold
Weight	32 kg
Sealing Material	Rubber
Collector Mounting	On Roof, Flat Roof
Absorber	
Material	Glass
Absorption	0.92 - 0.96
Emittance	0.04 - 0.06
Heat Transfer Fluid	1.74 litres
Number of Absorber Tubes	10
Number of Connections	2
Glass	
Material	High Borsilicate Glass
Transmittance	0.92
Outer Diameter Glass Tube	58mm
Thermal insulation	
Material	Rock Wool
Thermal Conductivity	0.035w/(mK)
Thickness	20 mm
Limits	
Stagnation Temperature	250 °c
Max. Operating Pressure	10 bar
Heat Transfer Fluid	Glycol / Water Mixture



## Technical Characteristics Evacuated Tubes - Evacuated 15

This is Camel Solar's new Evacuated Tube Collector. The collector is composed of 15 evacuated tubes with highly efficient selective coatings. The Glass tube has a PVD (physical vapour deposition) selective coating inside enhancing the absorption of the tube.

Inside the glass tube are U type copper pipes. These pipes are welded to an additional absorber. This absorber has its own patented selective coating increasing the heat transfer to the copper pipes and intern to the heat transfer fluid.

The U type copper pipes join two separate manifolds which are carefully placed in an anodized aluminum box and insulated with a high density rock wall.

Combining the latest research and technology this is one of the most efficient collectors on the market today and has recieved Solar Keymark Certification.

The Collector is perfect for domestic, commercial and industrial applications with a stagnation temperature of 250°c. Clients are using these panels for swimming pool applications, heating pools past 30°c without any other form of energy.

## **Efficiency Curve**





1 - Aluminium Manifold I 2 - Rubber Seal I 3 - Thermal Sidewall Insulation I 4 - Absorber I 5 - Glass Tube Double Wall Vacuum I 6 - Hot Supply Manifold I 7 - Cold return Manifold



Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rupublic of Macedonia         Type of Collector       CS Vacuum 15         Vear of Production       2011         Dimensions of Collector       Gross Area         Aperture Area       1.42 m²         Absorber Area       1.21 m²         Technical Figures       Collector With Direct Flow         Length       1990 mm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Height       159 mm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber       Sealing Material         Material       Glass         Absorber       15         Material       0.92 · 0.96         Emitance       0.92         Number of Absorber Tubes       15         Number of Absorber Tubes       15         Number of Absorber Tube       398         Test Lab       Sealing Material         Material       High Borsilicate Glass         Outer Diameter Glass Tube       5         Number of Absorber Tube       5	Manufacturer	
Type of Collector       CS Vacuum 15         Year of Production       2011         Dimensions of Collector       Gross Area         Gross Area       2.35 m²         Aperture Area       1.42 m²         Absorber Area       1.21 m²         Technical Figures       Collector type         Evacuated Tubular Collector With Direct Flow         Length       1990 mm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber       Material         Material       Glass         Absorbor       0.92 - 0.86         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Connections       2         Glass       2         Material       High Borsilicate Glass         Transmitance       0.92         Outer Diameter Glass Tube       58mm         Transmitance       0.92         Outer Diameter Glass Tube       58mm         Thermal Insulation       Model	Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rup	ublic of Macedonia
Year of Production     2011       Dimensions of Collector     Gross Area     2.35 m <sup>2</sup> Aperture Area     1.42 m <sup>2</sup> Absorber Area     1.21 m <sup>2</sup> Technical Figures     Collector Wth Direct Flow       Langth     1990 mm (Determined by Test Lab)       Width     1180 mm (Determined by Test Lab)       Width     1180 mm (Determined by Test Lab)       Material     Aluminium Frame + Manifold       Weight     45 kg       Sealing Material     Rubber       Collector Mounting     On Roof, Flat Roof       Absorber     Material       Material     Glass       Absorber Tubes     15       Number of Absorber Tubes     15       Number of Connections     2       Class     15       Material     High Borsilicate Glass       Transmitance     0.92       Outer Diameter Glass Tube     58mm       Thermal Insulation     Seal       Material     Rick Wool       Thermal Conductivity     0.035w/(mk)       Thickness     20 mm       Limits     250 °C       Stagnation Temperature     250 °C       Max. Operating Pressure     10 bar	Type of Collector	CS Vacuum 15
Dimensions of Collector         Gross Area       2.35 m²         Aperture Area       1.42 m²         Absorber Area       1.21 m²         Technical Figures       Collector With Direct Flow         Length       1990 mm (Determined by Test Lab)         Height       180 mm (Determined by Test Lab)         Height       188 mm (Determined by Test Lab)         Height       188 mm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber       Emittance         Material       Glass         Absorber Tubes       15         Number of Absorber Tubes       15         Number of Connections       2         Cias       Glass         Material       High Borsilicate Glass         Transmitance       0.92         Outer Diameter Glass Tube       58mm         Thermal Insulation       Samm         Material       Righ Borsilicate Glass         Transmitance       0.92         Outer Diameter Glass Tube       58mm         Thermal Insulation       Samm	Year of Production	2011
Dimensions of Collector           Gross Area         2.35 m <sup>5</sup> Aperture Area         1.42 m <sup>2</sup> Absorber Area         1.21 m <sup>2</sup> Technical Figures         Collector With Direct Flow           Length         1990 mm (Determined by Test Lab)           Width         1180 mm (Determined by Test Lab)           Height         158 mm (Determined by Test Lab)           Material         Aluminium Frame + Manitoid           Weight         45 kg           Sealing Material         Rubber           Collector Mounting         On Roof, Flat Roof           Absorber         Absorber           Material         Glass           Absorber Notes         15           Material         Glass           Absorbor         0.92 - 0.96           Emittance         0.04 - 0.06           Heat Transfer Fluid         2.95 Litres           Number of Connections         2           Gisse         Glass           Material         High Borsilicate Glass           Transmittance         0.92           Outer Diameter Glass Tube         Smm           Thermal Insulation         Thermal Conductivity           Thermal Insulation         Qa5tm/(mK/) <td></td> <td></td>		
Gross Area       2.35 m²         Aperture Area       1.42 m²         Absorber Area       1.21 m²         Technical Figures	Dimensions of Collector	
Aperture Area       1.42 m²         Absorber Area       1.21 m²         Technical Figures       Evacuated Tubular Collector With Direct Flow         Length       1990 nm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Height       158 nm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber       Material         Material       Glass         Absorption       0.92 - 0.96         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Connections       2         Ciass       15         Material       High Borsilicate Glass         Transmittance       0.92         Outer Diameter Glass Tube       58mm         Thermal Insulation       Instring Fluid         Material       Rock Wool         Thermal Conductivity       0.035w/(mk)         Theres       20 mm         Limits       20 °c         Stagnation Temperature       250 °c         Max. Operating Pressure <td< td=""><td>Gross Area</td><td>2.35 m<sup>2</sup></td></td<>	Gross Area	2.35 m <sup>2</sup>
Absorber Area       1.21 m²         Technical Figures       Collector type         Evacuated Tubular Collector With Direct Flow         Length       1990 mm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Height       158 mm (Determined by Test Lab)         Height       45 kg         Sealing Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber       Emittance         Material       Glass         Absorbor       0.92 - 0.96         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Absorber Tubes       15         Number of Connections       2         Glass       Glass         Material       High Borsilicate Glass         Transfittance       0.92         Outer Diameter Glass Tube       S8mm         Thermal insulation       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Stagnation Temperature       250 °c         Material       Glasc <td>Aperture Area</td> <td>1.42 m<sup>2</sup></td>	Aperture Area	1.42 m <sup>2</sup>
Technical Figures         Collector type       Evacuated Tubular Collector With Direct Flow         Length       1990 mm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Height       158 mm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber       Material         Material       Glass         Absorption       0.92 - 0.96         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Connections       2         Class       15         Material       High Borsilicate Glass         Material       High Borsilicate Glass         Transmittance       0.92         Outer Diameter Glass Tube       58mm         Thermal insulation       Material         Thermal conductivity       0.035w/(mk)         Thickness       20 mm	Absorber Area	1.21 m <sup>2</sup>
Technical Figures         Collector type       Evacuated Tubular Collector With Direct Flow         Length       1990 mm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Height       158 mm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber		
Collector type       Evacuated Tubular Collector With Direct Flow         Length       1990 mm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber         Material       Glass         Absorption       0.92 - 0.96         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Absorber Tubes       15         Number of Absorber Tubes       15         Number of Absorber Tubes       15         Number of Connections       2         Eliase         Material       High Borsilicate Glass         Transmittance       0.92         Outer Diameter Glass Tube       58mm         Seame         Thermal Insulation         Material       Rock Wool         Thermal Insulation       Units         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture <td>Technical Figures</td> <td></td>	Technical Figures	
Length       1990 mm (Determined by Test Lab)         Width       1180 mm (Determined by Test Lab)         Height       158 mm (Determined by Test Lab)         Material       Aluminium Frame + Manifold         Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber	Collector type	Evacuated Tubular Collector With Direct Flow
Width1180 mm (Determined by Test Lab)Height158 mm (Determined by Test Lab)MaterialAluminium Frame + ManifoldWeight45 kgSealing MaterialRubberCollector MountingOn Roof, Flat RoofAbsorberMaterialGlassAbsorption0.92 - 0.96Emittance0.04 - 0.06Heat Transfer Fluid2.95 LitresNumber of Absorber Tubes15Number of Connections2ClassMaterialHigh Borsilicate GlassTransmittance0.92Outer Diameter Glass Tube58mmThermal InsulationMaterialRock WoolThermal Conductivity0.035w/(mK)Thickness20 mmLimitsStagnation Temperature250 °cMax. Operating Pressure10 barHeat Transfer FluidGlycol / Water Mixture	Length	1990 mm (Determined by Test Lab)
Height158 mm (Determined by Test Lab)MaterialAluminium Frame + ManifoldWeight45 kgSealing MaterialRubberCollector MountingOn Roof, Flat RoofAbsorberMaterialGlassAbsorption0.92 • 0.96Emittance0.04 • 0.06Heat Transfer Fluid2.95 LitresNumber of Absorber Tubes15Number of Connections2ClassMaterialHigh Borsilicate GlassTransmittance0.92Outer Diameter Glass Tube58mmThermal InsulationMaterialRock WoolThermal Conductivity0.035w((mK)Thermal Conductivity0.035w((mK)Thermal Reserver20 mmLimitsStagnation Temperature250 °cMax. Operating Pressure10 barHeat Transfer FluidGlycol / Water Mixture	Width	1180 mm (Determined by Test Lab)
MaterialAluminium Frame + ManifoldWeight45 kgSealing MaterialRubberCollector MountingOn Roof, Flat RoofAbsorberImage: Sealing MaterialMaterialGlassAbsorption0.92 - 0.96Emittance0.04 - 0.06Heat Transfer Fluid2.95 LitresNumber of Absorber Tubes15Number of Connections2CollectionsThermal insulationMaterialHigh Borsilicate GlassTransmittance0.92Outer Diameter Glass Tube58mmThermal InsulationMaterialRock WoolThermal Conductivity0.035w/(mK)Thirds20 mmLimitsStagnation Temperature250 °cMax. Operating Pressure10 barHeat Transfer FluidGlycol / Water Mixture	Height	158 mm (Determined by Test Lab)
Weight       45 kg         Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber	Material	Aluminium Frame + Manifold
Sealing Material       Rubber         Collector Mounting       On Roof, Flat Roof         Absorber	Weight	45 kg
Collector Mounting       On Roof, Flat Roof         Absorber       Material         Material       Glass         Absorption       0.92 - 0.96         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Absorber Tubes       15         Number of Connections       2         Glass	Sealing Material	Rubber
Absorber         Material       Glass         Absorption       0.92 - 0.96         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Absorber Tubes       15         Number of Connections       2         Glass       2         Material       High Borsilicate Glass         Transmittance       0.92         Outer Diameter Glass Tube       58mm         Thermal insulation       10035w/(mK)         Thickness       20 mm         Limits       20 mm         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Collector Mounting	On Roof, Flat Roof
Absorber         Material       Glass         Absorption       0.92 - 0.96         Emittance       0.04 - 0.06         Heat Transfer Fluid       2.95 Litres         Number of Absorber Tubes       15         Number of Connections       2         Glass         Material       High Borsilicate Glass         Transmittance       0.92         Outer Diameter Glass Tube       58mm         Thermal insulation         Material       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture		
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Heat Transfer Fluid2.95 LitresNumber of Absorber Tubes15Number of Connections2GlassMaterialHigh Borsilicate GlassTransmittance0.92Outer Diameter Glass Tube58mmThermal InsulationMaterialRock WoolThermal Conductivity0.035w/(mK)Theress20 mmLimitsStagnation Temperature250 °cMax. Operating Pressure10 barGlycol / Water Mixture	Emittance	0.04 - 0.06
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Number of Connections       2         Glass       Material       High Borsilicate Glass         Transmittance       0.92         Outer Diameter Glass Tube       58mm         Thermal insulation       Naterial         Material       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits       Stagnation Temperature         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Number of Absorber Tubes	15
Glass       High Borsilicate Glass         Material       High Borsilicate Glass         Transmittance       0.92         Outer Diameter Glass Tube       58mm         Thermal insulation         Material         Material       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits         Stagnation Temperature         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Number of Connections	2
GlassMaterialHigh Borsilicate GlassTransmittance0.92Outer Diameter Glass Tube58mmThermal insulationMaterialRock WoolThermal Conductivity0.035w/(mK)Thickness20 mmLimitsStagnation Temperature250 °cMax. Operating Pressure10 barHeat Transfer FluidGlycol / Water Mixture		
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Transmittance       0.92         Outer Diameter Glass Tube       58mm         Thermal insulation         Material       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Material	High Borsilicate Glass
Outer Diameter Glass Tube     58mm       Thermal insulation       Material     Rock Wool       Thermal Conductivity     0.035w/(mK)       Thickness     20 mm       Limits       Stagnation Temperature     250 °c       Max. Operating Pressure     10 bar       Heat Transfer Fluid     Glycol / Water Mixture	Transmittance	0.92
Thermal insulation         Material       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits       Z50 °c         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Outer Diameter Glass Tube	58mm
Thermal insulation         Material       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits       Zummer         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture		
Material       Rock Wool         Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits       250 °c         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Thermal insulation	
Thermal Conductivity       0.035w/(mK)         Thickness       20 mm         Limits       250 °c         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Material	Rock Wool
Thickness     20 mm       Limits       Stagnation Temperature     250 °c       Max. Operating Pressure     10 bar       Heat Transfer Fluid     Glycol / Water Mixture	Thermal Conductivity	0.035w/(mK)
Limits         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture	Thickness	20 mm
Limits         Stagnation Temperature       250 °c         Max. Operating Pressure       10 bar         Heat Transfer Fluid       Glycol / Water Mixture		
Stagnation Temperature     250 °c       Max. Operating Pressure     10 bar       Heat Transfer Fluid     Glycol / Water Mixture	Limits	
Max. Operating Pressure     10 bar       Heat Transfer Fluid     Glycol / Water Mixture	Stagnation Temperature	250 °c
Heat Transfer Fluid Glycol / Water Mixture	Max. Operating Pressure	10 bar
	Heat Transfer Fluid	Glycol / Water Mixture





The CS Flat Plate collector is composed of a special façade fullplate absorber, coated with high quality, selective PVD (physical vapour deposition) coating.

The absorber sheet is then welded to a register comprising of 9 copper pipes. The absorber is welded using latest welding techniques to improve the heat transfer from the absorber to the heat transfer fluid in the copper pipes.

The completed absorber is placed into an aluminium anodized frame box and isolated with high density rock wall rock wool.

The glass is solar glass which is tempered, iron-free antreflective. The low-soiling coating on the glass is anti-dust and anti-corrosive. It keeps the glass clear with the same optical characteristics, which means that it can effectively help clean itself.

The sealing between the casing and glass is done using high temperature resistant silicone, for an attractive finish and minimal heat loss.



### **Efficiency Curve**





1 - Aluminium Frame I 2 - Silicone Seal I 3 - Thermal Sidewall Insulation I 4 - Thermal Insulation I 5 - Copper Tubes I 6 - Glass I 7 - Aluminium Back I 8 - Absorber



Manufacturer		
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rupublic of Macedonia		
Type of Collector	Cs Full Plate 2.0-2	
Year of Production	2012	
Dimensions of Collector		
Gross Area	2.02 m <sup>2</sup>	
Aperture Area	1.82 m <sup>2</sup>	
Absorber Area	1.82 m <sup>2</sup>	
Technical Figures		
Collector Type	Flat Plate Collector	
Length	2006 mm (Determined by Test Lab)	
Width	1005 mm (Determined by Test Lab)	
Height	85 mm (Determined by Test Lab)	
Material	Aluminium	
Weight	33kg	
Sealing Material	Silicon	
Collector Mounting	On Roof, Flat Roof	
Absorber		
Material	Aluminium Sheet and Copper Piping	
Absorption	0.95	
Emittance	0.05	
Heat Transfer Fluid	1.3 Litres	
Number of Absorber Tubes	9	
Number of Connections	2	
Glass		
Material	Tempered Low Iron Glass	
Transmittance	0.92	
Thermal insulation		
Material	Rock Rool	
I hermal Conductivity	0.035w/(mK)	
Ihickness	50 mm	
Limits	107.0-	
Stagnation remperature	19/ °C	
Max. Operating Pressure	10 bar	
Heat Iranster Fluid	Giycoi / Water Mixture	





The CS Flat Plate collector is composed of a special façade fullplate absorber, coated with high quality, selective PVD (physical vapour deposition) coating.

The absorber sheet is then welded to a register comprising of 10 copper pipes. The absorber is welded using latest welding techniques to improve the heat transfer from the absorber to the heat transfer fluid in the copper pipes.

The completed absorber is placed into an aluminium anodized frame box and isolated with high density rock wall rock wool.

The glass is solar glass which is tempered, iron-free antreflective. The low-soiling coating on the glass is anti-dust and anti-corrosive. It keeps the glass clear with the same optical characteristics, which means that it can effectively help clean itself.

The sealing between the casing and glass is done using high temperature resistant silicone, for an attractive finish and minimal heat loss.



### **Efficiency Curve**





1 - Aluminium Frame I 2 - Silicone Seal I 3 - Thermal Sidewall Insulation I 4 - Thermal Insulation I 5 - Copper Tubes I 6 - Glass I 7 - Aluminium Back I 8 - Absorber



Manufacturer		
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rupublic of Macedonia		
Type of Collector	Cs Full Plate 2.0-4	
Year of Production	2012	
Dimensions of Collector		
Gross Area	2.02 m <sup>2</sup>	
Aperture Area	1.83 m <sup>2</sup>	
Absorber Area	1.83 m <sup>2</sup>	
Technical Figures		
Collector Type	Flat Plate Collector	
Length	2005 mm (Determined by Test Lab)	
Width	1005 mm (Determined by Test Lab)	
Height	85 mm (Determined by Test Lab)	
Material	Aluminium	
Weight	33 kg	
Sealing Material	Silicon	
Collector Mounting	On Roof, Flat Roof	
Absorber		
Material	Aluminium Sheet and Copper Piping	
Absorption	0.95	
Emittance	0.05	
Heat Transfer Fluid	1.5 Litres	
Number of Absorber Tubes	10	
Number of Connections	4	
Glass		
Material	Tempered Low Iron Glass	
Transmittance	0.92	
Thermal insulation		
Material	Rock Rool	
Thermal Conductivity	0.035w/(mK)	
Thickness	50 mm	
Limits		
Stagnation Temperature	197 °c	
Max. Operating Pressure	10 bar	
Heat Transfer Fluid	Glycol / Water Mixture	





The Façade Collector has seamless connections. The Collector is manufactured using the highest quality materials and the transfer of heat from the absorber to the copper pipes below is optimized using new welding techniques and latest research and development.

The facade module uses the latest absorber technology with one single absorber. This absorber has no welding lines allowing for 6-8% increae in its efficiency.

The complete full-plate absorber is welded to a copper register comprising of 10 copper pipes and is then placed in a new Aluminium frame. Behind the window module is high density rock wool and the decorative plate, for efficiency and style.

The glass is solar glass which is tempered, iron-free antreflective. The low-soiling coating on the glass is anti-dust and anti-corrosive. It keeps the glass clear with the same optical characteristics, which means that it can effectively help clean itself.

These solar thermal collectors are designed to be integrated and fully functional, using the solar radiation from the sun and transferring that heat energy to heat domestic, commercial and industrial application.





### **Efficiency Curve**





1 - Aluminium Manifold I 2 - Rubber Seal I 3 - Thermal Sidewall Insulation I 4 - Absorber I 5 - Glass



Manufacturer		
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rupublic of Macedonia		
Type of Collector	Façade Module	
Year of Production	2012	
Dimensions of Collector		
Gross Area	1.9 m <sup>2</sup>	
Aperture Area	1.8 m <sup>2</sup>	
Absorber Area	1.8 m <sup>2</sup>	
Technical Figures		
Collector Type	Façade Module	
Length	1960 mm (Determined by Test Lab)	
Width	960 mm (Determined by Test Lab)	
Height	29 mm (Determined by Test Lab)	
Material	Glass / Aluminium	
Weight	-	
Sealing Material	Silicon	
Collector Mounting	Façade / On Roof	
Absorber		
Material	Aluminium Sheet and Copper Piping	
Absorption	0.95	
Emittance	0.05	
Heat Transfer Fluid	0.8 Litres	
Number of Absorber Tubes	9	
Number of Connections	4/2	
Glass		
Material	Tempered Low Iron Glass	
Transmittance	0.92/0.96	
Thermal insulation		
Material	Rock Wool	
Thermal Conductivity	0.045w/(mK)	
Thickness	50 mm	
Limits		
Stagnation Temperature	195 °C	
Max. Operating Pressure	10 bar	
Heat Transfer Fluid	Glycol / Water Mixture	



### **Case Studies**



Name Of project: Parrot House Type of project: Domestic swimming Pool Size of Pool: 11m x 6m x 1.5m = 99m<sup>3</sup> Size of Storage: 250 litres Panel Type: Flat Plate Collector Installed Equipment: 25 Flat Plate Collectors

The Swimming pool is heated from April to October by the solar thermal system which produces 30kw.



Name Of project: Sport Center Trajkovski Type of project: Swimming pool Complex Size of Pool: 33m x 25m x 2m = 1650m<sup>3</sup> Panel Type: Evacuated 15 tube Equipment installed: 190 Evacuated Tube Collectors

The swimming pool is heated throughout the year by the Solar thermal system which produces 250-300kw



Name of Project: Apartment Complex Soravia Type of Project: Domestic hot water Size of Storage: 14000 litres Panel Type: Evacuated 15 tube Equipment Installed: 80 Evacuated Tube Collectors

The apartment Hot water is heated throughout the year by the solar thermal system which produces 100-120kw





Name Of project: Queens Hotel Type of project: Commerical Hot Water Size of Storage: 1000 litres Panel Type: Evacuated CS15 Tube Installed Equipment: 24 Evacuated Tube Collectors Collectors

Luxurious four star hotel Queens, with 30 rooms and restaurants, located in the very center of the city of Skopje.

The hotel is heated throughout the year by the solar thermal system which produces 30-36kW.



Name Of project: Oxted Place Type of project: Domestic Swimming Pool Size of Pool: 5m x 3m x 1.5m = 19.5m<sup>3</sup> Panel Type: Façade Equipment installed: Façade

The swimming pool is heated throghtout the year by the solar thermal systen which produces 12-15kw



Name of Project: Camel Solar Factory Type of Project: Commercial factory Size of Storage: 7200 litres Panel Type: Evacuated tube, flat plate, facade Equipment installed: 3 x 78 evacuated tube collectors 18 x flat plate collectors 9 x facade collectors.

The factory has under floor heating which is done via the solar collectors and has backup heat pumps. The solar thermal system produces



### **Solar Keymark**

Camel Solar have received the Solar Keymark certification and Camel Solar products are listed on the Solar Keymark international database. This is the European label for quality.

### **Building Regulations**

All new domestic and commercial properties must obtain an Energy Performance Certificate (EPC) rating.

- Energy inspectors calculate the EPC rating by detailing the energy efficiency and environmental impact of a property.
- The higher the rating, the more energy efficient the property is. The key elements considered in calculating efficiency are: windows, walls, roof, floors, main heating, heating controls, secondary heating, hot water and lighting.
- The installation of solar thermal collectors increases

efficiency and improves EPC ratings on properties, reducing fuel bills, meeting modern building requirements and improving the features of the building.

- The social responsibility to integrate solar panels can be seen by government incentives and feed-in tariffs, to encourage consumers to consider this efficient form of energy generation.
- Approximately 28% of the UK's CO2 emissions come from domestic homes and around 49% of the energy demand of the EU comes from the heating and cooling sector. Solar energy is effective not only for the home, but also for the planet.



Camel Solar's patented formulas improve absorption and insulation to give the most effectiveresults at affordable prices. Camel Solar's products can be used for different energy and building requirements, maximising the potential of renewable energy.



#### **Renewable Heat Incentive**

#### What is the RHI?

The renewable heat incentive is a payment scheme established for those generating heat from a renewable source of energy. The RHI has been set up in the UK by the government to help us become more sustainable through reducing our energy bills but also helping the government to meet their CO2 emission targets for 2020.

#### **Benefits?**

- Reduced dependence on Fossil Fuels such as oil and gas, both of which are becoming increasingly expensive year-onyear.
- For commercial installation you will be paid up to 8.5p/kWhr for the hot water and heat you generate using the Camel Solar thermal system.
- The RHI payout will last for 20 years from the day that it is registered and will be constantly monitored with inflation.

Will this shorten the payback period and cover installation costs?

- The RHI does help reduce the payback period making it more attractive to consumers.
- We estimate at Camel Solar that many consumers will gain enough return from the tariffs to cover their installation costs within an estimated period of 5-10 years.

Investing in Camel Solar thermal and other energy saving products can significantly reduce a company's energy bills, through reduced operational costs and incentives. This also reduces a company's Climate Change Levy, creating savings year upon year.





#### Factory

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