





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.
- 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 m².

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 m³ storage tank which is located under the factory's first floor.

The hot water in the 7m³ 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 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.

We are able to manufacture Absorbers with different types of registers. We can manufacture U shape, serpentine and harp style registers. The register and size of the absorber can be changed depending on the client's requirements.

At the moment we can produce standard absorbers, maximum sizes 1200mm x 5000mm.

The Characteristics and Benefits of the Full Plate Absorber

The standard absorbers are composed of either 9 or 10 ultrasonically welded copper pipes. However for tailor made solutions this will vary.

The aluminium absorber has a PVD (physical vapour deposition) selective coating. This coating is available in three colours, blue, dark purple and bronze.

The new welding technique increases the heat transfer from the absorber to the heat transfer fluid in the copper register. This transfer is done by both convection and conduction improving the co-efficient of efficiency.

The absorber has no waves or deformation allowing for a very smooth and clean finish. This means they are perfect for mounting on the facades of buildings.

The absorbers can be mounted either in Flat plate collectors or facade collectors.

Performance Curves Based on Absorber Area









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 rockwool.

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



Manufacturer	
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rup	ublic of Macedonia
Type of Collector	CS Vacuum 10
Dimensions of Collector	
Gross Area	1.60 m ²
Aperture Area	0.95 m ²
Absorber Area	0.81 m ²
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
	32 Kg
Sealing Material	Rubber
Collector Mounting	On Hoot, Flat Hoot
Alexandrey	
Absorber	Class
Absorption	
	0.92 - 0.96
Heat Transfer Eluid	1.74 litros
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	Rockwool
Thermal Conductivity	0.035w/(mK)
Thickness	20 mm
Limits	
Stagnation Temperature	250 °c
Max. Operating Pressure	10 bar
Heat Transfer Fluid	Glycol / Water Mixture





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 rockwool.

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



Manufacturer	
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rup	ublic of Macedonia
Type of Collector	CS Vacuum 15
Dimensions of Collector	
Gross Area	2.35 m ²
Aperture Area	1.42 m ²
Absorber Area	1.21 m ²
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	Glass
	0.92 - 0.96
Emittance	
	2.95 Lilles
Number of Connections	0
	2
Glass	
Material	High Borsilicate Glass
Transmittance	0.92
Outer Diameter Glass Tube	58mm
Thermal insulation	
Material	Rockwool
Thermal Conductivity	0.035w/(mK)
Thickness	20 mm
Limits	
Stagnation Temperature	250 °c
Max. Operating Pressure	10 bar
Heat Transfer Fluid	Glycol / Water Mixture





The CSI Full Plate 2.5m2 - 4 collector is composed of a special full plate absorber, coated with high quality, selective PVD (physical vapour deposition) coating.

The absorber sheet is then welded to a register comprising of 15 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 rockwool.

The glass is solar glass which is tempered, iron-free, antireflective. The low-soiling coating on the glass is anti-dust and anti-corrossive. 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.

Power Curve





Test report No.: 17COL1405 ; Addition to test report No.: 17COL1405; Test report No.: 17COL1405Q; Annex to Solar Keymark Certificate–License number: 011-7S2821 F Testing laboratory / Inspection Body Universität Stuttgart, Institut Fur Thermodynamik und Wärmetechnik Pfaffenwaldring 6, 70569 Stuttgart, GERMANY





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



Manufacturer	
Camel Solar Itd Kacancki pat b.b 1000 Skopje Rupublic of Macedo	onia
Type of Collector	CSI Full Plate 2.5-4
Dimensions of Collector	
Gross Area	2.5 m ²
Aperture Area	2.29 m ²
Absorber Area	2.29 m ²
Coefficient of efficiency	
Per gross area:	0.769
Per aperture area:	0.840
Heat loss coefficient	Temperature dependent heat loss coefficient
Based on gross area: 3.715	Based on gross area: 0.006
Based on aperture area: 4.056	Based on aperture area: 0.007
Technical Figures	
Collector Type	Flat Plate Collector
Length	2005 mm (Determined by Test Lab)
Width	1245 mm (Determined by Test Lab)
Height	85 mm (Determined by Test Lab)
Material	Aluminium
Weight	42 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	1.9 Litres
Number of Absorber Tubes	15
Number of Connections	4
Class	
Material	Tempered Law Iron, AP Class
Hanshillance	0.30-0.37
Thermal insulation	
Material	Rockwool
Thermal Conductivity	0.035w/(mK)
Thickness	50 mm
Limite	
Stagnation Tomporature	012 °o
	10 bar
Heat Transfer Fluid	Glucol / Water Mixture





The CSI Full Plate 2.0m2 - 4 collector is composed of a special full plate absorber, coated with high quality, selective PVD (physical vapor deposition) coating.

The absorber sheet is then welded to a register comprising of 12 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-wool.

The glass is solar glass which is tempered, iron-free, anti-reflective. The low-soiling coating on the glass is anti-dust and anti-corrossive. 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.



Power Curve



Test report No.: 17COL1404 ; Addition to test report No.: 17COL1404AD0; Test report No.: 17COL1404Q; Testing laboratory / Inspection Body Universität Stuttgart, Institut Fur Thermodynamik und Wärmetechnik Pfaffenwaldring 6, 70569 Stuttgart, GERMANY



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



Manufacturer	
Camel Solar Itd Kacancki pat b.b 1000 Skopje Reupublic of Maced	donia
Type of Collector	CSI Full Plate 2.0 – 4
Dimensions of Collector	
Gross Area	2.0 m ²
Aperture Area	1.82 m ²
Absorber Area	1.82 m ²
Coefficient of efficiency	
Per gross area:	0.755
Per aperture area:	0.838
Heat loss coefficient	Temperature dependent heat loss coefficient
Based on gross area: 3.715	Based on gross area: 0.008
Based on aperture area: 4.056	Based on aperture area: 0.009
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	34 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	1.6 Litres
Number of Absorber Tubes	12
Number of Connections	4
Glass	
Material	Tempered Low Iron AR Glass
Transmittance	0.96-0.97
Thermal insulation	
Material	Rockwool
Thermal Conductivity	0.035w/(mK)
Thickness	50 mm
Limits	
Stagnation Temperature	200 °c
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 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 rockwool.

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



Manufacturer	
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rup	ublic of Macedonia
Type of Collector	Cs Full Plate 2.0-4
Dimensions of Collector	
Gross Area	2.02 m ²
Aperture Area	1.83 m ²
Absorber Area	1.83 m ²
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	Rockwool
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 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 rockwool.

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





Manufacturer	
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rup	ublic of Macedonia
Type of Collector	Cs Full Plate 2.0-2
Dimensions of Collector	
Gross Area	2.02 m ²
Aperture Area	1.82 m ²
Absorber Area	1.82 m ²
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	Rockwool
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% increase 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 rockwool 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 | 2 - Rubber Seal | 3 - Thermal Sidewall Insulation | 4 - Absorber | 5 - Glass



Manufacturer	
Camel Solar Itd Velijko Vlahovic 18 (mezanin) 1000 Skopje Rupublic of Macedonia	
Type of Collector	Façade Module
Dimensions of Collector	
Gross Area	1.9 m ²
Aperture Area	1.8 m ²
Absorber Area	1.8 m ²
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	Rockwool
Thermal Conductivity	0.045w/(mK)
Thickness	50 mm
Limits	
Stagnation Temperature	195 °c
Max. Operating Pressure	10 bar
Heat Transfer Fluid	Glycol / Water Mixture





PVT collectors provide both electrical and thermal energy. Electrical power is around 20% more than standard PV panel plus 3 to 4 times more thermal power compare with electrical power from PV standard module. The greater part of the absorbed solar radiation by photovoltaic is converted into heat (at about 70% - 80%), small part reflected and the rest into electricity. As result of that cell temperature of PV is increasing. This effect reduces PV electrical efficiency. In façade or inclined roof installations on buildings, the thermal losses are reduced due to the thermal protection of PV rear surface and PV modules operate at higher temperatures.

This undesirable effect can be partially avoided by PVT hybrid collector applying a suitable heat extraction with a fluid circulation, keeping the electrical efficiency at a satisfactory level.

PVT collectors Unglazed: PV panel without additional glass which produce more electrical power.







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Collector on the test rig



Dependence of thermal power output from temperature of PVT



Manufacturer	
Camel Solar Itd. Kacanicki pat b.b. 1000 Skopje Republic of North Macedonia	
Type of Collector	CS PVT Hybrid collector (Unglazed)
Dimensions of Collector	
Gross Area	1.514 m ²
Coefficient of efficiency	
Per gross area η0,hem, no wind:	0.566
Peak thermal power per unit	857 W
Peak el.power per unit(polycrystal)	280 W
Peak el.power per unit(monocrystal)	330 W
Heat loss coefficient	Temp. dependent heat loss coefficient
Based on gross area: 12.43	Based on gross area: 0.006
Technical Figures	
Collector Type	Flat Plate Collector
Length	1640 mm (Determined by Test Lab)
Width	992 mm (Determined by Test Lab)
Height	45 mm (Determined by Test Lab)
Material	Aluminium
Weight (Unglazed)	27 kg
Sealing Material	Silicon
Collector Mounting	On Roof, Flat Roof
Glass	
Material	Tempered Low Iron AR Glass
Transmittance	>0.92
Thermal Insulation	
Material	Rockwool
Thermal Conductivity	0.035w/(mK)
Thickness	50 mm
Limits	
Stagnation Temperature	93°c
Max. Operating Presure	10 bar
Heat Transfer Fluid	Glvcol / Water Mixture





PVT collectors provide both electrical and thermal energy. Electrical power is around 20% more than standard PV panel plus 3 to 4 times more thermal power compare with electrical power from PV standard module. The greater part of the absorbed solar radiation by photovoltaic is converted into heat (at about 70% - 80%), small part reflected and the rest into electricity. As result of that cell temperature of PV is increasing. This effect reduces PV electrical efficiency. In façade or inclined roof installations on buildings, the thermal losses are reduced due to the thermal protection of PV rear surface and PV modules operate at higher temperatures.

This undesirable effect can be partially avoided by PVT hybrid collector applying a suitable heat extraction with a fluid circulation, keeping the electrical efficiency at a satisfactory level.

PVT collectors Glazed: PV panel with additional glass above PVT panel which produce more thermal power.



Collector on the test rig



Figure 3: Collector on the solar simulator



Dependence of thermal power output from temperature of PVT



Manufacturer	
Camel Solar Itd. Kacanicki pat b.b. 1000 Skopje Republic of North Macedonia	
Type of Collector	CS PVT Hybrid collector Glazed
Dimensions of Collector	
Gross Area	1.558 m ²
Coefficient of efficiency	
Per gross area η0,hem, no wind:	0.544
Peak thermal power per unit	847 W
Peak el.power per unit(polycrystal)	280 W
Peak el.power per unit(monocrystal)	330 W
Heat loss coefficient	Temp. dependent heat loss coefficient
Based on gross area: 4.75	Based on gross area: 0.019
Technical Figures	
Collector Type	Flat Plate Collector
Length	1685 mm (Determined by Test Lab)
Width	1030 mm (Determined by Test Lab)
Height	85 mm (Determined by Test Lab)
Material	Aluminium
Weight (Unglazed)	45 kg
Sealing Material	Silicon
Collector Mounting	On Roof, Flat Roof
Glass	
Material	Tempered Low Iron AR Glass
Transmittance	>0.92
Thermal Insulation	
Material	Rockwool
Thermal Conductivity	0.035w/(mK)
Thickness	50 mm
Limits	
Stagnation Temperature	138°c
Max. Operating Presure	10 bar
Heat Transfer Fluid	Glvcol / Water Mixture







PVT combined system for swimming pool heating and for preheated water for sanitary needs and space heating

Location: North Macedonia, Skopje Number of PVT =16 Surface / PVT =1.6 m2 150 W/m2 Peak El. power 510 W/m2 Peak Th. power Power output / 14 PVT: 58 kWh heat /day and 16 kWh el power / day Swimming pool: 75 m3 plus small swimming pool 6 m3 Benefit from PVT system: During the summer period, temperature of the swimming pool water is 31^oC + - 1^oC





PVT system at Football Federation building Location: Skopje, North Macedonia Number of PVT =32 Surface of PVT =1.6 m2 / PVT 150 W/m2 Peak El. Power and 510 W/m2 Peak Th. Power Storage: 3 ton Thermal power output = 85 kWh/day and El. power output = 30 kWh/day



PVT system at private house Skopje

Location: Skopje, North Macedonia Number of PVT =14 Surface of PVT =1.6 m2/PVT 150 W/m2 El. power 510 W/m2 Th. Power





Hotel resort Aurora-Berovo



Name of Project: Hotel Aurora Resort & Spa, Berovo Type of Project: Hotel swimming pool Type of collectors: CSI Flat Plate 2.5m2 Equipment Installed: 10 x CSI Flat Plate 2.5m2

Hospital in Pomorie – Bulgaria



Name of Project: Hospital in Pomorie - Bulgaria Type of Project: Hot sanitary water Type of collectors: CSI Flat Plate 2.0m2 Equipment Installed: 320 x CSI Flat Plate 2.0m2

Thermal Baths and Clinic – Narechen Bulgaria



Name of Project: Thermal baths and clinic - Bulgaria Type of Project: Hot Sanitary water Type of collectors: CSI Flat Plate 2.0m2 Equipment Installed: 72 x CSI Flat Plate 2.0m2





Name Of project: Parrot House Type of project: Domestic swimming Pool Size of Pool: 11m x 6m x 1.5m = 99m³ 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 = 1650m³ 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's 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 = 19.5m³ Panel Type: Façade Equipment installed: Façade

The swimming pool is heated throghtout the year by the solar thermal system 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.





Name of Project: Hotel Sirius, Strumica Type of Project: Domestic sanitary hot water Size of Storage: 3000 litres Panel Type: CS Flat Plate 2.0m2 Equipment Installed: 35 x CS Flat Plate 2.0m2 Collectors

Hotel Siruis is located in Strumica, in the South-East region in Macedonia. It is five star hotel with 116 rooms. The installed Solar thermal system is being used for heating up hot sanitary water and produces 45-50kw.



Name of project: Sport Center Complex "Jane Sandanski" Skopje Type of project: Hot sanitary water Size of Storage: 5000 litres Panel Type: CS Flat Plate 2,5m2 Equipment installed: 40CS Flat Plate 2,5m2

Sport Center complex "Jane Sandanski", is multifunctional object which includes big and small sports arenas, fitness center, fan shops. Alongside of the complex is built luxurious four star Hotel Russia.

The Solar thermal system installed here is being used for heating up hot sanitary water through the year in both the sport complex and the hotel, and produces 70kw.



Name of Project: Hotel and child entertainment resort "Mihajlovo", Kavadarci Type of Project: Sanitary hot water Panel Type: CS 15 Evacuated tubes Equipment installed: 10 x CS15 evacuated tube collectors

Located in the slopes of Kozuf mountain at an altitude of 1200m, 40km away from the town of Kavadarci, this hotel and child resort is very popular. The object's hot sanitary water is being heated up by installed Solar thermal system and produces 13-15kw.





Name of Project: Hotel Tino, Ohrid Type of Project: Domestic sanitary hot water Size of Storage: 4000 litres Panel Type: CS Flat Plate 2.5m2 Equipment Installed: 30 x CS Flat Plate 2.5m2 Collectors

Located on the shore of Ohrid Lake, Hotel Tino is luxurious four star hotel. The hotel's hot sanitary water is heated by the Solar thermal system, which produces 45-50kw.



Name of Project: Adora building, Skopje Type of Project: Indoor Swimming pool Panel Type: Evacuated tube collectors Equipment installed: 32 Evacuated tube collectors CS15

This object is located on the slopes of Vodno, Skopje. The solar thermal system installed here, is being used for heating up indoor pool water through the year. The system produces power of 48kw..



Name of Project: Residental building in Skopje Type of Project: Domestic sanitary hot water Type of system: Thermosiphonic system with capacity of 150I and flat plate collectors 2.5 m2

Equipment Installed: 10 x Thermosiphonic sets Located in the center of the capital, Skopje, this building's hot sanitary water is being heated by thermosiphonic sytems which produce combined power of 18.7kw.





Name of Project: Private House, Slovenia Type of Project: Domestic sanitary hot water and heating Panel Type: CS Flat Plate and Evacuated tube collectors Equipment Installed: 5 x Evacuated tube collector CS15 1 x Evacuated tube collector CS10 3 x Flat Plate collector 2.0m2

This system has 9 solar thermal collectors installed, and it's being used for heating and sanitary hot water. It produces 12-15 kw.



Name of Project: Private House 3, Macedonia Type of Project: Domestic sanitary hot water Type of system: Evacuated tube collector CS15 Equipment Installed: 5 x Evacuated tube CS15

The installed 5 x Evacuated tubes CS15 in this house produces 7-8kw.

It is used for heating up hot sanitary water.



Name of Project: Private house 2, Slovenia Type of Project: Domestic sanitary hot water Panel Type: Evacuated tube collector CS15 and CS10 Equipment Installed: 5 x Evacuated tube CS15 2 x Evacuated tube CS10

The installed solar thermal system in this house produces 9-10kw, and is

used for heating up hot sanitary water.





Name of Project: Industrial building for food processing, Kosovo Type of Project: Hot sanitary water Size of Storage: 3000 litres Type of system: Evacuated tube collector CS15 Equipment Installed: 15 x Evacuated tube CS15

The installed 15 x Evacuated tubes CS15 in this building for food processing, produces 22-24kw. It is used for heating up hot sanitary water.



Name of Project: Etno Selo Complex, Kumanovo Type of Project: Domestic sanitary hot water Type of system: Evacuated tube collector CS15 Equipment Installed: 15 x Evacuated tube CS15

Located in the north part of Macedonia, 20km away from Kumanovo, this building's hot sanitary water is being heated by solar thermo system Evacuated tubes CS15 which produce combined power of 20-23kw.



Solar Keymark

The Solar Keymark Association is an official quality mark of the European Committee for Standardization (CEN), developed with ESTIF to overcome the varying testing and certification requirements in different EU countries. It guarantees the quality of solar thermal products, in particular panels or complete compact systems.

The Solar Keymark is a voluntary third-party certification mark for solar thermal products, demonstrating to end-users that a product conforms to the relevant European standards and fulfills additional requirements. The Solar Keymark is used in Europe and increasingly recognized worldwide and is solely dedicated to:

- Solar thermal collectors (based on European standard series EN 12975)
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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.

What are the benefits of The Solar Keymark?

- Certified product
- High quality products
- Enhanced customer confidence
- Enduring quality image of the solar thermal industry
- Access to subsidy schemes
- Guarantee that the product sold is identical to the tested product
- · Confirmation that products are FULLY tested according to the relevant standards
- Eligibility for subsidies

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.



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We are looking to build our distribution network around the world, offering our new products using the latest technologies. We are very passionate about our products at camel solar and we would like to see them used all over the world and have distributors as passionate as us.

We pride ourselves in manufacturing high quality produce at an affordable price.

If you feel that Camel Solar thermal collectors will benefit your company please feel free to contact us for more information.

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Factory

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