

SOLAR THERMAL SYSTEMS INFORMATION SHEET

Invest in the earth's future with a financial return within 3-5 years!

Installing a Free POWER High Efficiency Vacuum Tube Solar Panel is a practical way to help reduce greenhouse gas emissions into our atmosphere while reducing your monthly expenditure on electricity by an average of between 20% and 50%!

You will be saving money from day ONE! More than that, your savings with a Free POWER High Efficiency Solar Panel continue year after year. Once you recover your initial investment (within 3 - 5 years), the ongoing savings are yours to spend on yourself and your family any way you choose!

Product Information:

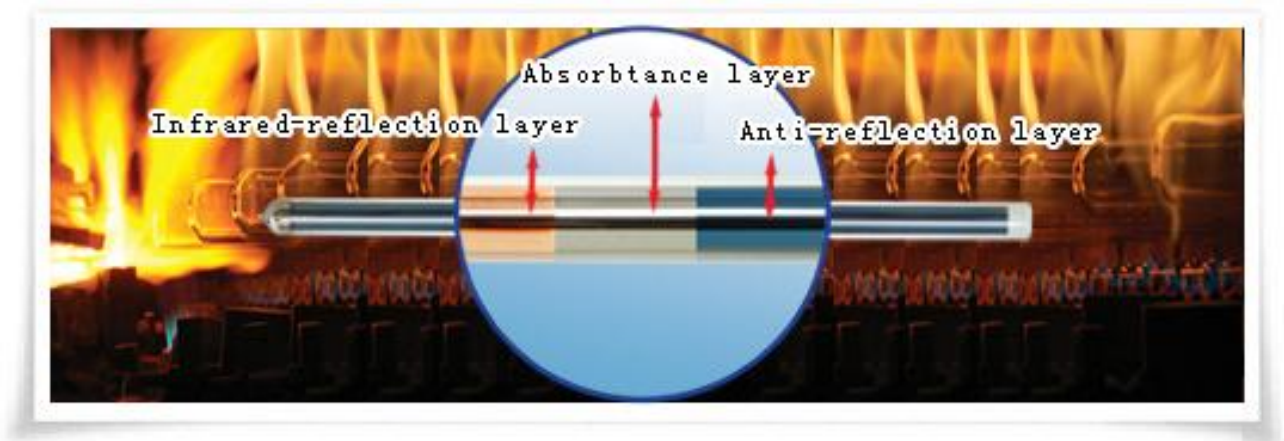
Solar Geyser technology has improved dramatically in the past 4 Years with the advent of Vacuum Tubes. The secret behind high efficiency solar water heating is the quality and design of the vacuum tubes and the heat-exchanging manifold.

Selective three coating vacuum tube

All Vacuum tubes seem to be the same but the efficiency and the inner tube film coating technology determines performance. Our manufacturing partner adopted a new graded coating technology from Qinghua University, and the "three-high-vacuum tube" raised the heat collection by more than 12% on traditional vacuum tube solar Panels. During summer, very high temperatures of up to 248°C can be accommodated by our special stainless steel aluminium nitride layer, without degradation of the film on the inner tube. In icy winter conditions the inner copper mirror with its low reflectance drastically reduces heat loss while producing high collection results. The Free POWER High Efficiency Solar Panel has a high absorption rating of 92% while reflection is reduced by 65%, thereby increasing heat by 12%. The increased efficiency of 12% means more hot water!

Unlike most other brands, which have 1.6mm or 2.0mm outer glass tubes, the Free POWER vacuum tubes have 2.25mm (±0.05mm) outer tubes for superior toughness and hail resistance. Each tube is also laser engraved with our logo and batch number for easy identification.

Layer Structure



Heat Pipes and Manifold

The Heat Pipes are what transfers the collected thermal energy to the manifold. These are manufactured of red copper and conduct heat towards the manifold by the sealed-in heat transfer liquid. The Heat pipes are held in the centre of the vacuum tubes by one-piece aluminium heat transfer fins and the Vacuum Tubes have silicon stoppers that are resistant to the high temperatures generated within the vacuum tubes and heat pipes. Water never enters the vacuum tubes or the heat pipes thereby negating the chance of scaling. The inner Manifold is made of 48mm copper pipe which is intersected by the heat pipe receptors, while the exposed ends are 22mm copper pipe; for convenient compression joint fitting. Each manifold is factory tested to 8kpa pressure!

Manifold Cover and Frame

Both the Manifold cover and the Frame is manufactured from extruded Black Electro-Coated Aluminium, which offers high levels of protection against the elements even at the coast while providing a long life aesthetically pleasing profile to the Solar Panel. The insulation between the manifold and the manifold cover is provided by Rock Wool. Tube Footer End Caps are made of UV Stabilised PVC.

High Pressure Manifold

Heat Pipes are manufactured of red copper and conduct heat towards the manifold by heat transfer liquid. The vacuum tubes have silicon stoppers and one piece aluminum heat transfer fins. Water never enters the vacuum tube or the heat pipe! The Manifold is also made of copper with 22mm ends and is pressure tested to 8kpa! The manifold cover is made from moulded Black Electro-Coated Aluminium while insulation is provided by Rock-Wool.



Options for system configurations:

- Thermo-siphon to a Solar Geyser.
- Separated direct circulation into a standard HP Geyser with heat circulation facilitated by AC Pump controlled by Digital Thermal Controller.
- Separated direct circulation into a standard HP Geyser with heat circulation facilitated by DC Solar Pump Powered by a Photovoltaic Panel.
- Separated indirect circulation into a Heat Exchanging HP Geyser with heat circulation facilitated by AC Pump controlled by Digital Thermal Controller.
- Separated indirect circulation into a Heat Exchanging HP Geyser with heat circulation facilitated by DC Solar Pump Powered by a Photovoltaic Panel.

- Capacities:
 - 150 Litre Geyser (domestic use): 18 tube system.
 - 200 Litre Geyser (domestic use): 24 tube system.
 - Larger installations: use the required number of Free POWER High Efficiency Solar Panels in series at a ration of 6 tubes per 50 litres (domestic use) of water

Eskom Rebate Qualification

Our Systems are SABS Approved, which will qualify you for a rebate. We are listed on the Eskom Website & are SESSA registered.



FPSD is a member of SESSA - COR 45909/9
 (Sustainable Energy Society of Southern Africa)
 SESSA is a non-government, non-profit organization representing the renewable energy sector in Southern Africa.

Accredited by Eskom
 on the Solar Water Heating
 Rebate Programme

Free Power Solar collectors
 have passed the SABS
 SANS 1211-12003 & 1307 tests

Specifications: Selective Three Coating Vacuum Tubes

Structure		All-glass concentric dual tube geometry
Glass material		Borosilicate glass
Outer tube diameter and thickness		$\phi=58\pm 0.7\text{mm}$ & $=2.25\pm 0.05\text{mm}$
Inter tube diameter and thickness		$\phi=47\pm 0.7\text{mm}$ & $=1.6\text{mm}$
Tube Length		1800($\pm 5\text{mm}$)
Absorbing coating properties	Configuration	1800($\pm 5\text{mm}$)
	Method to deposition	Graded A1-N/A1 solar selective absorbing coating
	Absorption	as 0.88-0.93
	Emittance	$\Sigma n: -.08-0.04$
Vacuum		$p \leq 2 \times 10^{-3}$
Stagnation parameter		250M2C/KW
Solar radiance exposure for obtaining a preset water temperature		2.8MJ/M ²
Average heat loss coefficient		0.8W(M ² C)
Life expectancy		15 – 20 years