



Solar Water Heater Catalogue

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Introduction

Solar water heaters, which heat water for personal use, are classified as either being open (direct) or closed (indirect) systems. An open/direct system has the household water circulating through the collector panels. This system is ideal for locations where the ambient temperature never falls below freezing and where the water quality is good. As most areas in South Africa regularly have temperatures below freezing in winter as well as regular incidence of frost, and due to the calcium content in many areas, the open/direct system is generally not considered viable.

In a closed/indirect system the household water used does not circulate through the collector panels. The agent, generally a glycol and water mixture, used in the collector panels is heated and that heat is then transferred indirectly, i.e. with-out coming into contact with the household water. Closed/indirect systems are typically used in areas where frost occurs and when water quality is poor.

The glycol solution that is used in the in the collector panels contains propylene glycol. This specific diol alcohol is considered generally safe for use in foods by the American FDA. This means that even if there is a lea, and the glycol mixes with the household water, there is no risk to humans or animals.

Thermo-siphon vs. split system

Thermo siphon systems are complete on-roof hot water systems, in which the storage tanks and solar collectors are mounted on the roof as a unit. Thanks to the sophisticated functional principle of the Thermo siphon, drinking water can be heated very economically and efficiently.

The cold and hot water supply lines are connected to the domestic water system. Due to the solar irradiation and differences in the specific weight of cold and hot water, the heated water rises to the top of the collector where it flows into the storage tank and displaces the cold water in the storage tank, which in turn flows into the collector and is heated there.

The heated water then flows into the hot water lines and can be used directly for cooking, washing or showering. The advantage is that this system is often the most economic solution, the technology is foolproof and requires almost no maintenance. This means because of the technology, your solar solution will be visible to all.

Split systems use a pump to move the liquid through the collectors and into the heat exchange in the storage tank, where the heated, pumped glycol solution will heat the household water.

Though this system has more components and is hence more expensive, its advantages are twofold:

1. The storage tank does not need to be placed directly above the collectors, allowing the tank to be placed up to 20m away from the collectors.
2. The system is more efficient as the pump regulates the flow rate of the glycol solution through the system.

If the sun does not shine for several days or the water consumption rate is abnormally high, the storage tank thermostat, used in both system types, automatically activates an additional electric heater. This ensures that hot water is always available.

Thermo-siphon systems

System view



Features & Benefits:

- German designed system
- No moving parts – low maintenance
- Quality design & stylish appearance
- Electric boosting with all systems (gas available as option)
- Flat and pitched roof mounting systems available
- Pay back in under 5 years
- Up to 90% of your hot water free from the sun
- Hot water in all weather conditions
- Save up to 3.4 tons of harmful emissions per year
- Long life in any environment
- Comprehensive 5 year warranty inclusive

Components

Storage Tank



- 175 & 300 litre tank sizes
- Vitreous enamel lined steel with sacrificial anode for long life
- even in hard water areas
- Durable Colorbond® and Polypropylene casing
- Robust construction with high density thermal insulation

	175 liter	300 liter
Storage Capacity (L)	175	300
Boost Capacity (electric/gas)	90L/26L - min	90L/26L - min
Tank weight empty (kg)	54	101
Tank Size (W x H x L/mm)	624x589x1237	624x589x2047
Booster element rating 220/250 V (KW)	2.4	2.4

Flat Plate Collector



- Toughened glass and durable copper waterway tubes
- EPDM rubber seals ensure durability and reliability in extreme climatic conditions
- Black chrome surface on copper substrate for maximum efficiency

Collector Size (H x W x D/mm)	2000x1000x80
Total Collector area (m²)	2.0
Collector weight empty (kg)	30
Collector weight full (kg)	32
Collector Material	Aluminium

Split Systems

We offer either flat plate collector or evacuated tube collectors with our split system. The split system, which requires a pump to move the glycol solution through the system, can either have an electrical or solar pump.

Examples of systems with the two different collectors are shown below. Both systems below have both pump types, to illustrate the parts required for a fully functioning solar water heating system.

Flat plate collector system

Front view:



Back view:



Evacuated Tube system

Front view:



Back view:



Components

Flat plate



- Toughened glass and durable copper waterway tubes
- EPDM rubber seals ensure durability and reliability in extreme climatic conditions
- Black chrome surface on copper substrate for maximum efficiency

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Total Collector area (m²)	2.0
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Evacuated Tube



Evacuated tube collectors use two glass tubes, in between which a vacuum has been created. The outer glass tube and the vacuum within protect the absorbent coating and structural materials from corrosion. The absorbent coating is most often a thin layer of barium.

The heat from the absorbent coating is transferred to the heat conveyance system. The fluid heat conveyance is an evaporating-condensing liquid that evaporates in the collector tubes, and then transfers the latent energy (heat) to the cold water in a manifold, through condensation. Heat transfer is always in one direction - from absorber to the manifold (thus collector to storage tank) and never the reverse. As each tube is independent, individually damaged tubes can be replaced without interference to the still functioning system. Tube damage is indicated by the tubes turning white when the vacuum has been broken.

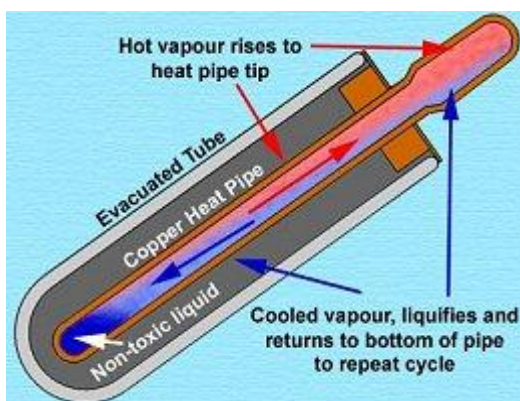
Below is a schematic representation of an evacuated tube type collector. Each company has their own, usually patented, evacuated tube technology; the drawings below are merely representations to explain the concepts.

Specifications:

Outer Glass tube thickness	2 mm
Diameter of Tube	58 mm
Tube length	1800mm

The tubes are SANS 1307 approved.

Cross Section of Evacuated Tube Collector



Storage Tank



The Solartherm® products are high quality using a Pex (cross linked polyethylene) lining to prevent corrosion and reduce maintenance.

The boiler material is 2.0 mm steel, which is lined with 2.5 mm Pex lining. The casing is galvanized steel and is insulated with 25mm PU (poly-urethane) foam.

	100 Liter	150 Liter	200 Liter	250 Liter
Power Rating	1 Kw	2 Kw	3 Kw	3 Kw
Outside Dimension	510 ø x 800	510 ø x 1100	510 ø x 1400	510 ø x 1580
Weight	35kg	45kg	57kg	73kg

Pumps

The pumps are used to actively move the heated liquid through the collectors into the tank, to heat the household water.

Photovoltaic



The photovoltaic (PV) pump requires more hardware and is more costly. However with a Direct Current (DC) pump, it is a carbon neutral solution, and can further reduce electric costs.

The advantages of the Laing pump are:

- soft start at very low in-rush current
- (soft start algorithm, less than 1 Watt required)
- economical and powerful
- long life, blockage free and maintenance free
- RF (radio frequency) suppressed
- protection against reverse polarity
- micro processor optimized flow

Electric



The electric pump, which is less expensive and requires less hardware than the PV pump, runs off grid electricity, thus this system is NOT carbon neutral, and electricity cost reduction is less.

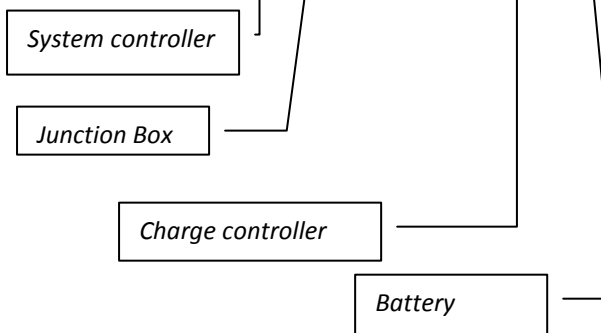
- Housing from green cast iron.
- Impeller from polypropylene.
- Chrome high-grade steel wave with Grafit sliding bearings.
- Enclosure IP44.
- All rotating parts are immersed in the fluid being handled.
- A shaft seal, being subject to wear and tear is not required
- Fluid lubricates the shaft bearings and act as coolant to bearings and rotor.
- The pump is completely maintenance free.

Photovoltaic Panel



Photovoltaic panels use sunlight to generate direct current electricity. A 20 Watt peak panel is used to charge a 12 volt battery. This battery is used to drive the DC pump. A battery is required to ensure that the pump will run, whether there is sufficient sunlight or not. The PV panel will be mounted with the collector

Controller for PV system



The controller box for the PV pump system contains the following:

System controller - Main functions are

- Clock display
- Temperature difference on/off
- Maximum tank temperature
- Frost protection
- Temperature controlled hot water circulation pump
- Time controlled hot water circulation pump
- Temperature controlled auxiliary heating during three time section
- Protection functions (a. Memory protection, b. anti-bacteria protection)

The advantages of this system controller are:

1. Self power consumption: <3W
2. Measures temperature with in 2 degrees accuracy.
3. Measurement range of 120 degrees.

Battery – The battery is a 12V 7 Amp battery

Charge Controller – ensures that the batteries are not overcharged by the solar panels during the day and prevents the solar panels draining the batteries at night. The charge controller also prevents the loads placed on the batteries from discharging the batteries too deeply

Junction Box – used to conceal and protect electrical junctions

Controller for electric system



System controller

Junction Box

The controller box for the electrical system contains two components:

System controller - Main functions are

- Clock display
- Temperature difference on/off
- Maximum tank temperature
- Frost protection
- Temperature controlled hot water circulation pump
- Time controlled hot water circulation pump
- Temperature controlled auxiliary heating during three time section
- Protection functions (a. Memory protection, b. anti-bacteria protection)

The advantages of this system controller are:

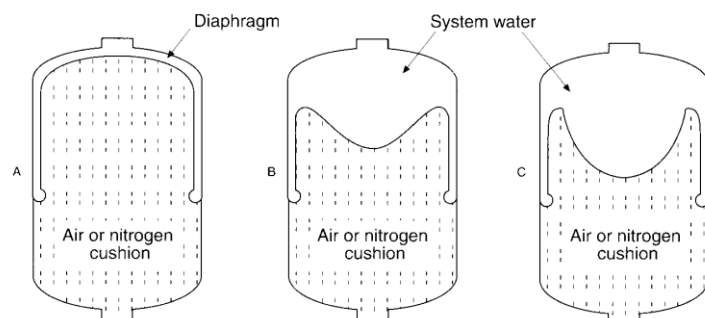
1. Dimension: 120mmX120mmX18mm
2. Self power consumption: <3W
3. Measures temperature with in 2 degrees accuracy.
4. Measurement range of 120 degrees.

Junction Box – used to conceal and protect electrical junctions

Expansion vessel



Anytime the water pressure rises, it will push against the diaphragm, and gently compress the air. The compressibility of the air cushions the pressure shock, and relieves pressure in the system that could otherwise damage the plumbing system.



A. When system is filled, no water enters tank when cushion and water pressure are in equilibrium

B. As temperature increases, diaphragm moves to accept expanded water

C. When water rises to maximum, full acceptance of expansion is achieved

The 24 litre vessel is made from high grade steel which is coated with epoxy. The bladder is made from butyl rubber.

Vacuum Breaker



Prevents water from draining out when the water supply to the system is cut-off.

Temperature Pressure Valve



A Temperature Pressure valve is installed on a geyser in case the pressure inside the tank exceeds safety levels, the valve will drain water to relief the pressure.

Pressure Control Valve



The pressure control valve is installed in every house as a matter of course. It is required to ensure that all water is at 400 kPa.

Further Information



Having pipes insulated, though an additional costs has the following advantages:

- *Reduces heat loss, thus further electrical savings, and wait time for hot water is reduced.*
- *To prevent injury*
- *Noise control*



A threaded elbow connector made from brass is used to connect the collector, pump and tank.

Where to contact us

We are here for you



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