Solar Hot Water Systems

Owner's Manual

Providing Insight into hot water, solar systems and various components used within a SolarArk Solar Hot Water System. This is a confidential document for SolarArk representative use only. This document is to be taken as a basic introduction into solar heating.

July 2012

Table of Contents

Thank you for your decision to purchase a SolarArk Evacuated Tube Hot Water System.

The content of this manual provides detailed information on maintenance, troubleshooting, safety precautions and warranty that should be thoroughly read and adhered to following installation.

Should you have any questions regarding the information contained, please contact SolarArk on Ph: 1300 760 966 for support.

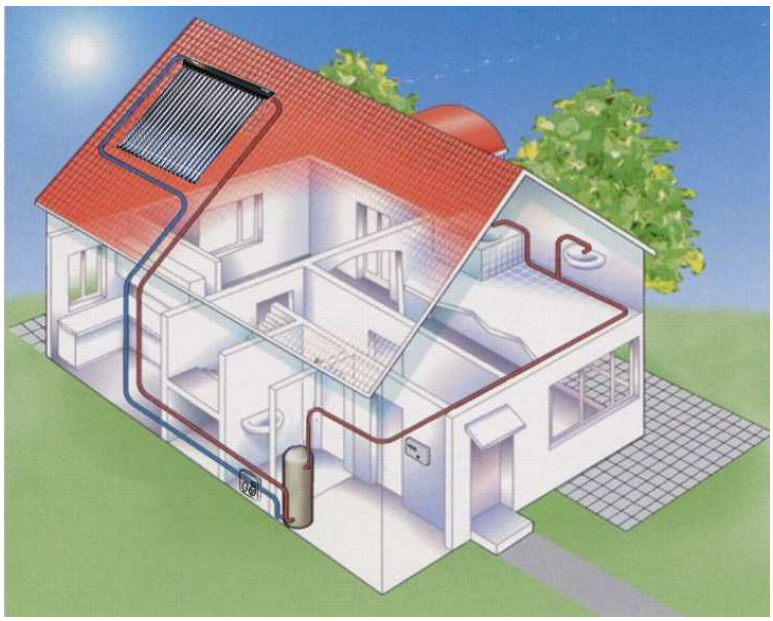
Introduction to Solar Water Heating

The design of the cylindrical evacuated tubes allows maximum absorption of the suns energy to convert it to heat.

The cold water from the bottom of the storage tank is pumped up to the insulated manifold of the solar collector, which passes through the heat exchanger. It absorbs the heat and is returned back to the storage tank.

The controller measures the differential temperature between the water supply from the bottom of the tank and the water return from the collector to maintain the set temperature within the storage tank.

The circulating pump operates intermittently throughout the day to maintain maximum hot water output and minimise energy consumption.



Key Features

- SolarArk utilizes copper, aluminium and titanium as part of a three target film technology. This provides excellent heat retention that exceeds other standard tubes by more than 12%.

- The diameter of the heat exchanger has been specifically designed to maintain low pressure drop.

- High density Rockwool insulation is used to ensure maximum solar heat gain by minimising the amount of heat loss even in cold temperatures.

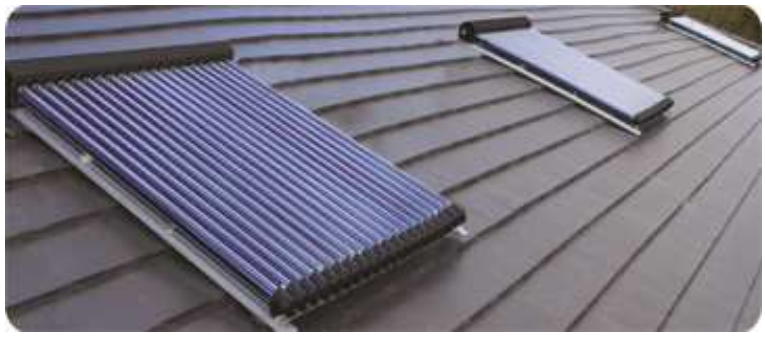
- The solar controller will maintain the temperature at the bottom of the tank to a pre-set temperature of 65°C to 70°C. The on/off differential settings of the controller are designed to ensure optimum pump cycling as the water in the manifold heats. If the collector reaches 8°C hotter than the tank the controller turns the solar pump on, and off again once the temperature decreases to 2°C.

- SolarArk solar collector tubes and heat exchanger are individually tested for vacuum and pressure to guarantee the highest quality.

- The tubes are designed to withstand hail and high winds, have long lasting performance and are cheap and easy to replace if damaged.

- The complete system is lightweight for easy installation and the stainless steel frame is resilient to corrosion.

- SolarArk are proud to provide a 15 year warranty on their complete solar collector.



Tempering Your Water Supply

Tempering valves are mandatory throughout Australia. They are to comply with local regulations as a safety device to reduce hot water supply to a maximum of 50°C.

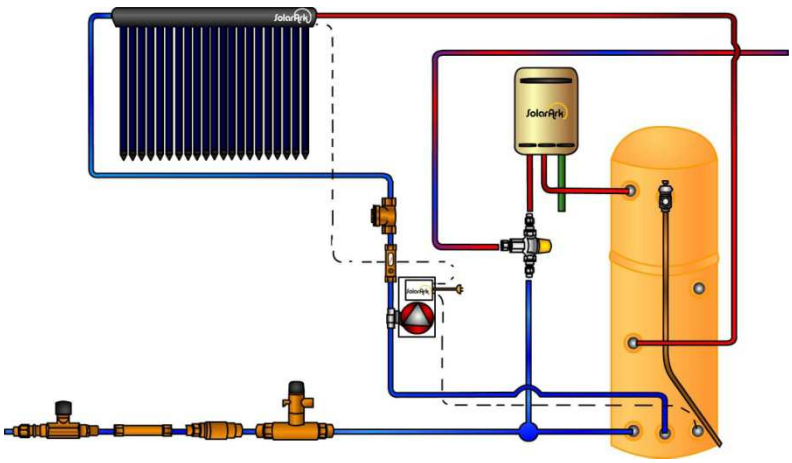
The function of the tempering valve is to reduce the 65-75 degree water leaving your hot water storage tank and blending it with cold water to achieve 50°C and reduce the possibility of scalding.

All adjustments of a tempering valve should only be carried out by a licensed plumber.

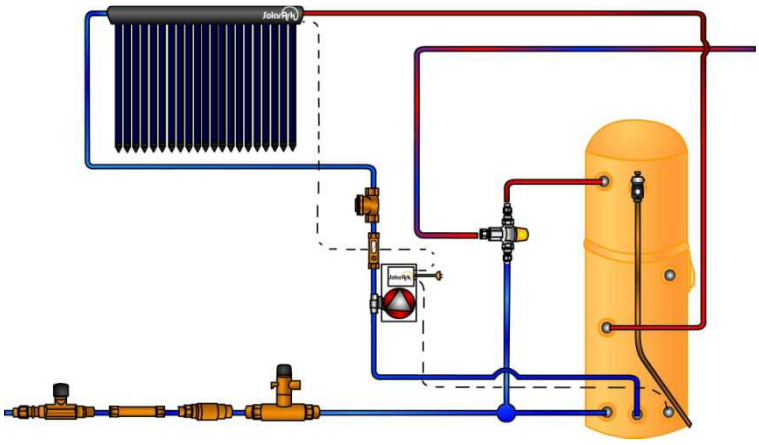
Boosting Options

For further procedures please follow gas booster model instructions.

Gas boosted



Electric Boosted



During periods to low solar contribution, gas or electric boosting is required to maintain 60° temperature.

Gas Boosting

The instantaneous gas booster is activated if the water passing through is <60°C. The gas booster will automatically turn off when boosting is not required, therefore increases energy efficiency.

Points to Note:

- The gas booster operates when there is a minimum of flow rate of 2.4 lpm of hot water flowing through the booster. The use of water saving devices that have less than 9lpm flow rate or that have restrictors may interfere with the operation. To ensure operation, open the hot tap fully to check if the gas booster comes on.

- The S20 gas booster requires a minimum of 120 kPa water pressure and the S26 requires a minimum of 160 KPa water pressure to achieve the maximum flow rate and optimal function. If the pressure is less than the required pressure, a water pressure pump should be installed.

- Electronic temperature controllers will not work with SolarArk systems and are not to be used.

Water Flow

S21 or S26 hot water gas boosters have limited hot water flow due to the flow rate of the gas booster (21 or 26 litres per minute).

To ensure that your instantaneous unit functions effectively, it is advisable to use a AAA rated showerhead with a minimum flow of 9 lpm. It is also recommended to periodically check showerhead for any debris or deposit built-ups as this may affect water flow and temperature.

Model Name		Model Number	
		S20	S26
Factory Default Temp	°C	60	60
Colour		Dune	
Water Pressure (kPa)	Min	120	160
	Max	1000	
Gas Rate LPG (Mj/hr)	Min	11.3	14.7
	Max	125	188
Gas Rate NG (Mj/hr)	Min	10.9	13.8
	Max	125	188
Flow Rate 25°C Rise (lpm)	Min	16	24
Flow Rate Max (lpm)	Max	20	26
Connection Sizes Gas/Hot/Cold	(mm)	20/20/20	

Electric Boosting

An electric boosted water cylinder is supplied with a 3.6kW electric boosting element as standard. The thermostat is set to 60°C. If solar radiation is low, the electric boosting element will activate to compensate for heat loss.

Generally, the required heating time would occur overnight during the off-peak Tariff. If off-peak is not available, the continuous Tariff will require a timer setting to be activated early evening or overnight when solar radiation is at its lowest.

Important Information

Local Standards

Installation must be completed in accordance with the requirements of AS/NZS 3500.4 (AS/NZS3500.4.2 "National Plumbing and Drainage Code Hot Water Supply Systems – Acceptable Solutions"), or in New Zealand, Clause G12 of the New Zealand Building Code, as well as any relevant local standards and regulations.

SolarArk Accreditations

BSI Benchmark Certification is an Australian Company originally established in 1993 to provide independent certification services to companies wishing to achieve formal recognition of their management systems. ISO 9001, QS-9000 and ISO 14001 and Product Certification.

Accreditation by JAS-ANZ also implies that companies approved by BSI Benchmark Certification is recognised and accepted in each country where JAS-ANZ has signed a Memorandum of Understanding with other National Accreditation Board.

The Institute for Thermodynamics and Thermal Engineering (ITW) has been working in thermal solar energy since the early 1970s. In 1993 the Research and Testing Centre for Thermal Solar Systems (TZS) was established. TZS is the largest testing centre for solar thermal components and systems in Europe. TZS has long standing established experience in testing the full spectrum of solar thermal experience in testing the full spectrum of solar thermal products as well as in conducting research and development projects with partners from research organisations and industry.

Authorised Installers

All installation of SolarArk solar hot water systems must be installed and checked by an authorised licensed plumber who holds all relevant qualifications.

Any inspections, repairs or maintenance that is required should only be carried out by a person authorised by SolarArk Pty Ltd.

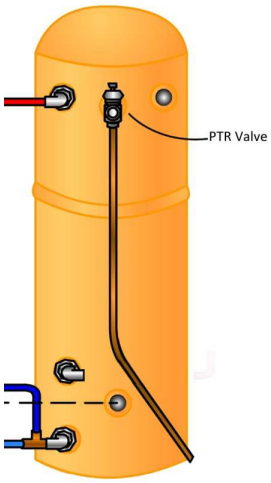
Safety Precautions and Legionella

In order to kill Legionella bacteria it is an Australian standards requirement (AS3498-2009) that the hot water in the storage tank be heated up to at least 70°C on a regular basis, either while in the storage tank (solar electric) or by a post boost (gas continuous flow).

Bottom element electric: The hot water storage tank must reach 60°C at least once a week. The element should be activated at least once weekly during winter months and overcast weather. The element is located at the bottom of the tank.

Mid element electric: The hot water storage tank must reach 60°C at least once daily. The element should be activated daily during winter months and overcast weather. The element is located in the middle of the tank, lowering boosting costs by boosting half of the tank until the solar unit kicks in again.

G*as boosted systems:* Gas booster must be left on at all times. It will only boost the water if it is less than 60°C.



Pressure and Temperature Control and Relief

The pressure & temperature Relief Valve is supplied with the water heater from the manufacturer. The valve must be installed into the socket marked "RELIEF VALVE". No hot water storage tank should be operated without the PTRV fitted and functional. The PTRV should be checked for correct operation or replaced at intervals not exceeding 5 years. .

The lever on the relief valve must be lifted and lowered very slowly to operate the valve at least once every 6 months. Failure to operate the relief valve at least once every six (6) months may result in the water heater exploding.

The relief valve and its drain outlet pipe must not be sealed or blocked.

Water Quality

All hot water storage tanks have been manufactured to suit water conditions of most Australian metropolitan supplies. Water supplies outside of the specifications specified can have a damaging effect on the water heater and its longevity. Information can be obtain from your local water supply authority regarding water quality details

Water Acceptability Composition Range for Stainless Steel Tanks

Water Quality	
Total Dissolved Solids	<600 mg/litre or ppm
Total Hardness	<200 mg/litre or ppm
Chloride	<250 mg/litre or ppm
Sodium	<150 mg/litre or ppm
Magnesium	<10 mg/litre or ppm
PH Levels	6.5 – 8.5
Electrical Conductivity	850 µS/cm

Water Acceptability Composition Range for Vitreous Enamel Tanks

Water Quality	
Total Dissolved Solids	<600 mg/litre or ppm
Total Hardness	<200 mg/litre or ppm
Chloride	<300 mg/litre or ppm
Sodium	<150 mg/litre or ppm
Magnesium	<10 mg/litre or ppm
PH Levels	6.5 – 9.5
Electrical Conductivity	850 µS/cm
Iron	1 mg/litre

The water heater is designed for use in areas where the Total Dissolved Solids (TDS) content of the water supply is less than 2500 mg/L. In areas where the TDS exceeds 600mg/L it is possible that the magnesium alloy anode (supplied in glass lined heaters only) may become over reactive.

To alleviate this, the magnesium alloy anode should be replaced with an aluminium alloy anode, available from your local plumbing supplier. Water can also be very corrosive, the measure of this is the saturation index, if the water saturation index is greater than 0.40 an expansion control valve should be fitted and where the index is greater than 0.80 the water heater installed should be a Hard Water Model. Please consult SolarArk for advice if required. In regions with "hard" water (<200mg/L or ppm), it is advisable to install a water softening device. This will ensure the long term efficient operation of the solar collector.

Corrosion

When high concentrations of chloride are present, both copper and stainless steel are susceptible to corrosion. Therefore, the use of this system to heat chlorinated pool or spa water will void any warranty. SolarArk will not warrant any equipment failure due to corrosion related damage.

Chloride levels present in most reticulated public potable water supplies are safe for use in the solar collector provided there is no use of bore waters in the reticulated supply.

Freeze protection and Snow Loading

The solar collector is protected by a frost protection controller. Evacuated tubes are impenetrable against damage due to cold weather. A low manifold temperature pump circulation feature turns the pump on if the manifold temperature drops to 4°C and turns off again when the temperature rises to 6°C.In areas prone to heavy snow fall, the solar collectors should be installed at an angle of 50° or greater to promote snow sliding off the tubes. Each tube is tested to withstand >50kg of loading.

Hail Resistance

The SolarArk evacuated tubes are able to handle significant impact from hail of up to 25mm/1" in diameter. The ability of the evacuated tubes to withstand impact from hail is greatly influenced by the angle of impact and so installing collectors at low angles will reduce their impact resistance.

Wind Stress

When installing the SolarArk collector please consider the following points: wind resistance caused by high strength winds and the stress applied upon attachment points due to these winds. The pitched roof frame and angle frame are designed to withstand high wind speeds without damage. However the roof attachment points may not be as strong. For areas with the possibility of high winds, additional arrangements for reinforcing attachment points should be considered.

Collector Dimensions & Weights

Collector Size:	10 tubes	20 tubes	30 tubes
Gross Weight (Empty):	45 Kg	78Kg	115 Kg
Absorber Area:	0.8m²	1.6m²	2.4m²
Aperture Area:	0.94m²	1.88m²	2.82m²
Gross Area:	1.57m²	2.96m²	4.35m²
Fluid Capacity:	754ML	1546ML	2338ML
Overall Width:	810mm	1560mm	2310mm
Overall Height:	155mm	155mm	155mm
Overall Length:	2000mm	2000mm	2000mm

Roof Structural Integrity

Collector weight is minimal and will not cause excessive weight stress on the roof structure. No reinforcement of the roof structure is required for flush mounted collectors.

If installing at a raised angle (adjustable frame) in a high wind region, high winds will cause vertical and horizontal loads on the frame. Please ensure that the roof structure is able to withstand such forces.

Stagnation and Excess Heat

Evacuated tube solar systems have the ability to heat water well above 100°C during periods of high solar radiation and minimal hot water usage. The controller has an inbuilt guard against hot water entering the storage tank. Once the bottom sensor has reached the pre determined setting of 65°C, (known as TOPOUT) power is no longer sent to the pump. This is needed as it is a requirement that heat in storage tanks does not exceed 80°C. During these periods of high solar contribution and minimum hot water usage, the collector can generate more heat than is required. At these times, the controller will turn off the pump to prevent the tank from overheating and the hot water tank temperature will not increase further. In some cases a crackling noise may be heard in the pipes when the hot water tap is opened as steam forms in the solar collector. This noise may be occur recurrently if the cold water supply pressure is low <400 kPa. Installation of a pressure pump may help reduce the occurrence of this noise.

Not having the pump cycling will cause stagnation in the manifold. This could potentially occur during periods of high radiation and little to no water usage in the home. Throughout these conditions the manifold will reach around 160°C. At this temperature the water does not boil as the pressure relief valve on the tank is set to 850kPa. This means that the water would have to reach roughly 180°C before any steam could form.

If the pump stops running due to power blackout or pump failure, a Pressure Temperature Relief Valve (PTRV) is incorporated into the hot water storage tank as a safety precaution which releases high temperature water and steam from the tank should it reach 95°C. The PTRV must have a downward facing copper pipe connected, running expelled water to an appropriate drainage point. It is important to ensure the relief valve or drain tube not be sealed or blocked. A regular maintenance check at six month intervals is recommended.

During stagnation conditions or for households with a cold water delivery <400kPa, large amounts of steam may be formed in the collector when the hot water tap is opened causing a “banging” sound within the copper pipes. Installing a pressure booster pump will eliminate this problem. This is applicable for installations with main water supply, tank or bore water. A check valve must also be installed on the cold main line before the tank.

Storage Tanks

The storage tank is typically an insulated metal tank with an electric heating element in the bottom or middle of the tank. Gas boosting is also available as an alternative option to electric boosting.

The storage tanks promote thermal stratification that prevents incoming cold water from mixing with the hot water at the top of the tank. Gas boosted systems provides optimum energy conservation, as it is only required when the temperature in the tank falls below 60°C.

A thermostatically controlled electric element in the bottom of the cylinder can be connected to normal or "off Peak" power supply. The heated water rises up the cylinder by natural convection to the top where it is ready for use. As hot water leaves the storage cylinder, it is replaced by cold water, which enters at the bottom of the cylinder.

SolarArk recommends flushing the water heater at regular intervals as advised by your licensed plumber, and to assist this operation, the cold water inlet has a large opening for flushing any build up solids that have escaped the line strainer. The tank may be used either indoors or outdoors and should be installed by and located in accordance with your licensed plumber’s recommendation, but usually close to the outlet where there is the greatest usage of hot water. Installation must comply with Australian Standard AS 3500.4 and any local authority regulations.

Tanks – Stainless Steel

Stainless steel storage tank can be heated using “full” or "off-peak" Tariff electricity. The latest aspects of design and material selection include:

- Hi-grade stainless steel cylinder
- Control of thermal stratification
- Dual Positive Domed Cylinder resulting in optimum location of element(s) water supply and delivery and flushing-through of suspended solids
- Highest level of insulation due to the use of a polymeric external casing combined with thick polyurethane insulation

Tanks – Vitreous Enamel (Glass Lined)

The Vitreous Enamel (glass lined) tanks are an efficient option for water heaters. Some features include:

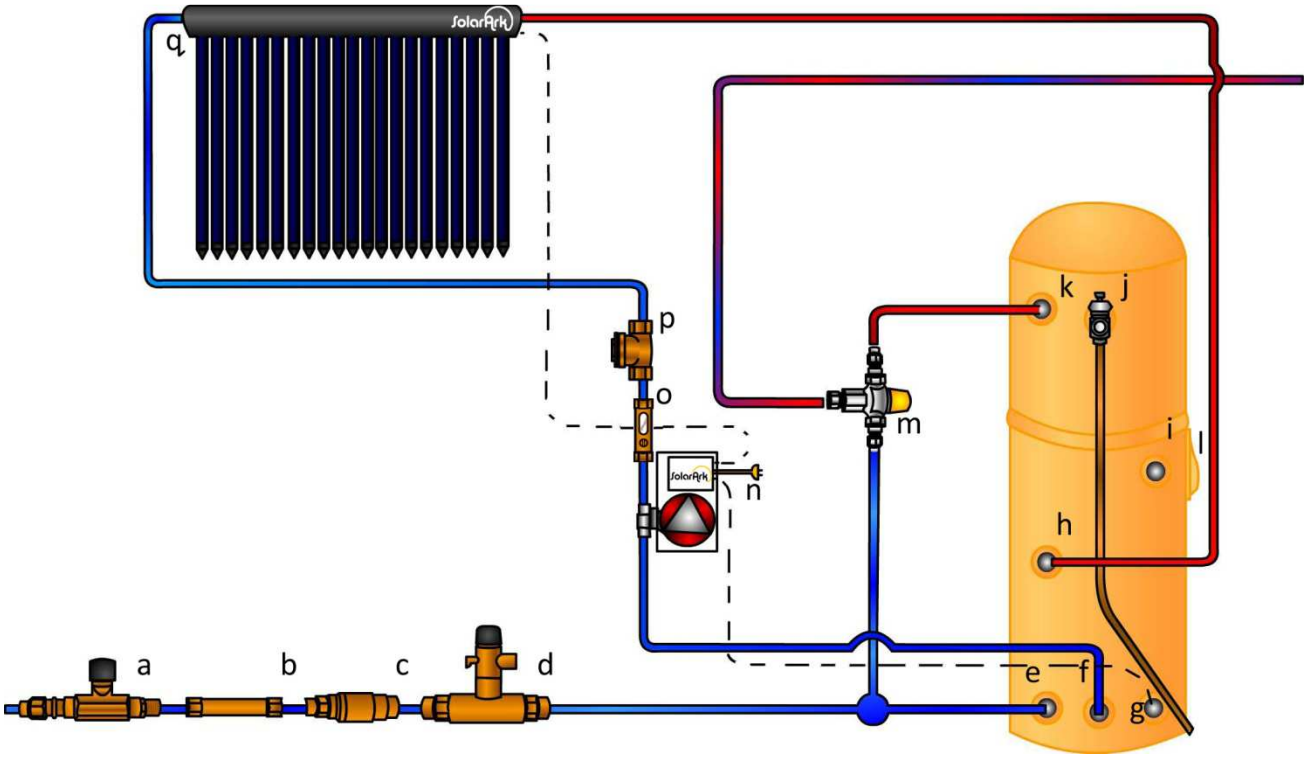
Glass lined tanks have a magnesium sacrificial anode that ensures potable water quality. Suitable to poor water quality areas as an aluminium anode can be installed to extend the life of the tank.

The release of hydrogen can sometimes occur if the water is not used for long periods of time. To combat hydrogen built up, all water heaters have a pressure and temperature release (PTR) valve fitted to Australian Standards.

If the water has been stagnant for two or more weeks, pull the lever on the PTR valve to “purge” the system for 30 seconds. This will expel any hydrogen built up. Caution need to be taken when purging as the water will be HOT.

Solar Collector Installation

System Design-Electric Boosted Solar Water Heater



Parts Schematic – Not all components are Provided by SolarArk

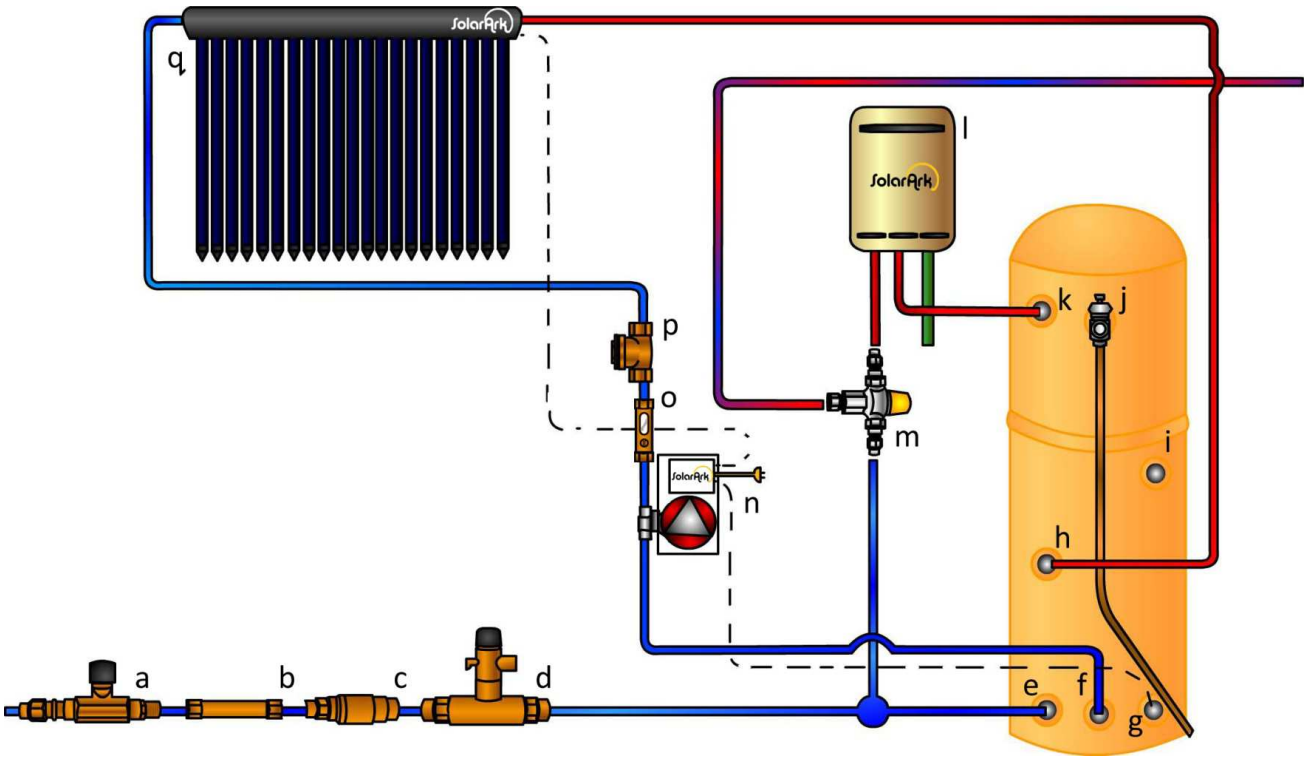
	Component Name	Qty	Supplier: Part Code
a	Non-Return Isolating Valve	1	Australian Standards Approved
b	Line Strainer	1	Australian Standards Approved
c	Pressure Limiting Valve (500kPa)	1	Australian Standards Approved
d	Expansion Control Valve	1	Australian Standards Approved
e	Cold Water Inlet	1	Australian Standards Approved
f	Solar Flow	1	Australian Standards Approved
g	Lower Sensor Port	1	Australian Standards Approved
h	Solar Return	1	Australian Standards Approved
i	Upper Sensor Port	1	Australian Standards Approved
j	PTR Valve	1	Australian Standards Approved
k	Hot Water Supply	1	Australian Standards Approved
l	Electric Element	1	Australian Standards Approved
m	Solar Rated Tempering Valve	1	Australian Standards Approved
n	Pump and Controller	1	Australian Standards Approved
o	Flow Control Valve	1	Australian Standards Approved
p	Brass Swing Check Valve	1	Australian Standards Approved
q	SolarArk Solar Collector	1	SolarArk SA-M-20, SA-M-30

Notes

1. Optional Inclusion, compulsory in some states
2. Allow 30cm of straight pipe before either side of pump
3. Allow 50cm of straight pipe before brass swing check valve
4. For runs longer than 20m use DN18 copper pipe
5. Temper valve MUST be installed
6. Only brass flip swing check valve can be used, no synthetic seats.

System diagrams have been approved in line with S/NZS2712 requirements. The installer must not change the design of the major system components. It is the responsibility of the installer/contractor to ensure that the system design meets all relevant standards, regulations and guidelines, and is safe and operating correctly. The installation of SolarArk products must be in accordance with the guidelines outlined in the latest version of the SolarArk installation manual. Any installer/contractor must be legally certified to install solar water heating systems and have attended an accredited SolarArk training session before completing the installation of any SolarArk products.

System Design-Gas Boosted Solar Water Heater



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j	PTR Valve	1	Australian Standards Approved
k	Hot Water Supply	1	Australian Standards Approved
l	Gas Booster	1	Australian Standards Approved
m	Solar Rated Tempering Valve	1	Australian Standards Approved
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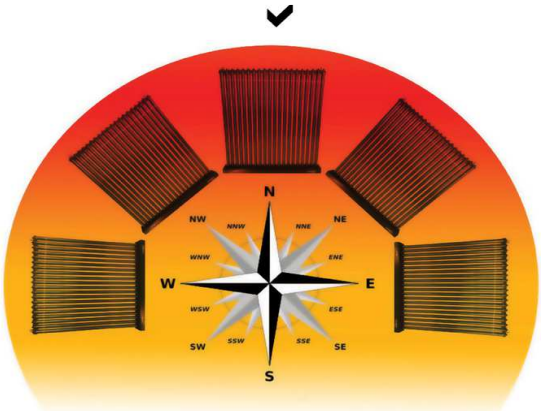
Mounting Frame

Some major factors need to be considered when installing the evacuated tube collector

Location	Latitude	Acceptable Pitch Angle	Optimum Angle
Adelaide	35˚	20-55˚	55˚
Alice Springs	23˚	20-43˚	43˚
Brisbane	27˚	20-47˚	47˚
Canberra	35˚	20-55˚	55˚
Darwin	12˚	20-32˚	32˚
Hobart	42˚	20-62˚	62˚
Melbourne	37˚	20-57˚	57˚
Perth	32˚	20-52˚	52˚
Sydney	34˚	20-54˚	54˚

To achieve optimum efficiency, the solar collector needs to face the equator in Australia and New Zealand is due north. With the cylindrical shape of the evacuated tube solar collector installation angles of up to 45° away from north have minimal effect on the yearly solar production. Collectors facing east, achieve higher solar input of the morning. Collectors facing west, achieve higher solar input of the afternoon. However if the solar collector is installed east or west facing a pitching frame can be installed at an angle between 35-40° to improve output by exposing the tube to perpendicular sunlight.



Regardless of the length of the pipe run, it is vital the flow and return lines are insulated with closed cell insulation, no less than 15mm wall thickness.

Ensure the structure of the roof is suitable to sustain the weight of the collectors. The SolarArk collectors weigh approximately 78kg for 20 tube and 115kg for 30 tube collector.

The minimum inclination of the collector is 20° and a maximum inclination of 80°.

SolarArk Maintenance

PTRV

It is recommended that the lever on the pressure and temperature relief valve (PTRV) on the side of the hot water tank be operated once every 6 months to ensure reliable operation. It is important to raise and lower the lever smoothly. Please be careful as the water released from the drain pipe will be HOT. If required ask the plumber to tell you where the valve is located if in doubt.

Glass Breakage

If adverse weather prevail causing large hail, debris or falling branches it is possible that a tube or tubes will be broken. The evacuated tubes are made of glass so please be aware of any glass that may have found its way from the roof to surrounding grounds. This should be cleaned up and disposed of in a sensible manner. Your plumber is to be called to check the system and replace any damaged tubes. Any broken tubes should be replaced as soon as possible to maintain maximum performance.

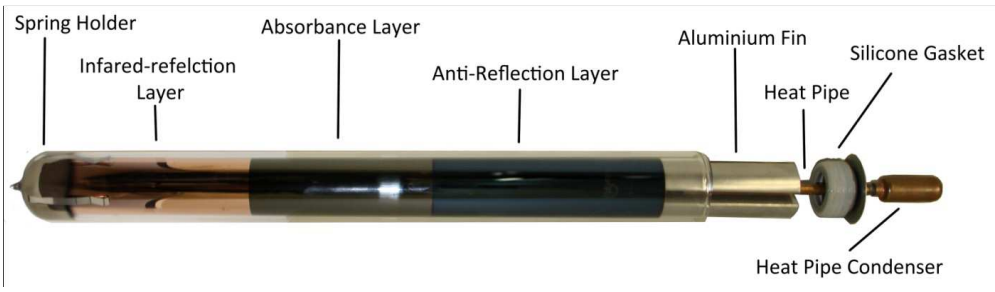
Replacement of Broken Tubes

Open the tube locking cap and unscrew the tube holder at the base of the solar collector. Slide the existing tube out and remove any broken glass pieces from the solar collector. If the O-ring in the manifold pops out while removing the tube, reinstall and spray with soapy water before re-inserting the replacement tube. Avoid contact with the Rockwool insulation as this may cause skin irritation.

Unpacking New Tubes

Ensure that the tubes are unpacked in a shady area (away from direct sunlight) as this may cause the heat pipe bulbs to heat up and cause major burns if touched.

The heat pipes are pre-inserted into the evacuated tubes. Remove tubes from packaging and check that the heat pipe is securely inserted into the centre of the aluminium fin of the evacuated tube. Ensure that the top of the heat pipe is straight. The silver at the bottom of the evacuated glass tube indicates good vacuum. The presence of white colour at the bottom of the tube indicates lack of vacuum and this tube should not be used.



Evacuated Tube Installation

- Pull out each heat pipe by 15cm. Coat each pipe tip with thermal paste by squirting thermal paste into a short piece of insulation. Insert the heat pipe, rotate clockwise and then anti-clockwise to ensure the tip is thoroughly coated with paste. Insert heat pipe fully into the manifold port.

- Lubricate the mouth of evacuated tube (outer wall) with soapy water using a sponge or spray bottle.

DONT SPRAY WATER INSIDE TUBE

- Push the evacuated tube into place. Do not twist more than ⅛th left and right turn.

- If the heat pipe is inserted properly no clear glass should be visible.

DO NOT PULL THE EVACUATED TUBE DOWN

- Once all tubes are installed ensure they are aligned neatly and clean each tube of any dirty marks.

- After the insertion of the heat pipe, secure the glass tube in the locking cap by closing the locking cap and carefully tightening the screw located at the base of the locking cap until the tube is secure. Do not over tighten, as the screw only needs to be up against the protective cap on the base of the evacuated tube to stop it from moving.

Insulation

The insulation of the plumbing pipes should be checked annually for damage as deterioration can occur over time. High temperature UV stabilised foam or metallic wrap are suitable insulation. Significant heat loss can occur if sub-standard insulation is used.

Other System Components

The pump, storage tanks and gas/electric boosters should be inspected by a qualified technician according to the manufacturer's maintenance guidelines.

TROUBLESHOOTING

Any system adjustments or repairs should only be carried out by a qualified technician. Home owners may safely inspect only the items listed below.

Insufficient hot water	▪ If the gas booster is not turned on before sending water through, it will default to 40°C. To reset the system, turn the gas booster off via the power point or take the plug out of the controller and wait two minutes before turning the system back on. ▪ If connected to full tariff, the element can be turned on for a few hours if additional hot water is needed. Lack of hot water will generally be related to the gas or electric heating booster system. Contact your SolarArk dealer.
Lack of Solar Contribution	During winter months, and periods of rainy or overcast weather, the amount of energy produced by the solar collector will be reduced. ▪ Firstly, check if there is power supply to the controller - the green light should be ON at all times. The orange light indicates that the pump is running and should be cycling ON and OFF. The pump should not be continuously running for long periods of time. ▪ Check for broken tubes and/or excessive water leaks. Should there be a controller or pump malfunction, contact your SolarArk dealer.
"Banging" Noise in Pipes/Tank	▪ The hot water has remained stagnant for a long period of time. ▪ Mains water supply to the tank is ≤400kPa. ▪ Solar collector oversized for the tank. ▪ Short pipe run between the collector and the tank. ▪ High Solar contribution and low levels of water usage ▪ Check valve (duo-valve) not installed or faulty – Contact your SolarArk dealer.
Releasing of Hot Water from TPR Valve	Few litres daily is normal. To test the system, run the hot water tap in the bathrooms or kitchen for 3 minutes to release some heat from the system (caution: water is hot). If after this period the tank is still regularly releasing hot water, it indicates a definite problem. Contact your SolarArk dealer.
System producing more hot water than is required.	This will be most apparent in the summer months when solar contribution levels are high.

Precautions and Warnings

VITREOUS ENAMAL TANKS: For solar collector systems using a vitreous enamel/glass lined storage tank the following precaution applies:

IF THE HOT WATER SYSTEM IS NOT USED FOR TWO WEEKS OR MORE, A QUANTITY OF HIGHLY FLAMMABLE HYDROGEN GAS MAY ACCUMULATE IN THE WATER HEATER

TO DISSIPATE THIS GAS SAFELY, IT IS RECOMMENDED THAT A HOT TAP BE TURNED ON FOR SEVERAL MINUTES OR UNTIL DISCHARGE OF GAS CEASES. USE A SINK, BASIN, OR BATH OUTLET, BUT NOT A DISHWASHER, CLOTHES WASHER, OR OTHER APPLIANCE

DURING THIS PROCEDURE, THERE MUST BE NO SMOKING, OPEN FLAME, OR ANY ELECTRICAL APPLIANCE OPERATING NEARBY. IF HYDROGEN IS DISCHARGED THROUGH THE TAP, IT WILL PROBABLY MAKE AN UNUSUAL SOUND AS WITH AIR ESCAPING
THE TPRV MUST BE OPERATED BY LIFTING AND LOWERING THE LEAVER VERY SLOWLY TO AVOID DAMAGE TO TPRV

Warranty

Warranty Conditions

i. The solar water heating system must be installed in accordance with the manufacturer's installation instructions, the local, State and National authorities and all relevant statutory requirements - AS3500.4 & 5, AS5601, AS3000, AS2712 etc.

ii. This warranty applies only to those components provided as part of the SolarArk solar water heating product and does not apply to any electrical or plumbing parts provided by the installer.

iii. The coverage period is valid for the indicated time from the date of purchase. Should any part of the complete solar system/water heater product be replaced during this warranty period, only the balance of the original warranty will continue to remain effective.

iv. The electrical system components must be installed in a domestic application and connected to a 240V power supply by a qualified electrician in accordance with AS3000.

v. The drain cock for flushing must be fitted at the time of installation should this system be installed in a regional location where regular flushing is required due to sediment build-up.

vi. Component manufacturers are at liberty to alter the design or construction for the products not withstanding that the product may have been sold by description or sample, even though alterations made have been introduced from the date of Contract and the date of delivery provided that the products are of the same or similar quality and are fit for the purposes for which they are purchased. Such alterations shall not constitute a defect in design or construction under this warranty.

vii. Dated proof of purchase is required prior to commencement of warranty work.

viii. The Warranty shall be limited to the replacement or repair, at the option of SolarArk Pty Ltd of any defective products and of such parts as have been damaged in consequence of the defect. SolarArk Pty Ltd is excluded to the extent allowable by Law from responsibility for any consequential loss including injury to persons; damage to property; economic loss; pain and suffering and any legal or other damages flowing from any manufacturing during fault or defect.

ix. SolarArk Pty Ltd shall be under no obligation to return parts replaced at its option pursuant to this warranty.

x. All independent work carried out must be authorised and prearranged by SolarArk Pty Ltd before any work commences.

xi. Labour credit claims must be logged to SolarArk Pty Ltd within 14 days of the service call.

xii. By law you must observe certain minimum safety precautions when working on high work sites. These safety precautions are outlined in work cover code of practice "safe work on roofs" part one and two in the occupation health and safety act 1983.

Warranty Exclusions

The following exclusions shall cause the warranty to become void, and may incur a service charge and cost of parts that may be required.

i. Accidental damage, acts of God, failure due to misuse, incorrect installation including but not limited to, as per owner's manual, installation guide, installation instruction and any other requirements set by SolarArk and or lack of maintenance.

ii. If the system is sold or attempts to repair or alter the system without the consent of or other than by an authorised SolarArk Pty Ltd representative.

iii. Where the solar collector leaks or fails to operate normally due to freezing in regions above the snow line and/or with minimum temperatures below -15^{o}C (in accordance with AS/NZS 2712:2007 freeze level 1), or when power supply to the controller and pump is cut.

iv. Power surge and/or voltage fluctuation.

v. Damage caused by animals, birds and rodents.

vi. Claims for damage to wall foundations, furnishings, roofs or other losses directly or indirectly due to leakage from the water heater.

vii. Damage to the collector due to excessive winds.

viii. Damage to the evacuated tubes due to impact by any object.

ix. This warranty does not cover for any damages incurred to the solar collector, valves/fittings and or storage tank due to incorrect sizing, selection of the solar collector or system water supply pressure under 400 KPa.

x. The use of this solar hot water system to heat chlorinated pools or spa water. Chloride levels present in most reticulated public potable water supply are safe for use in the solar collector provided there is no use of bore waters in the reticulated supply.

xi. Damage to Collector as a result of excessive oxygen (Dissolved Oxygen) common in low pressure systems (Supplied from Rain Water Tank/Gravity supplied).

xii. The solar collector is left dry (no liquid circulation) and exposed to daily sunlight (i.e. not covered) for a period exceeding 10 consecutive days.

xiii. Where the solar water heating system component has failed directly or indirectly as a result of excessive water pressure, negative pressure (partial vacuum), excessive temperature, corrosive atmosphere, faulty plumbing and/or electrical wiring, or major variations in gas or electrical energy supply.

xiv. This warranty does not cover the effects of sludge/sediment as a result of connection to a water supply from unfiltered or treated sources i.e. spring, dam, bore, rain water tanks, river and town supply from a bore or highly mineralized water.

xv. Warranty for must be filled out and a copy returned to SolarArk within 10 working days of system installation date.

xvi. Where the water stored in the cylinder exceeds at any time the following levels:

Water Acceptability Composition Range for Stainless Steel Tanks

Water Quality	
Total Dissolved Solids	<600 mg/litre or ppm
Total Hardness	<200 mg/litre or ppm
Chloride	<250 mg/litre or ppm
Sodium	<150 mg/litre or ppm
Magnesium	<10 mg/litre or ppm
PH Levels	6.5 – 8.5
Electrical Conductivity	850 /cm

Water Acceptability Composition Range for Vitreous Enamel Tanks

Water Quality	
Total Dissolved Solids	<600 mg/litre or ppm
Total Hardness	<200 mg/litre or ppm
Chloride	<300 mg/litre or ppm
Sodium	<150 mg/litre or ppm
Magnesium	<10 mg/litre or ppm
PH Levels	6.5 – 9.5
Electrical Conductivity	850 µS/cm
Iron	1 mg/litre

Water Acceptability Composition Range for Solar Collector

Total Dissolved Solids	<600 mg/litre or ppm
Total Hardness	<200 mg/litre or ppm
Chloride	<250 mg/litre or ppm
Sodium	<150 mg/litre or ppm
Magnesium	<10 mg/litre or ppm
PH Levels	7.0 – 8.5
Electrical Conductivity	850 µS/cm

xvii. Any serial tags/stickers on any of the components are removed or defaced.

xviii. The product is relocated from its original point of installation

xix. Subject to statutory provisions to the contrary, SolarArk Australia shall not be liable for consequential damage or any incidental expenses resulting from any breach of this warranty.

xx. The benefits conferred by this warranty are in addition to all other rights and remedies in respect of the product, which the purchaser has under the Trade Practices Act (Commonwealth) 1975, and similar State or Territory laws.

Component Warranty

Replacement of major components, including gas heater, evacuated tube solar collector, storage tanks, solar circulating pump, electric tank heating element, electric tank thermostat that fail due to faulty manufacturing or workmanship will be provided at no charge to the customer for replacement.

SolarArk reserves the rights to reject or void warranty if the customer has not paid in full for the SolarArk hot water system.

Warranty will be covered within Metropolitan areas. Where the system is installed outside the boundaries of a Capital Cities Metropolitan area (areas on STD), or where the Solar Hot Water System is installed outside of a 20km radius of an accredited SolarArk Service Agent's premises, the costs of transport, insurance and travelling will be charged to the consumer.

The period for which free replacement applies varies for different components as detailed below.

Replacement or repair excludes all travel, insurance and/or transport costs. This cost will be passed on to the consumer.

Faulty parts will only be replaced under warranty after the faulty part has been returned to SolarArk for inspection to validate the cause of the failure.

Any parts returned for repair may be replaced by refurbished parts of same type rather than repairing same parts. Refurbished parts may be used to repair or replace the returned parts.

It is a warranty requirement to replace the anode on the SolarArk vitreous enamel tank (glass lined tank) every three years. Failure to replace anode will void warranty.

Major Component	Part	Domestic Use		Commercial Use	
		Parts Warranty	Labour Warranty	Parts Warranty	Labour Warranty
Evacuated Tube Solar Collector	Evacuated Tubes	15 Years	1 Year	5 Years	1 Year
	Manifold	15 Years	1 Year	5 Years	1 Year
	Mounting Frame	15 Years	1 Year	5 Years	1 Year
S20 and S26 Solar Compatible Gas Booster	Heat Exchanger	10 Years	3 Years	5 Years	1 Year
	Other Components	3 Years	3 Years	1 Year	1 Year
Solar Storage Tanks	SolarArk Vitreous Enamel	5 Year	1 Year	1 Year	1 Year
	Stainless Steel	15 Years	1 Year	5 Years	1 Year
Components	Solar Controller	1 Year	1 Year	1 Year	1 Year
	Sensor Cable	1 Year	1 Year	1 Year	1 Year
	Circulating Pump	2 Year	1 Year	2 Year	1 Year
	Tempering Valve (If supplied by SolarArk)	1 Year	N/A	1 Year	N/A
	Electric Heating Element	1 Year	1 Year	1 Year	1 Year
	Anode (where applicable)	1 Year	1 Year	1 Year	1 Year

- In order to comply with Queensland State legislation, in Queensland domestic installations only, a 2 year warranty on the solar circulating pump 1 year labour warranty applies.
- In order to comply with Victorian State legislation, in Victoria domestic installations only, a 5 year warranty on the solar circulation pump, solar controller and components within the gas booster with 1 year labour warranty applies.
- For Everlast stainless steel tanks the 15 years warranty applies for installation in Eastern sea boarder from Sunshine Cost to Tasmania out to Darling Range and Tamworth all other States 10 years' warranty.

SolarArk Warranty Claim Procedure

For all warranty claims on SolarArk Solar Hot Water Systems, please contact your SolarArk Representative.

Have all information regarding the warranty claim available including:-

- Copy of Warranty Card
- Installer Details
- Installation Compliance Certificate
- Customer Details
- System Details
- Information on Faulty Components

An authorised agent will be allocated to your warranty claim.

In the case that the warranty is not valid, the labour and parts will be charged to the agent or consumer based on the warranty coverage.

Labour claims will only be honoured based on the SolarArk Schedule of Rates and once the faulty stock has been received.

Please find a contact list below outlining the relative suppliers.

Component	Contact
Rinnai Gas Booster	Contact: Rinnai 1300 555 545
Everlast Stainless Steel Tank	Contact: Everlast 03 9768 2404
SolarArk Solar Collector	Contact: SolarArk 1300 670 966
SolarArk Solar V.E Tanks	Contact: SolarArk 1300 670 966

Disclaimer

This manual contains an overview of the SolarArk Solar Hot Water System, all instructions/recommendations must be followed exactly as stated herein. SolarArk Pty Ltd is not responsible for any loss of damage to any person or property of any type, whether direct or consequential, arising from the operation of the solar hot water system or any of its components.

OH&S Disclaimer – SolarArk Pty Ltd and its Authorised Dealers work with and recommend various installation and plumbing companies to install, test and certify correct operation of solar hot water systems. Each installation must be covered by the installer's insurances, commercial terms and conditions and by the applicable OH&S legislation. Each person that installs assembles or services must comply with all OH&S requirements relevant to the type of work being conducted including, but not limited to, plumbing work, work on roofs and electrical work. SolarArk Pty Ltd and its Authorised Dealers do not accept any responsibility for any loss or damages to any person or property of any type, whether direct or consequential, arising from the installation, maintenance or operation of the solar hot water system or any of its components.

SolarArk's Frequently Asked Questions

Why Choose a SolarArk Hot Water System?

SolarArk is the only system in the Australian market that is backed by a 15 year manufacturing warranty for all major components. As SolarArk is an Australian owned company with its own manufacturing facility, you can be assured of the highest quality, ongoing support and service. We offer the most efficient Solar Collector for both cost efficiency and performance.

How does the SolarArk Evacuated Tube Hot Water System Work?

Sunlight passes through two outer glass layers to an internal tri-layer (comprising an infrared-reflection layer, an absorbance layer and an anti-reflection layer). The heat collecting absorbance layer converts the sunlight into usable heat. The heat generated by the evacuated tube's absorbance layer is transferred to the manifold at the top of the tubes, where the cold water is converted to hot water as it passes through the header pipe to be stored in the hot water tank.

Is Solar Water Heating a viable alternative to gas or electricity?

Due to varying weather conditions, solar water heating plays a complementary role to gas and electricity. Solar water heating cannot completely replace the need for gas or electric heating as there are some days when solar contributions are low. On average, over a period of a year, a correctly sized solar system can provide 90% of a household's hot water needs. The hot water system can be automated so that hot water is guaranteed regardless of sunlight levels.

What is gas or electric boosting?

When solar contribution is low, the gas or electric booster will automatically boost the water temperature to the required level of 60°C.

What are Small- Scale Technology Certificates (STC's) or formerly known as (REC's)?

A Small-Scale Technology Certificate is a new form of currency created by the Federal Government and is used to demonstrate compliance with the requirements of the Governments Mandatory Renewable Energy Target (MRET) scheme. Each STC's represents the equivalent of one megawatt hour of electricity generation from an accredited renewable energy source. Each SolarArk system has been assigned a REC's value based on independent testing authority to establish the performance and efficiency of each system. The REC's values assigned to SolarArk systems represent the amount of energy savings over 10 years. STC's have a monetary value which changes weekly based on the renewable energy industry.

Are any structural roof modifications needed to support the hot water system?

There are *NO* roof modifications required to accommodate SolarArk hot water systems. The manifold, frame and tubes are lightweight and easily installed by a qualified person.

What is the optimum angle to install the Solar Collector?

The solar collector should be installed for optimum winter performance. The tubes perform best when installed at an angle of between 20° and 70° from the horizontal. If a roof has an angle less than 20°, it is advisable to use an adjustable pitched roof frame or A-frame to ensure optimal heat pipe operation.

Are the Evacuated Tubes affected by frost?

Frost protection is incorporated into the solar controller. SolarArk evacuated tubes operate at high efficiency levels in freezing conditions without the use of chemicals such as glycol.

Are the glass tubes hail resistant?

Yes. The evacuated tubes are extremely strong. The SolarArk evacuated tubes are able to handle significant impact from hail of up to 25mm/1" in diameter.

SolarArk Warranty Form

Customer Reference No: _____

CUSTOMER

Last Name: _____ First Name: _____

Address: _____

Suburb: _____ State: _____ Postcode: _____

SITE INSTALLATION

Address: _____

Suburb: _____ State: _____ Postcode: _____

INSTALLER

Last Name: _____ First Name: _____

Address: _____

Suburb: _____ State: _____ Postcode: _____

License Number: _____

Date of Installation: _____

SYSTEM DETAILS

System Installed Model Number: SA _____

Solar Tube Collector Serial Number: - ____ ____ - ____ ____ ____ ____ ____

Hot Water Tank Model and Serial Number: _____

PLEASE RETURN TO SOLARARK PTY LTD WITHING TEN (10) WORKING DAYS OF PRODUCT INSTALLATION

MAIL TO: PO BOX 2719 TAREN POINT NSW 2229

FAX TO: (02) 9531 4500

EMAIL TO: warranty@solarark.com.au

OFFICE USE ONLY

DATE OF RECEPTION: _____

APPROVED BY: _____ SIGNATURE: _____