

USER MANUAL

EVACUATED TUBE COLLECTOR
SOLAR WATER HEATER SYSTEM

ETC



समझदारी की सोच!



Sudarshan Saur[®]

AN ISO 9001: 2015 & ISO 14001 : 2015 Certified Company

**Instruction for Non bio Degradable
Material disposition:**

Material used in product like foam, Thermocol, PP Material & Rubber etc are non bio degradable. To protect and save the Environment, the same material, after product cycle or during maintenance required to disposed please do not throw anywhere and suggested / recommended to return the same to factory or give to any authorized recycler in area.

**ASK DEALER
FOR YOUR GUARANTEE CARD**

समझदारी की सोच!



Sudarshan Saur®

WELCOME

Dear Customer,

Congratulations!

You are now a proud owner of a world-class solar water heating system by Sudarshan Saur.

You have purchased the Evacuated Tube Collector System (ETC). It is a world-renowned product and has been introduced for the first time in India by Sudarshan Saur with technical collaboration from abroad.

The ETC System (Wonder Series) has been created in our magnificently fitted out, technically sound unit, under the strictest of quality control standards.

Before installing your solar water heater, kindly go through this user manual, so that you get an idea as to how best to use your new product.

We at Sudarshan Saur have a variety of applications for a wide range of users. Be it houses, hospitals, hotels, industries, or anywhere else, you'll find that we are able to provide you with the solar water heater that is ideal for your institution.

All important information regarding such applications has been covered in this manual. Plus you can also get a clear idea of the principles and technologies that go into creating our products.

If you still have any queries or would like to talk about any inconvenience to the system, or our service, then please get in touch with us on our Customer Care number.

Yours sincerely,

Managing Director,
Sudarshan Saur

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INTRODUCTION

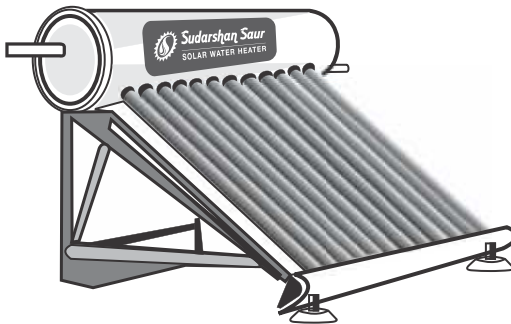
Our Mission

The Sun is the powerhouse of the universe. It is the ultimate source of energy for the Earth and it is the only source of energy which can be harnessed completely, without disturbing the natural cycle of life.

We at Sudarshan Saur have made it our mission to harness this divine source of energy for the well-being of mankind.

Ideal for Indian Society

The Evacuated Tube Collector (ETC) systems from Sudarshan Saur are specially designed to satisfy the needs of Indian households. They are highly economical, require low maintenance, are cost-effective, and most importantly, they help to reduce the increased load on traditional means of power such as electricity, LPG and firewood. Since they can be installed in areas having minimum space requirements, they are the perfect appliance for your home.



WORKING PRINCIPLE OF ETC SYSTEM

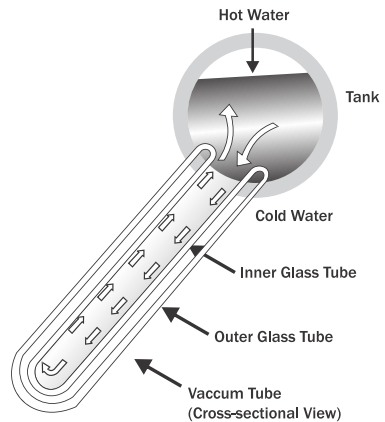
The Sudarshan Saur ETC system works on a Black Body Heat Absorption Principle. The principle states that black colour absorbs maximum heat, more than any other colour.

The system uses vacuum tubes made of borosilicate glass with a special coating to absorb solar energy.

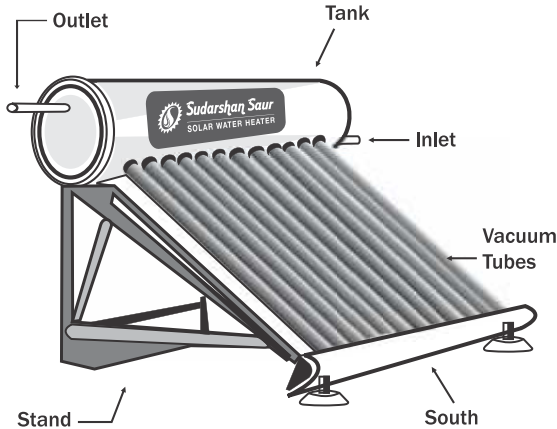
Air inside the gap between two glass tubes is evacuated which results in a high level of vacuum, which acts as the best insulation to minimize heat loss from the inner tube.

The black coating transfers this heat to the water. The water on the upper side of the vacuum tube becomes hot and thus lighter, and starts moving upwards in the tank.

At the same time, cold water, which is heavier, comes downward from the tank and is stored at the bottom. This phenomenon is called as natural thermosyphon circulation, which occurs in every tube.



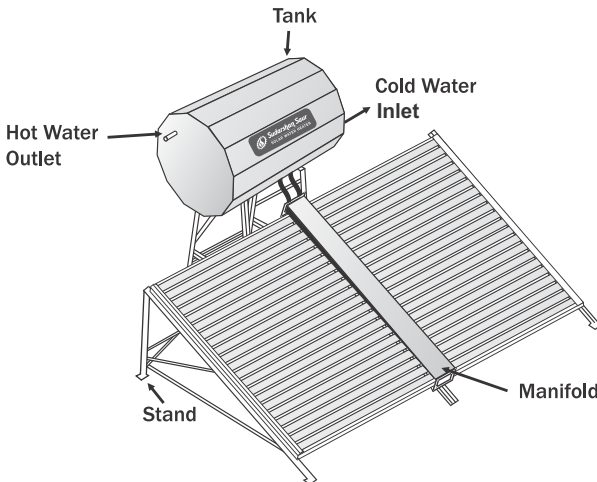
COMPONENTS



The ETC system has the following components:

- A) **3 T Evacuated Glass Tubes:** Evacuated glass tubes are the main component of the ETC system. They are made by assembling two concentric borosilicate glass tubes. The outer surface of the inner tube is coated with Cu/SS-ALN by an innovative coating technology called 'magnetron sputtering technique'. A special selective black coating absorbs maximum energy from the sun and loses minimum energy. Since the evacuated tubes are round, sun rays fall on them at an angle, and they are able to absorb solar radiations all day long.
- B) **Water Storage Tank:** The storage tank is designed on the basis of different system capacities. It is made from special grade stainless steel (SS-304) or special grade anti-corrosive thick metal sheet with special non-stick food grade coating or glass coating. The tank is covered with high-density PUF or Rockwool insulation, which keeps the water hot overnight. This insulation is again laden with an outer pre-coated G.I. cover.

- C) **Manifold (for bigger systems):** Manifold is used to hold the array of vacuum tubes on either side, for systems of higher capacity (from 500 LPD upwards). The assembly of tubes is covered with high quality PUF insulation, ensuring low conduction and convection loss to the atmosphere. This insulation is again laden with pre-coated G.I. cover to protect the in-built structure from the external atmosphere. This makes the system compatible, efficient and economical.
- D) **Stand:** The Stand is made of sturdy steel sections and G.I. powder coated (pure Polyester) folded angles, so as to support all components of the system. It is designed to take the load of the hot water storage tank (especially during storms). The stand is supplied in various parts, which need to be assembled on site.
- E) **Other Components:** There are various components like seals, grommets, Tube Bottom Support and other fasteners required, before the entire system can be assembled.

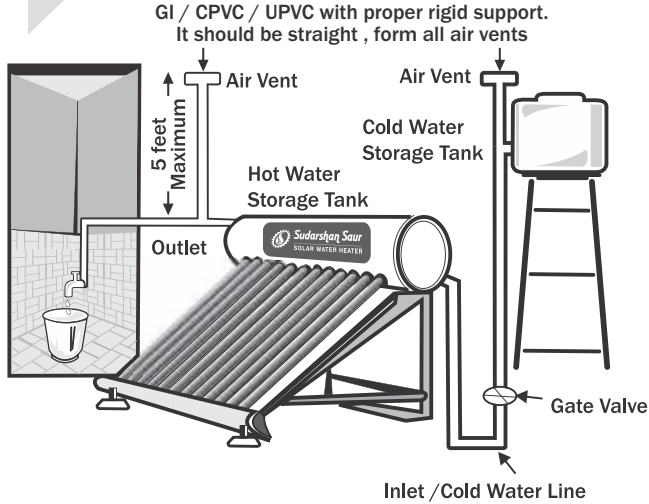


SITE REQUIREMENTS

- a. **Cold Water Head:** You would require a cold water supply from the level above the tank of your system i.e. the bottom of the cold water tank should be at least 4.5 feet (for systems up to 300 LPD) above the installation platform of ETC system.
- b. **Water Hardness:** There are two different systems for soft water and hard water. And depending on your system type, it will work differently according to your requirement.
- c. **Area:** This varies for systems with different capacities e.g. a 100 litre system requires approximately 6'x 6' area.
- d. **Orientation:** System should face the south direction. If there is any limitation on site, a variation of + or - 10° from south can be allowed, as it has minimal effect on system performance.
- e. **Minimum Hot Water Line:** The solar water heater must be installed at a place which is easily accessible to the point in the home where hot water is to be used.
- f. **Place of Installation:** The system can be installed directly on an RCC slab or on a tapered roof, facing south. It can also be done on an open ground with a proper foundation, a balcony or on a wall with proper structural support.
- g. **Shadow-free Place:** The selected place should be free of shadows, as much as possible, so as to receive clear sunshine from all angles, all through the day.

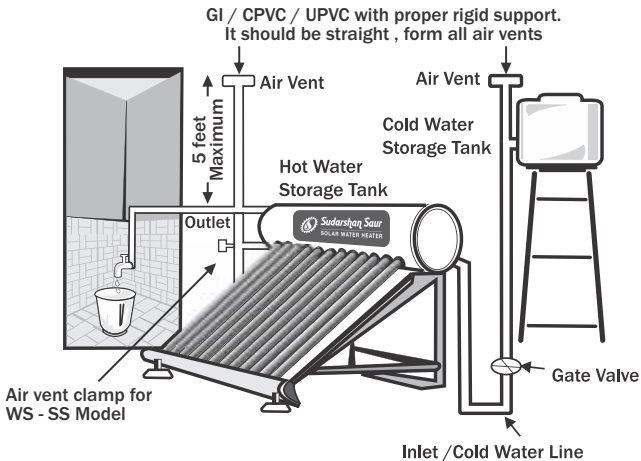
PLUMBING CONNECTION: AUTOMATIC MODE

Fig. 01

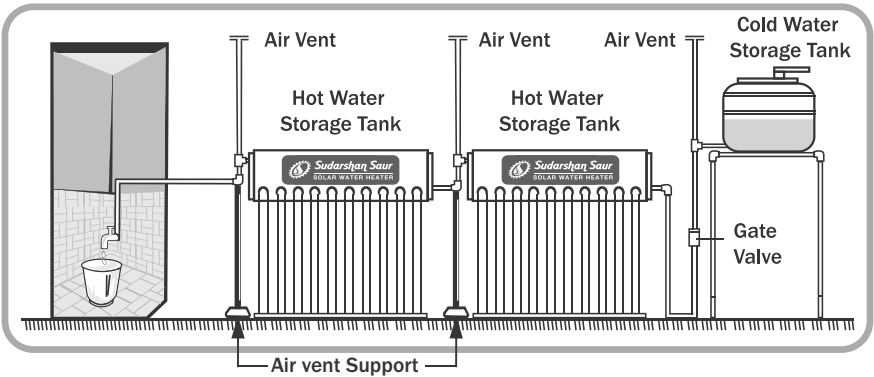


This method of plumbing will work when there is a drop in temperature, due to mixing of cold water in the tank. The ETC system needs to be of a sufficient capacity to hold this water. The best part is, you won't have to operate the gate valve every day to fill the system to use hot water. No use of NRV is allowed to Inlet & Outlet line of the solar system.

Fig. 02



PLUMBING CONNECTION: SERIES MODE



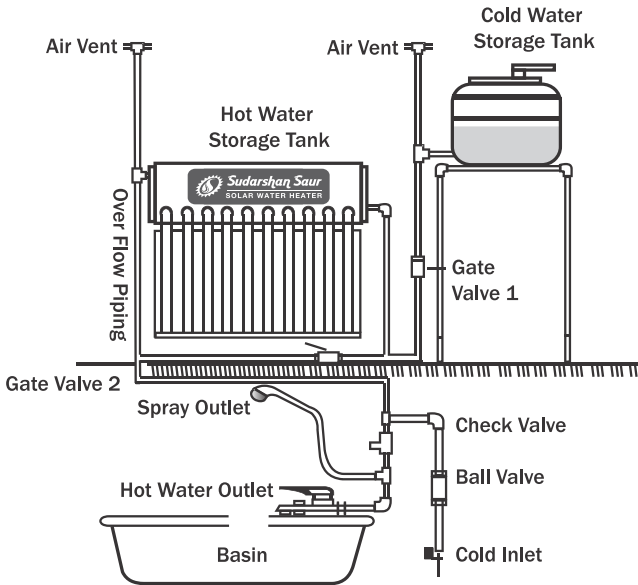
This is suitable if you are residing in a cold region or if you have a large number of family members utilizing hot water facilities at home.

Two systems of equal capacities are connected in a series, e.g. if your hot water requirement is 150 LPD, then two systems of 150 LPD ($150 \times 2 = 300$ LPD) would be installed. The operation for this system is similar to the automatic mode type of plumbing connection.

Water in a system gets heated for a couple of days. As you use the hot water from the main system which has an outlet that is connected to your hot water tap, pre-heated hot water from the other system moves into the main system and again gets heated for one whole day.

Since water gets heated twice, you have the twice the amount of hot water during winter season or in cold regions.

PLUMBING CONNECTION: DUAL MODE

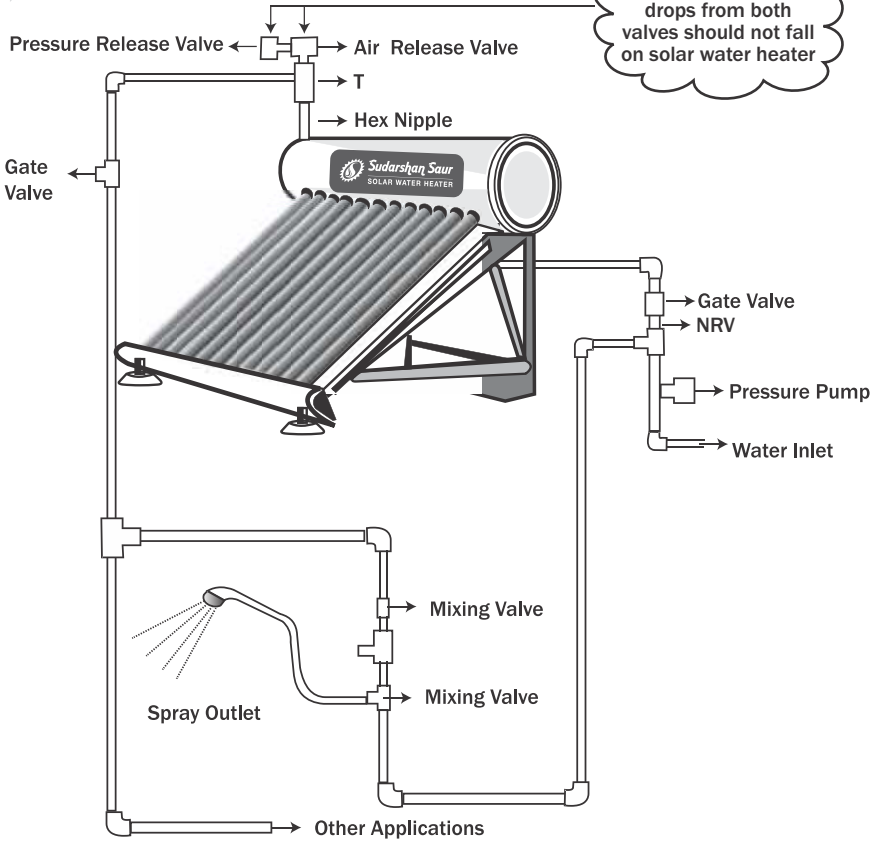


This is an alternate arrangement of plumbing, if you want to operate the valve in winter or on cloudy days. You must close the cold inlet gate valve 1 and open gate valve 2 of the optional pipeline. After hot water has been utilized, make sure to fill water in the storage tank.

This plumbing connection is highly recommended if you have purchased the Wonder Standard (SS) model or Wonder Ultimate Glass Lining (GL) model.

PLUMBING CONNECTION: HEAT PIPE MODEL

Take care of water drops from both valves should not fall on solar water heater



This plumbing connection is only recommended for the Heat Pipe Model, also called Wonder Ultimate: Pressurized Series.

This system is designed for bungalows and homes that use pressure pumps for high water pressure requirements.

HOT WATER LINE: AUTOMATIC MODE

- a) This table must be strictly followed to know about the size and length of the hot water line:

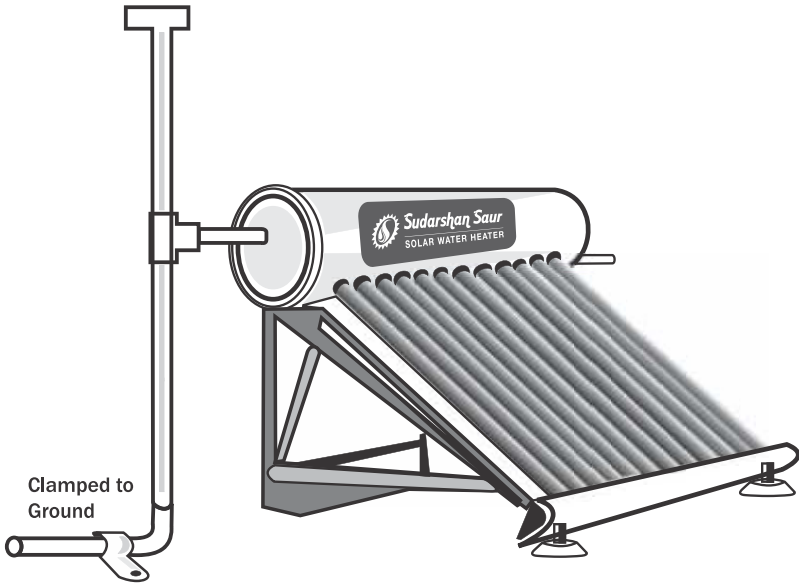
ETC System Ratings	Max Length Mtr.	Line size	Using Points
100 ETC	10	1/2"	1
150 ETC	10	1/2"	1
200 ETC	10	1/2"	2
250 ETC	10	1/2"	2
300 ETC	10	3/4"	2
500 ETC	20	3/4"	2

- b) Insulation of Hot Water Line: Insulation may not be needed if the line size and length are kept minimal, as stated in this table. This is applicable because, in most parts of India, the temperature generally does not go below 10°C. However, it is recommended to insulate the hot water line as per standard procedure.
- c) Gate Valve: This must be provided in the hot water line, immediately after the system outlet port, to help during system maintenance. Separate cold water line must be laid down for the solar water heating system.

Cold Water Line:

If the cold water line is not separate and tapped from the main line going to other points, the hot water which comes back might mix with the cold water and the system will not function properly. Even a non-return valve should not be used while establishing such connections. Gate valve must be provided in inlet line to help during system maintenance. Size of cold water line should be equal to the main port of the hot water line.

HOT WATER VENT: AUTOMATIC MODE



Duly insulated vent pipe must be provided immediately after the outlet port of your solar water heating system. The height of the vent pipe must be at least one foot above the top level of the cold water supply tank.

The outlet line must be brought downward up to floor level and must be clamped or grounded with the floor, so that the vertical load of vent pipe is transferred to the ground. This will eliminate any chances of damage to system tank due to vent pipe load.

OPERATIONAL HINTS

- 1) **Always fill cold water in your tank:** Especially do this in the morning, because doing so during afternoons might cause the glass tubes to crack, due to a sudden change in temperature. Although the tubes have been designed to take this pressure, yet it is a point to be careful about.



- 2) **Cleaning of Tubes:** Outer surface of glass tubes must be kept clean by frequently removing any kind of dust that accumulates on it (twice a month is ideal).



- 3) **Shadow-free Place:** Remove any objects obstructing the sun's rays in reaching the absorber panel by forming shadows. Make sure you consider these obstructions before installing your solar water heating system.



- 4) **Dry Running of System:** It is vital for you to have a consistent supply of cold water to replace the hot water in the tube. In case the system is not going to be used for a long period, we advise you to cover the absorber tubes with a thick sheet.



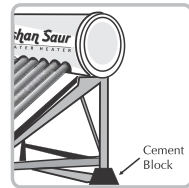
5) **Time gap between hot water removal:** The water present in the pipeline is usually cooler than the water in your storage tank. So, do wait while the cold water goes out of the pipeline and hot water has filled up again. This hot water loses its heat, and the best way to reduce this heat loss is to minimize the time gaps between water usage.



6) **Cleaning of scales in vacuum tubes:** If hard water creates a scale formation in your tube then you should clean the tube with a round wire brush. However, it is advised that a trained plumber or technician do this kind of servicing. This kind of deposition usually occurs in areas of hard water. The effectiveness of heating may be reduced if the scale removal is not done at proper time.



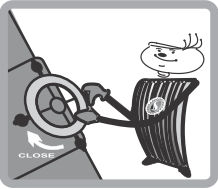
7) **Long-lasting effectiveness of the stand:** To make the stand more stable, for a longer period of time, prop it up by using a cement block.



8) **High temperature due to non-usage:** If hot water is not utilized for more than 2-3 days, the temperature of the water in the system can go up to 80-90°C. This temperature would be too high for hot water usage so do mix an appropriate amount of cold water with it.



TROUBLESHOOTING GUIDELINES



Problem: Water is not sufficiently hot.

Reason: Supply valve may have remained open, which led to mixing of cold water in the ETC tank.

Solution: Close the supply valve before you take a bath.



Problem: Water is not sufficiently hot.

Reason: There might be some obstacle or obstruction that does not allow sunrays to fall on the vacuum tube of your system.

Solution: Remove the obstacle and make sure that sunrays do fall on the system through the day.



Problem: Water is not sufficiently hot.

Reason: There may be some scaling inside the vacuum tube due to hard water impurities.

Solution: Call a trained plumber or technician and have them remove the impurities by servicing the system.



Problem: Water is not flowing out of the outlet.

Reason: The ETC system tank may be empty as the water may not have been filled, the previous morning.

Solution: Open the supply valve and make sure water gets filled first thing next morning.

Disclaimer

All the information in this manual is based on the product range, design and models available as on the date of printing. At Sudarshan Saur, our products continuously undergo the process of improvement and innovation, thus the parameters of your product may vary from the information given in this manual. The company reserves the right to change/alter any part of its system/product without prior notice.

CUSTOMER FEEDBACK

Name _____

Address _____

Contact Number _____

E-mail _____

How did you find out about Sudarshan Saur Solar Water Heater?

Please tick (✓) as applicable.

Referral

Friends/Relatives

Advertisements/Communication

Internet

Comments _____

System Sr. No. :

Invoice No. :

Date :



ASK DEALER FOR YOUR GUARANTEE CARD

Please see other terms and conditions applicable carefully.

Performance Of Solar Water Heating System In (Winter) Cold Climate Season.

As you very well aware that the solar water heater absorbs the heat from the sunlight and transfers this heat to the water & make it hot. The input energy to heat the water is sunlight which we receive from sun and as you know, intensity of the sunlight changes during the year with-respect to change in season.

So we request to you all to understand that the performance of solar water heater is depending upon many parameters as given below

1) Capacity of Solar Water Heating System with respect to the number of users. 2) Capacity of Solar Water Heating System with respect to water used by the number of user. 3) The hot water used for Bathing / Washing hands and legs during last night. 4) Intensity of Solar Rays. 5) The temperature of cold water entering in hot water solar tank. 6) Continues Drop leakage from solar water tank. 7) Failure of hot & cold water mixer causing entering the cold water in the hot water tank from outlet side due to gravity and height of cold water tank. 8) Improper Cold Water Pipeline (Do it as per sticker given on solar tank).

So from above given detailing, it is very much clear to you, that the effectiveness of solar water heating system is much more related to the intensity of heat present in sunlight and performance of solar water heater is also related with various points given above which should be taken care by the customer.

We hope that you will understand us, be with us and will enjoy the hot water from solar water heating systems for the clean & healthy life.

We hereby confirm that your Sudarshan Saur Solar Water Heating System is Guaranteed for the period mentioned, from the date of the invoice on pro-rata basis.

Guarantee Exclusions

Repair and replacement work will be carried out as set, but following terms and exclusions may cause the solar water heater Guarantee* to become VOID and may incur a service charge and cost of part/s if any.

- 1 If the completed Guarantee* card not presented to the company or authorized dealer/technician at the time of testing, repair or servicing.
- 2 If the system is not installed, operated, maintained as per the guidelines given in the user manual.
- 3 If the system parts repaired altered or shifted from other unauthorized agencies without company's official permission.
- 4 If the original serial number is deleted, defaced or altered.
- 5 If none clearing of any payment.
- 6 Breakage of Vacuum Tube & Toughned glass due to any reason.
- 7 Defects or faults which in the opinion of the company is due to misuse or neglect or accident, acts of god like cyclone, heavy winds, hail stones, heavy rainfall, earthquakes, fire, lightning etc.
- 8 Damages resulting from exceeding the maximum permissible inlet water pressure 0.3kg/cm2 for non pressurized system and 4kg/cm2 in case of pressurized system.
- 9 Damages due to improper selection of accessories external to the original equipment and/or Improper selection of model/ capacity or misuse of any kind.
- 10 Improper performance of system or any other damage due to salts and scaling occurred because of hard water/ Algae.
- 11 Minor scratch or distortion occurred during transport, loading, unloading or installation of system and normal wear and tear of various parts.
- 12 Various components like rubber parts, plastic parts, air relief valve, electrical heater etc, that are bought from outside. Accessories external to the original equipment.
- 13 Effect on exterior surface coating due to weathering, rain or sunshine etc.or drops from the air vent.
- 14 Heat loss resulting from not insulating the air vent, out let pipeline and extra length of hot water pipeline and very cold water supplied to the system.
- 15 No fixed temperature Guarantee* can be given for hot water generated by this Sudarshan Saur product, as the heating of water depends on solar radiation fluctuations OR geo-climatic conditions.
- 16 In no event shall the company be liable to a user for any special, incidental or consequential loss or damage; any such claims are specially excluded under this Guarantee* certificate.
- 17 Cleaning of scales of deposits inside the evacuated tube & Flat plate collector absorber is not covered under Guarantee*.
- 18 If solar water heater which, during the Guarantee* period either, has been shifted from one location to another or changed ownership by sale or lease, gift or otherwise, without written intimation to that effect being given to the company within seven days of such shifting or change of ownership and, in the case of shifting, has not been installed in the new location as per instruction given in user manual or by one of the company's authorized dealers or technician at cost of the purchaser.

*** Guarantee* Terms and Conditions**

- 1 We agree to repair or if found necessary to replace any defective part. While the company and/or authorized dealer will make every effort to carry out repairs and/or replacements at the earliest. However it is made expressly clear that the company and/or authorized dealer is under no obligation to do so in specified period of time without any material/part charges to the user.
- 2 The Guarantee* does not include transport, delivery, handling charges of defective and replaced items.
- 3 The Company Reserves the right to decide whether the defective part is to be repaired or replaced but in no case do we Guarantee* to replace the total system.
- 4 Where failed component or solar water heater is replaced under Guarantee*: the balance of original Guarantee* period will remain in effect. The repaired/replaced part or solar water heater does not carry a new Guarantee*. The liability of Sudarshan Saur under this Guarantee* is limited to the Guarantee* obligations as provided for herein. Any liability for indirect or consequential loss or damages which may be suffered by the customer including, but not limited to, loss/ damage of data or programs, loss of use, loss of profits, loss of production, loss of physical assets, loss of revenues or business interruption, is therefore specifically excluded.
- 5 Guarantee* for the solar water heater will be on pro-rata basis as per the bellow details. New hot water storage tank against replacement will be given on pro-rata Guarantee* at discounts on spare price list, which is decided and finalized by Sudarshan Saur Shakti Pvt. Ltd time to time.
- 5A **For Evacuated tube collector based GL non pressurized model 10 Year*** - Pro-rata calculation for replacement of the tank after proper inspection and permission, **1st year to 5th year tank price free***, for 6th year 50% discount, for 7th year 40% discount, for 8th year 30% discount for 9th year 20% discount and for 10th year 10% discount to the standard spare price list.

- 5B For Evacuated tube collector based GI/SL/SS/Pressurized model GL & Flat plate collector based SW/HW and Pressurized GL Model - Pro-rata calculation for replacement of the tank after proper inspection and permission, 1 To 30 Months tank price free*, for 31 To 36 Months 50% discount, for 37 To 42 Months 40% discount, for 43 To 48 Months 30% discount, for 49 To 54 Months 20% discount and for 55 To 60 Months 10% discount to the standard spare price list.
- 5C For Flat plate collector based and Evacuated collector based pressurized solar, Air release and pressure release valve should be Change Yearly for soft water supply and once in a Six month for hard water supply.(Charges applicable)
- 5D Maximum working pressure for post pressurized (Pressure pump installed at non pressurized solar water heaters outlet) Evacuated collector based system is 2.5 Kg/cm²
- 5E Post pressurized (Pressure pump installed at non pressurized solar water heaters outlet) Evacuated collector based system should be install in series mode/combination.
- 5F If solar water heater system capacity, model, plumbing is not installed as per guidelines and requirements.
- 6 **This Guarantee* is valid only if quality of the water supplied to this Sudarshan Saur product is as follows for the period of use :**
- 6A Chloride hardness of water supplied should be less than 600ppm and TDS must be less than 1500 ppm for Wonder Ultimate GL series.
- 6B Hardness of water supplied should be less than 300 ppm and TDS must be less than 800 for Chloride Wonder Ultimate SL series.
- 6C Chloride hardness of water supplied must be less than 50 ppm and TDS must be less than 100 ppm for Wonder Standard S.S. series.
- 6D Chloride hardness of water supplied must be less than 50 ppm and TDS must be less than 500 ppm for Wonder Standard G.I. series.
- 6E pH value of water supplied to this solar water heating system should be 6.5 to 7.5
- 6F Chloride hardness of water supplied should be less than 600ppm and TDS must be less than 1500ppm for Delite FPC Hard water model.
- 6G Chloride hardness of water supplied must be less than 50ppm and TDS must be less than 100ppm for Delite FPC Soft water model.
- 7 The TDS value measured and recorded at time of sale are approximate and may vary during the course of use due to the depth, type Of the water source. Hence the TDS measurement at the time of sale does not in any way bind Sudarshan saur to support this Guarantee* if The above criteria in clause 6(A,B,C,D,E,F & G), is not met during the period of use.
- 8 Damages resulting from not grouting the supports/air vent/outlet pipeline.
- 9 The Sudarshan Saur solar water heating system must be purchased from our authorized dealer.
- 10 For Digital controller and solenoid valve Guarantee* 2 (Two) Years. Against manufacturing defect. It is mandatory to have voltage fluctuations Controlling devices to be installed by customer.
- 11 Service charges will be applicable after completion of 1(one) Year.
- 12 Solar water heating system should be installed and functioned within one month from company invoice date
- 13 If customer complains frequently despite of zero failure, customer have to pay for any service after two free visits of technician.
- 14 The company's employees, dealers and service contractors have no authority to vary the terms of this Guarantee*.
- 15 Service charge would be applicable in case of non standard installation and/ or where the system is installed on a slope roof / fabricated Structure or in a place difficult to access the system. The service charge applicable would be extra at actual, payable by the customer.
- 16 This Guarantee* shall not cover any consequential or resulting liability, damage or loss to property or life arising directly or indirectly out of any defect or improper use of/in the solar water heating system. The company's obligation under this Guarantee shall be limited to repair or providing replacement of defective parts only under the Guarantee* period.
- 17 Maximum liability of the system installed and failed to perform should not be more than the cost of the failed part of the individual system. Whether are not installed in series or parallel.
- 18 The company reserves the right to retain any parts/s or components at its discretion, in the event of a defect being noticed in the equipment during Guarantee period.
- 19 This Guarantee* will automatically terminate on the expiry of the Guarantee period, even if the solar water heating system may not be in use for any time during the Guarantee period for any reason.
- 20 In case of doubts in interpretation of the terms of Guarantee* or the mode of redressal of these complaints, the purchaser is required To seek such clarification in writing from the company. The decision of the company is final in all such cases of complaints.
- 21 Sudarshan saur is liable or responsible for complaints, which are communicated in written on our customer care Email ID. (customercare@sudarshansaur.com)
- 22 All disputes shall be subject to Aurangabad Jurisdiction only.



समझदारी की सोच!



Sudarshan Saur[®]

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