WELCOME

Dear Customer, Congratulations!

You are now a proud owner of a world-class solar water heating system by Popular solar systems LLP.

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 Popular solar with technical collaboration from abroad.

The ETC System 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 Popular solar 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

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,

Designated Partner
Popular solar systems

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INTRODUCTION

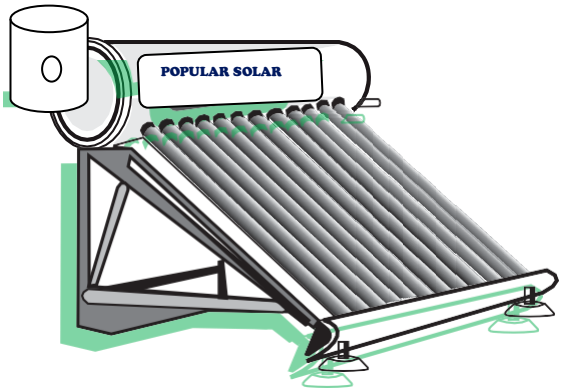
Our Mission

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 Popular solar 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 Popular solar 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

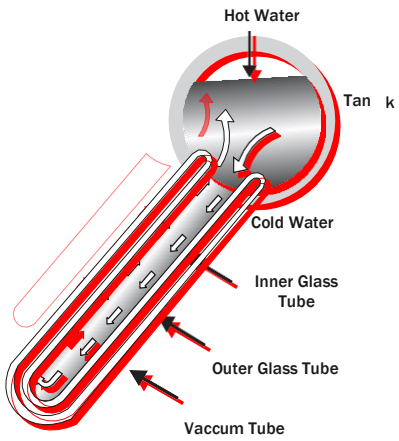
The Popular Solar for ever green ETC system works on a Black Body Heat Absorption Principle. The principle states that black colour absorbs maximum heat, more than any other colour.

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

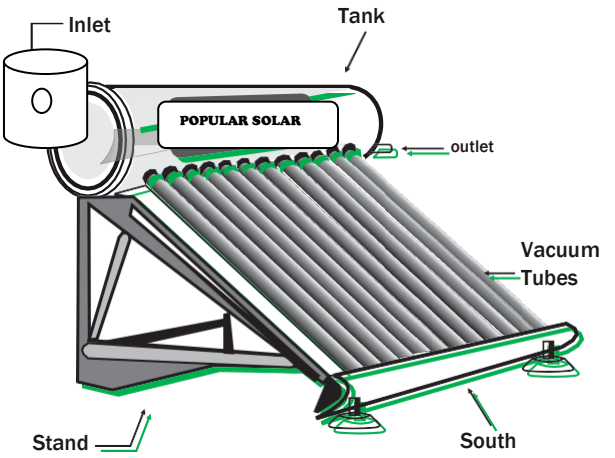
Air inside the gap between two glass tubes is evacuated which results in a high level of vacuum, which acts as the best insulation to minimize heat loss from the inner tube.

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:

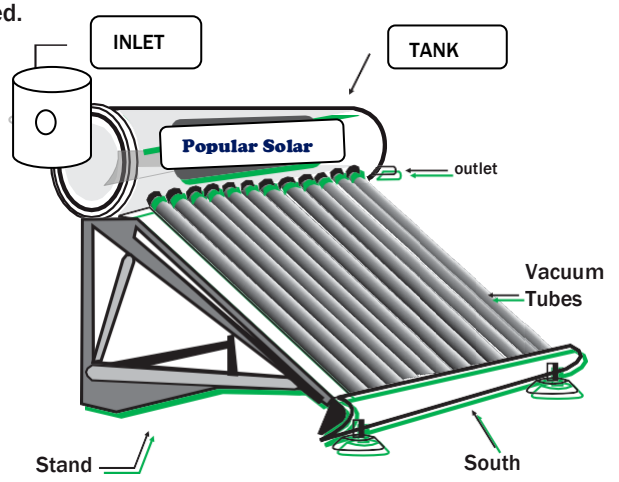
A) **Evacuated Glass Tubes:** Evacuated glass tubes are the main component of the ETC system. They are made by assembling two concentric borosilicate glass tubes. The outer surface of the inner tube is coated with Cu/SS-ALN by an innovative coating technology called 'magnetron sputtering technique'. 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 . The tank is covered with high-density PUF or Rockwool insulation, which keeps the water hot overnight.

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.

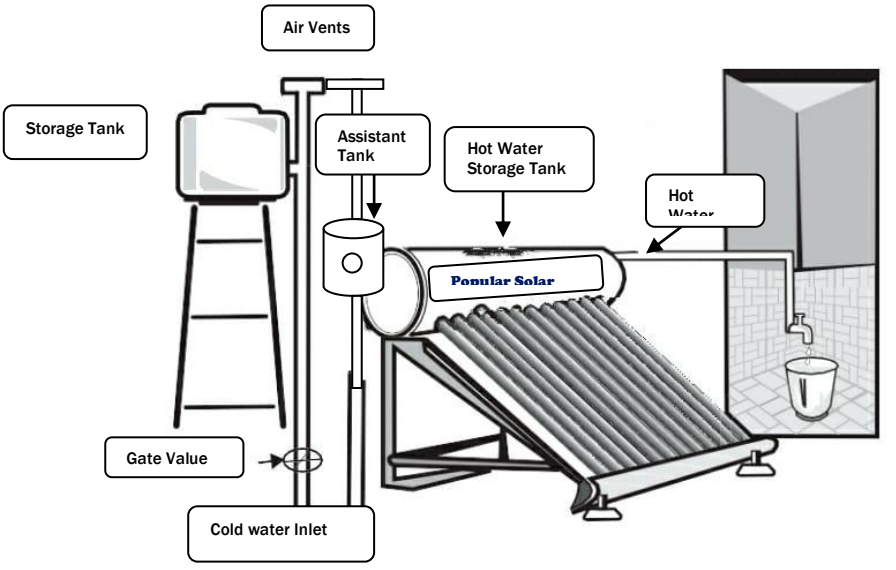
d. **Orientation:** System should face the south direction. If there is any limitation on site, a variation of + or - 10° from south can be allowed, as it has minimal effect on system performance.

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.

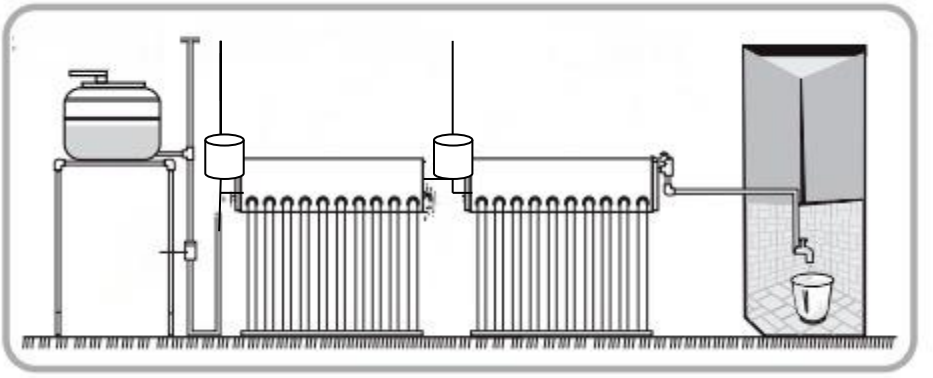
g. **Shadow-free Place:** The selected place should be free of shadows, as much as possible, so as to receive clear sunshine from all angles, all through the day.

PLUMBING CONNECTION : AUTOMATIC MODE



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.

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 x 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.

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.

OPERATIONAL HITS

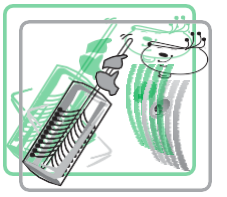
1) **Always fill cold water in your tank:** Especially do this in the morning, because doing so during afternoons might cause the glass tubes to crack, due to a sudden change in temperature. Although the tubes have been designed to take this pressure, yet it is a point to be careful about.

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).

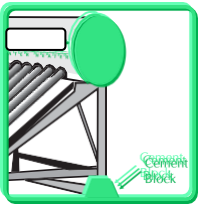
3) **Shadow-free Place:** Remove any objects obstructing the sun's rays in reaching the absorber panel by forming shadows. Make sure you consider these obstructions before installing your solar water heating system.

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 thicksheet.

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.



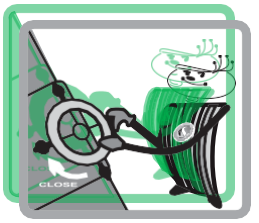
6) **Cleaning of scales in vacuum tubes:** If hard water creates a scale formation in your tube then you should clean the tube with a round wire brush. However, it is advised that a trained plumber or technician do this kind of servicing. This kind of deposition usually occurs in areas of hard water. 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.

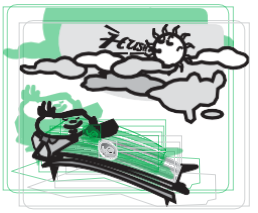
TROBLESHOOTING GUIDELINES



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.

CUSTOMER FEEDBACK

Name_____

Address _____

_____

_____

Contact Number _____

E-mail_____

How did you find out about Popular Solar Water Heater?

Please tick (✓) as

applicable. Referral ☐

Friends/Relatives ☐

Advertisements/Communicatio ☐

n Internet ☐

Comments _____

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