

## FAQ SOLAR WATER HEATER

1. Does this Solar Water Heater work in any climate?

Solar water heaters can operate in any climate. Performance varies depending, in part, on how much solar energy is available at the site, but also on how cold the water coming into the system is. Only during rainy season you will need a conventional backup system (Electric).

2. Is there any maintenance required for SWH systems?

Solar Water Heaters once installed requires very little maintenance. Maintenance involves wiping the dust deposited on the glass surface once in 5 days. Wiping the glass every day will help increase the efficiency of the system. Other important thing to be taken care of is to see that the main cold water tank from which water is supplied to the solar tank is always filled up to the level. Use of Automatic Level controller can help in maintaining an optimum level of water.

3. What if my area has hard water?

Due to the smoothness of the glass tube, the surface is not easily susceptible to scaling. Also, the large diameter of the tubes ensures that minor scaling does not impede the efficiency of the system.

4. What if I have high pressure bath fittings such as rain showers, Jacuzzis or body jets?

We have a range of pressurised systems available to cater to high pressure bath fittings.

5. How do I integrate the heater with my current plumbing system without any breakage?

Our system is very easy to install and integrate with all kinds of existing plumbing systems without any breakage to existing plumbing. Our installation experts will visit your site and provide you with a detailed plan on how the system can meet your requirements.

6. How does use of solar water heater help the environment?

A 100 litre system, the average size of a household of 3 - 4 people, can prevent emissions of 0.4 to 1.0 tonnes of carbon dioxide per year. The reduction in emissions of carbon dioxide (one of the major green house gases) can positively help in slowing down the pace of global warming.

7. What are the maintenance requirements?

ETC based solar water heaters do not need significant maintenance. The collector tubes may need annual cleaning to remove accumulated scale and sediment deposits at the bottom.

8. Can the glass tubes withstand hail stones?

The glass used to make these tubes is not ordinary glass but very strong boro-silicate glass, which enables the tubes to resist hail stones as big as 25 mm (1 inch) diameter size.

9. The sizes offered by you are in multiples of 100 litres. What if I prefer some other size like 520 litres?

Normally, we have ready stocks of the standard sizes in multiples of 100 litres. Special sizes can be made on request and will take more delivery time.

10. What shall I do in case some tube breaks? Can I replace the broken tube myself?

The broken tube will have to be replaced by our team. In case of water leaking out of the system from broken tube, please shut the inlet and outlet valves and inform us at the earliest so that your system can be put in order without any delay.

11. Are additional geysers required after installation of Solar Water Heating System?

The Solar Water Heating System has inbuilt option of electrical back-up, and so no extra geysers are required in the bathrooms.

12. If different use points are scattered and the capacity required is large how can I minimise the wastage of hot water in the pipelines?

In such a case, instead of a single large system, a number of smaller systems can be installed which have same total capacity as desired. These systems can be placed at locations closer to the use points, thus minimising the piping cost and the wastage of hot water too.

13. Why 'new' ETC (Evacuated Tube Collector) Technology is better than the 'old' FPC (Flat Plate Collector) Technology?

The ETC technology is almost a decade old and thus not so new! This technology, though much superior and suitable than FPC technology, could not take-off being more expensive than FPC technology. It will be obvious that the only advantage FPC ever had over ETC was lesser price. But NOWADAYS, with recent worldwide advances in mass production techniques of evacuated tubes, ETC based systems are more cost effective than their FPC counterparts. In other words, FPC systems are as obsolete as typewriters in the computer age.

14. How is the Solar Hot Water System specified ? What is LPD ?

The capacity of a solar hot water system is specified is LPD. It is a short form for Liters Per Day. The intensity of Solar radiation varies through out the day, hence capacity cannot be specified in terms of hourly output.

15. What is FTC ?

FTC means Fixed Temperature Control.

The operation of the circulation pump of forced flow system needs to be controlled to avoid pumping of cold water into the hot water storage tank. In FTC control, it is achieved by monitoring the temperature at the outlet of the collector. The pump is switched ON only when the outlet temperature is higher than the SET temperature. If the temperature falls below the SET temperature, the pump is automatically switched OFF.

16. How do I identify a good solar water heater?

A good solar water heater should have sufficient collector area. For example, on a sunny winter day in North India, a sq. m. of collector area can heat around 50 liters of water to a temperature of 30-40C. Typical flat plate collectors made in the country have an area of around 2 sq. m and are thus capable of heating 100 liters of water per day. Further, the collectors should use good materials and the absorbers should carry a good quality coating (BIS approved collectors the best)

17. Why should I install a solar water heater?

Solar water heaters save both electricity and money. As electricity is becoming more expensive, a solar water heater is a great way to access 24/7 hot water at far cheaper rates. They are also safer than electric geysers as they are located on the roof and are a super way to display your commitment to the environment

18. How do I select a solar water heater?

A: Before you purchase and install a solar water heating system, you want to do the following:

- Consider the economics of a solar water-heating system
- Evaluate your site's solar resource
- Determine the correct system size
- Determine the system's energy efficiency
- Estimate and compare system costs
- Investigate local codes, covenants, and regulations

19. What is the maximum possible temperature it could attain ?

About 60 to 80° C. The rise in temperature depends on:-

- Solar Radiation
- Weather Conditions
- No. of Solar collector

20. Can it be installed any where ?

Yes, it can be installed on.

- Roof tops
- Building terrace
- Open Ground

There should be :

- No shadowing
- South orientation of the collectors
- Collector Tilt = Latitude + 15° thereof
- Over head tank above SWHS system

21. Does it generate hot water on all days and in all seasons of the year ?

It generates hot water on

- Clear sunny day - Maximum
- Partially cloudy day - Moderate

22. Can we use any type of water such as municipality treated water, bore well water or tank water ?

Only soft and potable water.

- hard water with special jacket type heat exchanger or with softener.

23. What about pipelines ?

Galvanized steel pipes of class "B" for cold water line & precast PUF insulated.

HDPE Pipe with "B" class Galvanized pipes for Hot Water Lines

24. You said that the hot water will be available for 300-325 days in year. How about the rest of the days ?

Every SWHS can be provided with auxiliary back up heating system by Electrical heater at extra cost.

25. How much money do we have to spend for maintenance ?

Maintenance is negligible

- Periodic glass cleaning
- Check for leakages and valve functioning, if any.

26. Are there any governmental incentives, subsidies, loans etc. ?

Yes

- Soft loans from Bank & BAFL at low interest.
- 100 % depreciation tax relief for profit making companies.
- No Sale Tax, Excise & Octroi on SWHS

27. How many hours are required to heat the water ?

- Normally, 6 to 7 hours of normal solar radiation is required to heat the water upto 60°C

27. Comparison between Evacuated Tube Collector & Flat Plate Collector

| S.No | Evacuated Tube Collector  | Flat Plate Collector   |
|------|---|--|
| 1    | Quick heat generation   | Slow heat generation   |
| 2    | Collector efficiency on higher temperature is high  | Collector efficiency on higher temperature is low.   |
| 3    | Heat loss in the tubes during the daytime is negligible (evacuated tubes)   | Heat loss in the collector & tank during the day-time is high due to convection.   |
| 4    | Convection and Convecting losses is low.  | Convection and Convecting losses is high.  |
| 5    | Emissivity is low.  | Emissivity is high.  |
| 6    | Satisfactory performance even in extreme cold condition (-18 deg. C)  | Freezing of water will take place at high altitude causing damage to the collector.  |
| 7    | Temperature range from 60deg. to 120 deg.   | Temperature range from 60 deg. to 80 deg.  |
| 8    | System hot water tank only is insulated using polyurethane insulation material which does not absorb water or moisture  | Collector & tank insulated with glasswool/ rockwool, absorbs moisture & gets wet during monsoons reducing the efficiency of the system                                 |
| 9    | Negligible scaling of tubes which can be cleaned manually (inner tube dia. Is 37mm). Loss of efficiency consequently is minimal                                   | Heavy scaling of the copper/aluminum tubes which cannot be cleaned manually as the bore dia. is 12.50 mm. giving rise to substantial loss in efficiency of the system. |
| 10   | The collector glass tube absorbers being cylindrical the incident sun's rays on the tubes is at 90 degrees throughout the day. Hence peak heat absorption always. | The collector fins & tubes being flat the incident sun's rays will be at 90 degrees at noon only for peak absorption   |
| 11   | In locations with average availability of solar energy over-sizing of the system glass tube collectors is not required.   | Higher system sizing is required to get the desired result. Hence added cost.  |
| 12   | Heat exchanger not required   | Heat exchanger required  |
| 13   | Advanced technology at competitive prices that is System Cost per unit water is low.  | Old technology at higher prices  |

|    |  |  |
|----|--|--|
| 14 | Hot water availability for 350 days in a year. | Hot water availability for 300 days in a year claimed.                 |
| 15 | System life above 15 years.                    | System life above 15 years   |
| 16 | It is very easy to replace glass tube.         | Difficult and expensive to replace glass sheet                         |
| 17 | Water quality is not effect the system.        | Water quality effect the heating system forming scale over metal tube. |
| 18 | It has low maintenance                         | Its required high maintenance.   |
| 19 | Grouting of Collectors not required.           | Grouting of collectors are required.                                   |

29. Efficiency graph of different types of Solar Collectors:

Efficiency graph showing performance of different types of Solar Collectors indicates evacuated tube collector has highest efficiency at higher temperature. For this reason, evacuated tube collectors are used.

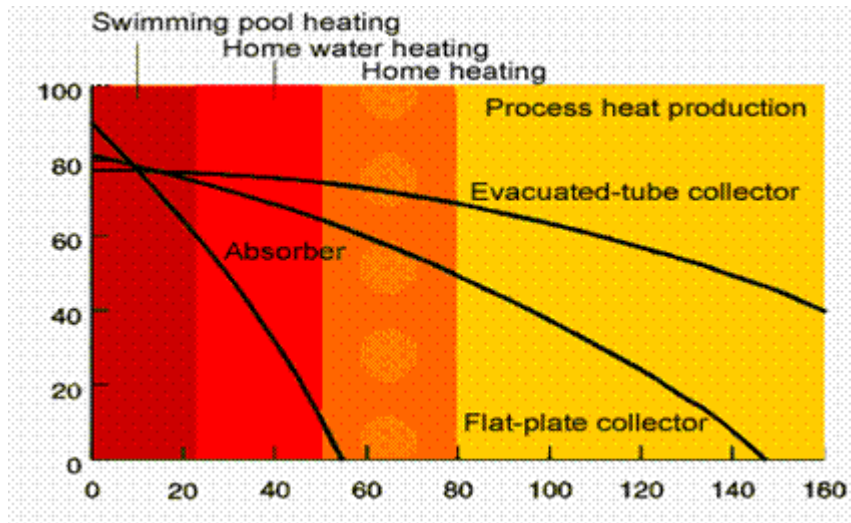


Figure: Graph of efficiency ( $\eta$ ) and Temperature (T) ranges of various type of collector (Solar Radiation: 1000 W/m<sup>2</sup>)