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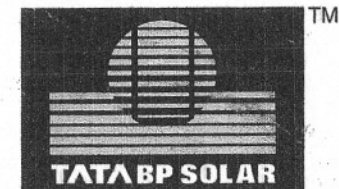
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NEAREST SERVICE CENTER

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TATA BP SOLAR INDIA LIMITED

INDUSTRIAL - THERMAL

SOLAR WATER HEATING SYSTEM

TYPE : THERMOSYPHON

POWER OF THE SUN, WORKING FOR YOU

DESIGNED, MANUFACTURED, INSTALLED & COMMISSIONED BY

TATA BP SOLAR INDIA LIMITED

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TATA BP SOLAR INDIA LIMITED is the leader in Design, Development, Manufacture and Marketing of complete Solar Hot Water and Photovoltaic generator systems.

Tata BP Solar is promoted by the reputed **TATA's** in collaboration with world leaders **BP SOLAR of UK**, the British Petroleum Group.

TATA BP SOLAR is in a unique position of being able to supply totally integrated systems comprising of major components viz; Solar collectors, Insulated Stainless Steel Storage Tank, Sacrificial Anode, Pumps and Pump Control Panel manufactured in house or to our specifications.

We have evolved a philosophy embracing the "**TOTAL SYSTEM CONCEPT**" which ensures optimum reliability and life expectancy, a policy borne out by the performance of collaborator systems worldwide.

As a member of **TATA GROUP**, we are in position to enjoy substantial Technical, Marketing and Financial support. All our customers can be secured in knowledge that is carrying the TATA name. We are committed to provide a totally professional and reliable service before, during and after any sale.

TATA BP SOLAR - THERMAL Systems wide spectrum of applications are,

- Domestic Uses : Hot water for Laundry, Cleaning, Bathing and other Chores
- Industrial Applications : Boiler Feed, Cleaning and Washing.
- Hotels : Hot water for Bathing, Cleaning, Washing, Laundry and for swimming pool heating.
- Educational Institutions : For Bathing, Cleaning and Washing.
- Hospitals : Washing, Cleaning, Bathing and Sterilisation.
- Dairies : Washing cans & cattle and for Boiler feed water.

2-1. ENERGY

Energy is the lifeblood of our society. Whatever the source - oil, coal, hydro, nuclear, gas- the use of energy is all-pervasive. Energy lights and heats our homes, offices & factories. It powers the machine in industries and transportation. The clothes we wear, the food we eat, the building we live and work in, the goods we produce such as dye, lubricant, metals, glass, plastic, and the services we render, such as transportation & communication - energy is inextricably woven into it all.

Energy can be classified into **RENEWABLE** and **NONRENEWABLE**. It has become a reality that availability of Non-renewable energy like fossils, hydro sites and even uranium is finite. Renewable energy is one, which is available in abundance and can be harnessed in an unlimited way.

Everyday the sun showers the earth with several thousand times the energy we use. In other words the entire stock of fossil fuels on earth is not worth more than few days of sunlight.

Solar energy can be effectively utilized in two ways - either by converting light energy into heat (Solar thermal) OR converting light into electricity (Solar photovoltaic). A flat plate collector is used to convert light energy into heat.

2-2. HOW A FLAT PLATE COLLECTOR WORKS

The collector is made up of a set of fins, Raisers and headers known as Absorber, assembled inside an insulated extruded aluminum frame covered with a transparent glass. When the solar radiation falls on the collector, the absorber converts this radiation into heat energy; the water passing through the raisers and headers absorbs this heat energy. This water as it absorbs the heat becomes less dense and rises to the top of the collector and comes out at a higher temperature. This hot water can be used for bathing, cleaning, washing and any productive process requiring hot water.

2-3. BASIC SOLAR WATER HEATING SYSTEM

Each typical solar collector gives an approximate output of 125 * ltrs per day at 60 degree C. Such collectors are connected in parallel and series to obtain desired quantity of hot water at desired temperature.

The Solar water system consists of following major components :

- A. Solar Collectors
- B. Insulated SS Tank with Sacrificial Anode
- C. Pump and Pump Control Panel (if it is forced circulation system)
- D. Indicating and Control Instruments (optional at additional cost)

* - Based on the solar intensity of 5.0 kWh/sq.m./day for Bangalore.

3-1 HEALTH & SAFETY :

3-1.1 READ the Manual thoroughly before **"USING THE SYSTEM"**. Observe the precautions detailed in the manual.

3-1.2 The collector surface develops very high temperature. To avoid this, the collector should be shaded from the sun by opaque sheeting before making any internal piping connection.

3-1.3 Do not use the hot water for direct drinking application.

3-1.4 Do not touch the collector surface / glazing during sunshine hours as it could lead to burn injury.

3-1.5 Do not touch the tank surface or internal or external piping of the system bare handed.

3-2 SYSTEM DESCRIPTION :

Solar radiation falling on the collectors passes through the glazing and is absorbed by the absorber consisting of fins, raisers and headers. A special selective coating on the absorber prevents escape of heat back to the environment. Water contained in the raisers and headers absorbs the heat from the fins and raises and becomes less dense than the water in the storage tank. On the principle of **"THERMOSYPHON"**, it starts rising through the collector and enters the top of the hot water tank. Simultaneously cold water from the tank descends to the bottom header of the collector, gets heated up in the absorber and rises back to the hot water tank and the cycle repeats.

The movement of heated water from the collector to the storage tank which is placed above the collectors, is due to the difference of density only. There are no moving parts in the system and hence the system reliability is very high.

The water retains its heat for long time as the hot water storage tank is insulated to prevent significant heat loss. The sacrificial Anode provided in the hot water storage tank protects the system against Galvanic Corrosion. The Temperature Gauge provided in the tank will indicate the water temperature in the tank.

3-3 OPERATING INSTRUCTIONS :

For optimum performance of the system, it is required to follow the Do's & Don'ts given below.

Do's

3-3.1 Ensure that the cold water tank is always full and never runs dry.

3-3.2 Ensure use of hot water once in a day either in the morning or in the evening.

3-3.3 Ensure that the GATE VALVE provided (customer's scope) in the cold water line is always open.

3-3.4 Clean the glass once in a week.

3-3.5 For hot & cold water lines, use only GI pipes.

Don'ts

3-3.6 Don't cover the collectors.

3-3.7 Don't erect any structures which can cast shadow on the collectors.

3-3.8 Don't put the auto Air Vent, provide Air Vent pipe or install Float Chamber if the Air Vent pipe exceeds 3.0m height.

3-3.9 Don't draw the water during day time.

3-3.10 Don't put the water on the collector glasses when it is hot.

3-4 MAINTENANCE INSTRUCTIONS :

- 3-4.1 Before the onset of monsoon, check the pipe and tank insulation for possible leakage. If damage has occurred to the cladding due to tampering, ensure that the water doesn't seep into the insulation. Use proper sealant like M-Seal for joining the openings susceptible to water seepage.
- 3-4.2 Once in three months drain the tank by opening the Drain Plug provided at the bottom of the tank.
- 3-4.3 Before draining, close the cold water inlet valve and after draining open the same.
- 3-4.4 Draining should be done only after the usage of hot water.
- 3-4.5 Once in an year check for erosion of sacrificial anode. Replace it if found eroded or 80 % of the material has sacrificed.
- 3-4.6 The solar usage water hardness should be less than 300 ppm, If it exceeds 300 ppm, scale formation takes place within very short period resulting in choking of Collectors & Tank and leads to drastic reduction in system efficiency & further it will lead to corrosion of the tank. In such cases the system is not guaranteed for its performance. Chlorine & Flourine content in usage water should be less than 100 ppm.

USE ONLY GI "B" CLASS PIPES FOR HOT WATER & COLD WATER PIPELINES

ENSURE THESE

- a. You are using the solar water heating system as per the instructions given in the manual for the best results.
- b. Water hardness is less than 300 ppm.
- c. Flourine content is less than 100 ppm in the usage water.
- d. Chlorine content is less than 100 ppm in the usage water.
- e. The height of the Air Vent provided is more than that of the over head tank (2.5 to 3.0m).

3-5 TROUBLE SHOOTING :

SYMPTOM	POSSIBLE CAUSE	ACTION / REMEDY
No water at usage point	a. Over head tank empty b. Gate valves closed	a. Fill up overhead tank b. Open gate Valves on hot, cold and internal pipelines
Only cold water at the usage point	a. Mixing tap problem b. Heat loss in hot water pipe, due to long interval between usage	a. Adjust mixing tap proportionately b. Drain cold water until warm water flows
Leakage in a. Collector b. Pipe line & flanges c. Tank	a. Damage in absorber b. Loose fittings of pipes and flanges c. Damage to the tank	a. Inform TATA BP b. Tighten respective flanges & pipes c. Report to TATA BP
Water at usage point with less hotness	a. Hot water line not insulated	a. Insulate the usage hot water pipeline with Rockwool & Aluminum cladding

SECTION 4 INSTALLATION & COMMISSIONING CHECK LIST

TO BE VERIFIED BY I & C PERSONNEL AND CUSTOMER BEFORE HANDING OVER THE SYSTEM

- | | | | | |
|--|-----|--------------------------|----|--------------------------|
| 1. Completion of Collector Installation | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 2. Completion of Tank installation | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 3. Completion of Hot water (Piping Only system internal piping is In TATA BP cope) | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 4. Completion of Cold water Piping (Not in TATA BP scope) | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 5. Completion of Tank insulation | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 6. Completion of insulation | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 7. Completion of system Hot water Piping insulation | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 8. Temperature Booster Cap fitted properly after wiring | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 9. C- clamps provided on collector | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 10. Completion of grouting work for all Collectors & Tank | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 11. Check for leakages at pipe joints | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |
| 12. Completion of Commissioning & Testing | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> |

SECTION 5 TYPICAL SCHEMATIC DIAGRAM

