



Solar Water Heater

Dr. A. Balamurugan

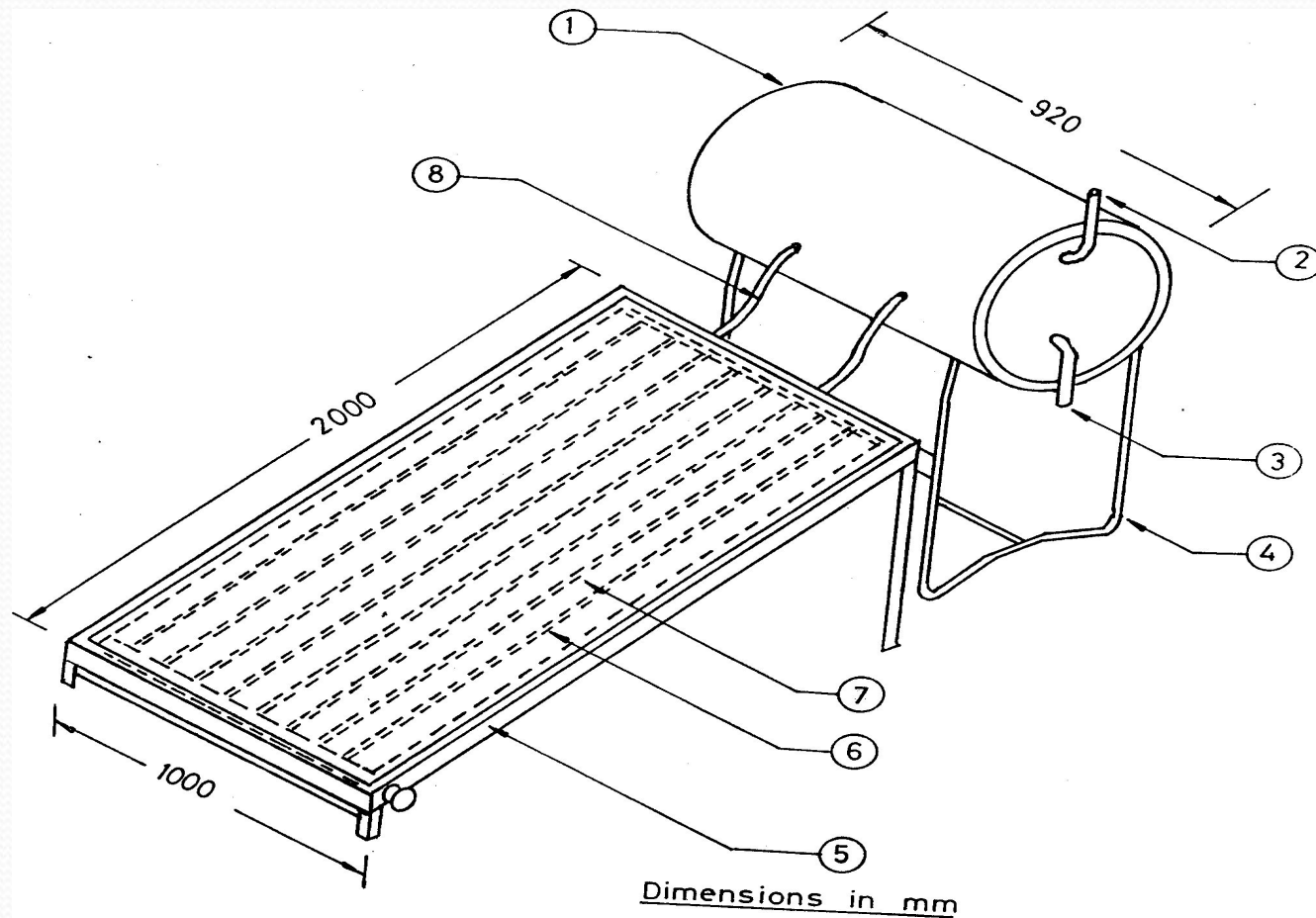
Assistant Professor

Department of Physics

Government Arts and Science College

Avinashi-641654

Diagram of Solar Water Heater



Parts of Solar Heater

1. Insulated water tank
2. Water inlet
3. Water outlet
4. Tank support
5. Frame
6. Liquid pipe
7. Absorber
8. Water line


The solar water heating systems come with a solar collector of 25 sq. m area for solar tank of 100 litre capacity. It occupies an area of 35 sq. ft on the roof top. The water is loaded in the daytime and is stored in the storage tank for a period of 48 hours.

This system can be connected to bathrooms and kitchen. Generally, the life of the system is about 15 years and it requires no maintenance.

The collector is having 20 gauge G.I. corrugated sheet as absorber with 12 mm. G.I. pipes as heat exchanger laid in the corrugations of the sheet in serpent fashion. The absorber and the pipes are painted black and embedded in a wooden box insulated at the bottom and sides. The ends of the pipe are connected to the insulated storage drum which is kept just above the collector. The collector is kept on an angle iron stand such that the flat plate is at 11° slope facing south. Hot water temperature is $55 - 63^\circ \text{C}$ on a typical sunny day and heat loss due to over night storage is about 4 to 8°C .

Types of Collectors

A solar collector is a device designed to absorb incident solar radiation and to transfer the energy to a fluid passing in contact with it. Utilization of solar energy requires solar collectors. There are two general types - the **flat-plate collector** and the concentrating (focusing) collector.

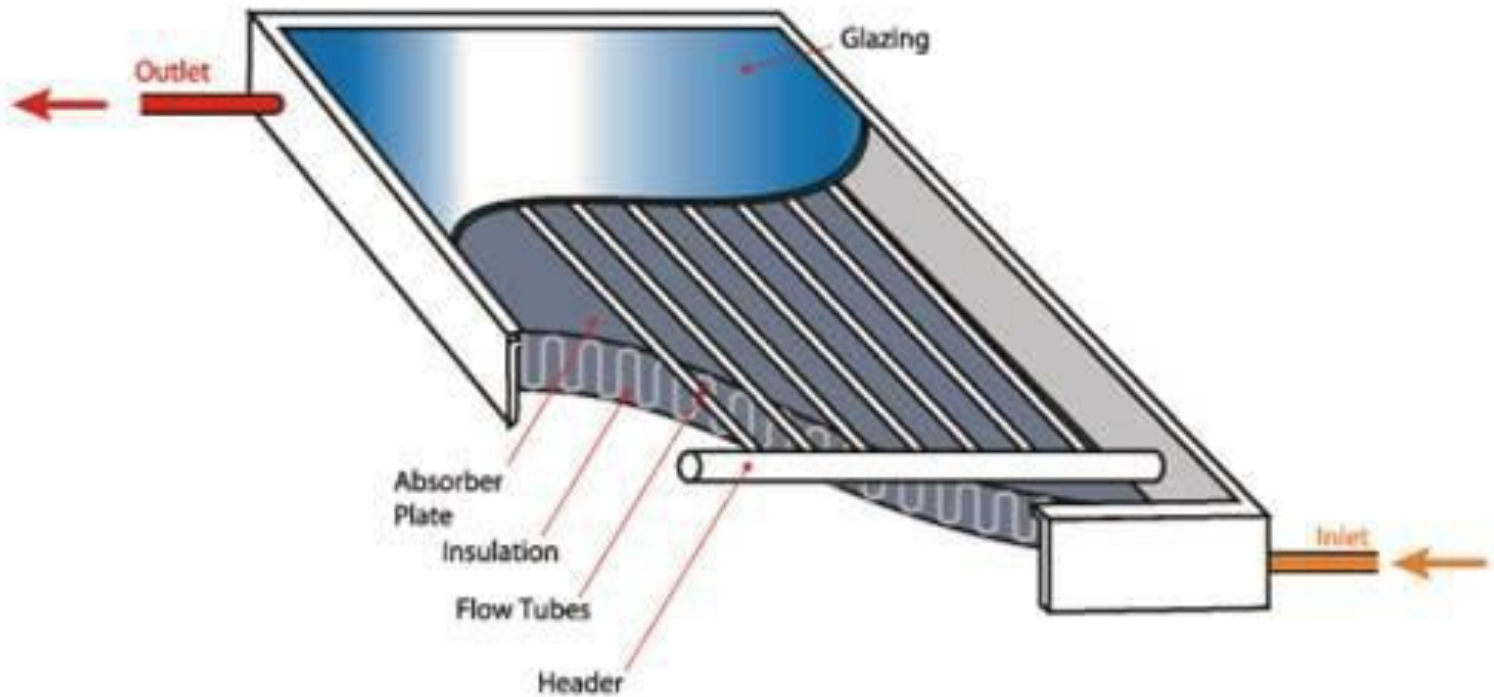


Solar collectors may be classified according to their collecting characteristics, the way in which they are mounted and the type of transfer fluid they employ.

General Description of Flat-plate Collectors

Flat-plate solar collectors may be divided into two main classifications based on the type of heat transfer fluid used.

Flat Plate Collector



Uses of Collectors:

Liquid heating collectors are used for heating water and non-freezing aqueous solutions and occasionally for non-aqueous heat transfer fluids. Air or gas heating collectors are employed as solar air heaters.

The majority of the flat-plate collectors have five main components as follows:

- (i) A transparent cover which may be one or more sheets of glass or radiation transmitting plastic film or sheet.
- (ii) Tubes, fins, passages or channels are integral with the collector absorber plate or connected to it, which carry the water, air or other fluid.
- (iii) The absorber plate, normally metallic or with a black surface, although a wide variety of other materials can be used, particularly with air heaters.
- (iv) Insulation, which should be provided at the back and sides to minimize the heat losses.
- (v) The casing or container, which encloses the other components and protects them from the weather.

A Typical Liquid Collector





Thank

You