

Flat Plate Collectors

These consist of a flat metal plates in contact with a number of small fluid filled tubes called risers which transfer heat into the fluid. Whilst the metal plate is positioned behind a piece of glass the whole collector is still exposed to ambient air temperature. This causes these collectors to perform better in summer than in winter when outside air is cold. The thin risers cause flat plates to suffer frost damage if not used in indirect configurations with glycol in circulation.

- Flat Plates
- 40% efficient
- Frost Prone
- Narrow operating angle
- Very heavy

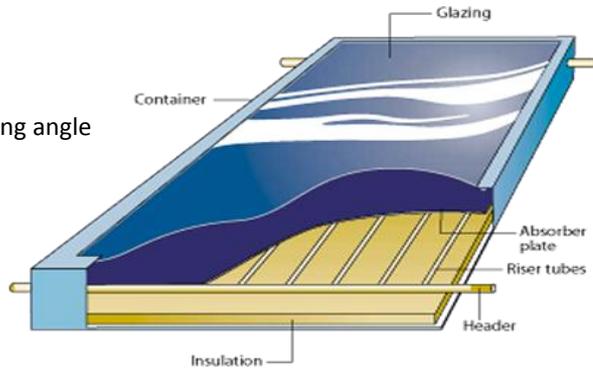


FIGURE 1 – Flat-plate cross-cut

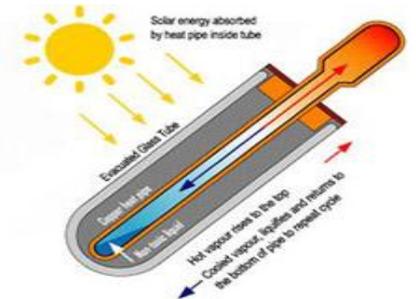
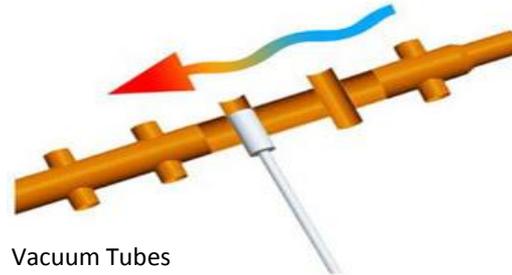


Solar Thermal Energy Collector Types

Technical Brief No.2

Vacuum Tubes or Evacuated Tubes

(2 types water filled or heat pipes) This type of collector is basically a long thin thermos flask. Either filled with water directly or preferably populated with a heat pipe tube. Inside the heat pipe tube is a small amount of antifreeze type fluid. This fluid evaporates when the tube is exposed to the sun causing the vapour to rise into the condenser bulb at the top where it condenses back into a liquid thereby giving up its energy and causing the collector bulb to become hot. Such systems are resistant to frost damage and can be used in areas of mild frost conditions in direct configurations without risk. For heavy frost areas i.e. regularly experiencing temperature below -5 degrees ,it would still be prudent to employ a indirect configuration.



- Vacuum Tubes
- 80% efficient
- Heat pipe tubes - frost tolerant
- Water filled tubes - frost prone
- Wide operating angle
- Light weight

Vacuum tubes are as robust as flat plate collectors yet being more modular are easier to install .

Tubes can be replaced individually and with heat pipe systems no water loss is experienced should a breakage occur.

Flat plates, when exposed to cold air, re radiate a large portion of the energy they collect. Vacuum tubes are able to contain the heat so that it is not lost back into the atmosphere.

