3.5.3 Solar Collectors

Solar energy collectors are special kind of heat exchangers that transform solar radiation energy to internal energy of the transport medium. The major component of any solar system is the solar collector. This is a device which absorbs the incoming solar radiation, converts it into heat, and transfers this heat to a fluid (usually air, water, or oil) flowing through the collector. The

solar energy thus collected is carried from the circulating fluid either directly to the hot water space conditioning equipment or to a thermal energy storage tank from which can be drawn for use at night and/or cloudy days.

There are basically two types of solar collectors: non-concentrating or stationary and concentrating. A non-concentrating collector has the same area for intercepting and for absorbing solar radiation, whereas a Sun-tracking concentrating solar collector usually has concave reflecting surfaces to intercept and focus the Sun's beam radiation to a smaller receiving area, thereby increasing the radiation flux.

3.5.4 Stationary Collectors

Solar energy collectors are basically distinguished by their motion, i.e. stationary, single axis tracking and two axes tracking, and the operating temperature. Initially, the stationary solar collectors are examined. These collectors are permanently fixed in position and do not track the Sun. Three types of collectors fall in this category:

1. Flat plate collectors (FPC);
2. Stationary compound parabolic collectors (CPC);
3. Evacuated tube collectors (ETC).