ABSTRACT

In this study, a flat plate solar thermal collector was made in the heat absorbing pipe consisting of capillary pipes. Capillary pipes are small diameter pipes and are generally made of copper. The small diameter of the pipe is expected to form a more dense and multiple pipeline so that the heat flow rate absorbed by the collector is greater than that of the solar thermal collector using a larger diameter copper pipe. The purpose of this study was to determine the efficiency value of flat plate solar thermal collectors whose heat absorbing pipes are made of capillary pipes. In this study also made a solar radiation simulator as a heat source to replace the sun. In taking data and measurements there are several variations of conditions, namely, changes in the collector's tilt angle, use of glass layers and without glass coating on solar thermal collectors, and changes in intensity in the radiation simulator. The aim is to determine the effect of variations in the state on the efficiency value produced. The parameters measured in this study are temperature, radiation intensity, and water flow rate. From the experiments have been obtained The most effective situation in this study is the state of slope shrinkage 0 ° with the minimum intensity glass layer produces the greatest efficiency value of 49.37%. It turns out that various variations of the conditions given have an effect on the efficiency of the solar thermal collector. Capillary pipes can be used as heat absorbing pipes in solar thermal collectors. However, it has a very small water flow rate which affects the value of the heat flow rate. Although the increase in radiation intensity is directly proportional to the increase in the value of the heat flow rate, it is inversely proportional to the value of its efficiency. The greater the value of radiation intensity, the smaller the efficiency value. Because the increase in the value of the heat flow rate is not as significant as the increase in the intensity of the radiation causing a small efficiency value.

Keywords: Solar Thermal Collector, Efficiency, Capillary Pipe, Heat Flow Rate