

***Study Cooling of Monocrystalline Solar Panels Using Dielectric Liquids with Immersion Cooling Techniques***

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**ABSTRACT**

*Solar thermal energy produces irradiation which can be utilized as electrical energy through solar panels. The average solar irradiation in Indonesia is 4.8 kWh/m<sup>2</sup>/day, this value can change depending on location, position, time of day and weather. Sunlight is not only in the form of irradiation but also in the form of heat that can be absorbed by solar panels. So that the temperature of the solar panels increases and the resulting output decreases. Therefore, cooling of solar panels is carried out in order to stabilize and increase output. Cooling solar panels with immersion cooling technique uses a dielectric liquid in the form of mineral oil with variations in height of 1 cm, 2 cm, 3 cm. The research method used is a quantitative experimental method. Data collection was carried out for 5 hours every 5 minutes from 09.00-14.00WIB because it is included in Indonesia's peak time. The research data generated are ambient temperature, solar panel temperature without cooling, solar panel temperature with cooling, coolant temperature, voltage and current from both solar panels and solar irradiation. From the results of the temperature data it is stated that the increase in ambient temperature is followed by an increase in the temperature of both solar panels and the temperature of the liquid but when the environmental temperature decreases other temperatures also decrease but not significantly. This increase in temperature is also affected by an increase in solar irradiation. The voltage and current generated by solar panels with coolant are smaller than solar panels without coolant, so the performance obtained is also greater for solar panels without coolant. The average power value is 4.5 v > 3.81 v in the first variation. 3.53 v > 2.997 v in the second variation and 4.81 v > 3.93 v in the third variation. The research was not successful in increasing the output of solar panels, so other techniques were needed.*

**Key words:** *Solar cell, temperature, mineral oil, and immersion cooling.*