

INTISARI

Solar Water Heater (SWH) merupakan pemanas air tenaga surya dengan energi surya sebagai sumber energi. Penggunaan air memiliki kelebihan yaitu konduktivitas termal tinggi, murah, dan mudah ditemukan, serta kekurangannya yaitu memberikan beban berat berlebih pada tangki. *Paraffin* berpotensi sebagai media penyimpanan panas yang ringan, tetapi konduktivitas termal rendah. Serbuk tembaga memiliki konduktivitas termal tinggi. Campuran *paraffin* dan serbuk tembaga digunakan untuk melengkapi kekurangan air, tetapi memerlukan kasus dasar sebagai rujukan peningkatan pelepasan kalor. Tujuan penelitian untuk mengetahui evolusi suhu air, waktu proses *discharging* kontinyu, laju pelepasan kalor air, dan laju penurunan suhu air.

Discharging kontinyu dilakukan dengan mengalirkan air ke tangki secara kontinyu dengan variasi debit air 1; 1,5; 2; 2,5 LPM hingga suhu bak air mencapai 35°C. Data yang direkam berupa data suhu tiap titik termokopel. Data terekam akan diolah menjadi grafik evolusi suhu, grafik *discharging* kontinyu, grafik laju pelepasan kalor air, dan grafik laju penurunan suhu air.

Dari hasil penelitian didapatkan evolusi suhu air mengalami penurunan suhu cepat karena hambatan dan *heat loss*. Penurunan suhu tercepat baris vertikal penampang A-A dan C-C pada T13 dan T4, baris horizontal penampang A-A dan C-C pada T23 dan T12, dan baris aksial pada T15. Variasi debit air besar mempercepat transfer kalor sehingga mengakibatkan *discharging* kontinyu mencapai penurunan suhu drastis, laju pelepasan kalor air, dan laju penurunan suhu air. Waktu tercepat penurunan suhu drastis *discharging* kontinyu 21 menit, nilai terbesar laju pelepasan kalor 2.175,36 J/s dan nilai terbesar laju penurunan suhu air 31,18 °C/jam.

Kata kunci : Air, SWH, SHS, *discharging* kontinyu

ABSTRACT

Solar water heater (SWH) is a water heater with solar energy. The water usage has the advantages such as high thermal conductivity, cheap, and easy to find. Besides, its disadvantage is it provides an excessive heavy load on the tank. Paraffin is potential to be a lightweight heat storage instrument with low thermal conductivity, and copper powder has high thermal conductivity. The mixture of paraffin and copper powder is used to complete the deficiency of water, but it requires a basic case as a reference to increation of heat release. The purpose of this study is to determine the evolution of water temperature, the processing time of continuous discharging, the rate of heat release of water, and the rate of decreation of water temperature.

Continuous discharging is carried out by flowing water to the tank continuously with variations in water discharge 1;1,5;2;2,5 LPM until the temperature of water tub reaches 35°C. The recorded data is data of temperature for each thermocouple point. This recorded data will be processed into a graph of temperature evolution, a graph of continuous discharging, a graph of the rate of heat release of water, and a graph of the rate of decreation of water temperature.

The results of this study found that the evolution of water temperature has decreased rapidly due to obstacles and heat loss. The fastest temperature decreation are vertical lines of the cross-section A-A and C-C of T13 and T4, horizontal lines of the cross-section A-A and C-C of T23 and T12, and axial line of T15. The variations in large water discharge accelerate heat transfer which cause drastic decreation of temperature of continuous discharging, the rate of heat release of water, and the rate of decreation of water temperature. The fastest time of drastic decreation of temperature of continuous discharging is 21 minutes. The biggest value of rate of heat release is 2.175,36 J/s and the biggest value of rate of decreation of water temperature is 31,18°C/hour.

Keywords : Water, SWH, SHS, continuous discharging