

ABSTRACT

DESIGNING, BUILDING, AND TESTING COMPACT HEAT EXCHANGER IN COFFE DRYING MACHINE

By

YULIAN NUGRAHA

In general, this research explained about the design, manufacture, and testing of compact heat exchangers as a means of heating the coffee drying machine mechanic. Heat source used is hot water from the boiler output. The design was conducted to determine the dimensions of the heat exchanger order to be able produce hot air temperature according to the ideal temperature for drying coffee beans that is 50 - 60⁰C. The results obtained from the heat exchanger design was using of surface-type specification 7.75 - 5 / 8T of Kays and London, with a length of pipe 30 cm, length and width of the fin is 30 cm. From the test results with rate of water flow 0,066467kg / s, incoming water temperature 94⁰C, air flow rate 0,22kg / s, and intake air temperature 32⁰C, the heat exchanger is capable of generating of air out temperature 76⁰C, air get to drying chamber at 50⁰C. Then be tested by varying the intake air flow rate, there are four variations used is 0,22 kg/s, 0,38 kg/s, 0,45 kg/s, and 0,49 kg/s. From the test results obtained variations of air flow rate influence of the air temperature and the effectiveness from heat exchanger. The higher flow rate of air entering so exit air temperature and heat exchanger effectiveness will decrease, the maximum effectiveness obtained that is equal 73% with a maximum exit air temperature is 76⁰C.

Keywords : compact heat exchanger, fin and tube, heat exchanger.