

PERFORMANCE OPTIMIZATION OF MINI COMPACT CRUCIBLE FURNACE

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ABSTRACT

The mini compact crucible furnace in the previous innovation has been refined. The heat insulator is redesigned using a combination of stainless steel plate and ceramic blanket. Furnace weight reduced by 28%. The furnace is capable of melting 3 kg of aluminum in 35 minutes with a consumption of 1.2 kg of LPG gas. Mini compact crucible furnaces need to be improved in their performance to be more efficient so that they are more suitable for aluminum casting practice.

Experimental method is used to improve the performance of mini-sized compact crucible furnace. On the inner wall of the furnace, vertical and horizontal fins are installed. Two vertical fin models were studied in this study. The effect of the number of fins is also studied. Variations in the number of vertical fins are 4, 6, and 8. Horizontal fins are stainless steel plates measuring 20 mm x 20 mm. variations in the angle of inclination of the horizontal fins are 10°, 30°, and 50°. Variations in the number of horizontal fins are 8, 12, and 16 pieces. Kowi made of carbon steel with an outer diameter of 170 mm, a wall thickness of 8 mm and a height of 210 mm. The performance of the furnace is determined by the rate of temperature increase, the rate of melting of aluminum, and the consumption of LPG gas. Measurement of temperature changes was carried out using a type K thermocouple and the data was recorded using a data logger. The measurement data are presented in the form of a graph against time.

Quantitative descriptive analysis was used to provide an explanation of the furnace performance.

The fins and tubes are made of SS 304 stainless steel plate. The fins manufactured are horizontal and vertical fins. The vertical fin consists of model 1 and model 2.

Kata Kunci: *nnovation, Crucibel Furnace, Compact, Mini*