ABSTRAK

Melting furnace bekerja meleburkan aluminium HD2 melalui proses pembakaran bahan bakar solar, sebagai sumber energi panasnya. Saat ini gas buang *melting furnace yang* bersuhu cukup tinggi (450-600°C), langsung dibuang ke lingkungan, padahal masih memiliki energi kalor yang bisa dimanfaatkan untuk pemanasan awal. Tujuan penelitian ini adalah melakukan analisis konsumsi energi *melting furnace* pada *existing condition,* dimana aluminium HD2 *charging* pada suhu ruangan dibandingkan dengan *treatment condition,* dimana aluminium HD2 diberikan pemanasan awal melalui bantuan panas gas buang dari *melting furnace* sebelum di-*charging* ke *melting furnace*. Selain itu, dilakukan investigasi pada kondisi operasi (*pretreatment*) terbaik dengan mengukur kenaikan *temperature* aluminium HD2 berdasarkan variabel waktu (menit): 2, 4, 6, 8, 10. Nilai konsumsi energi *melting furnace* diperoleh dengan perhitungan *heat balance*. Dari hasil penelitian diperoleh nilai konsumsi energi *melting furnace* untuk *existing condition* sebesar 1.470.948,04 kJ/jam, pada *treatment codition* sebesar 1.260.729,5 kJ/jam, dengan kondisi operasi (*pretreatment*) terbaik selama 8 menit menghasilkan kenaikan suhu sebesar 206,33°C, dan besar *reduce* energi yang didapatkan dengan dilakukannya proses *pretreatment* pada aluminium HD2 sebelum *charging* ke dalam *melting furnace* sebesar 58,4 kW.

Kata kunci: aluminium HD2, *melting furnace, pretreatment*, *heat balance*, konsumsi energi

MELTING FURNACE ENERGY CONSUMPTION ANALYSIS THROUGH PRETREATMENT ALUMINUM USING HEAT BALANCE METHOD

ABSTRACT

Melting furnace is a device to melt aluminum HD2 which used diesel fuel as energy source. In current condition the flue gas as combustion output was streamed to the open air, while it had quite high temperature between (450°C-600°C). The objective of this research was to analyze the energy consumption of melting furnace. Existing condition which was Aluminum HD2 charging in ambient temperature was compared to Treatment condition, which Aluminum HD2 was preheated by flue gas of melting furnace before charging into melting furnace. There was investigation to analyze the most optimum of condition of operation by calculating the aluminum HD2 temperature increase based on time (minute) variable: 2, 4, 6, 8, and 10. The energy consumption of melting furnace was analyzed with heat balance. The result of the research showed that, the consumption of energy in melting furnace on existing condition was 1.470.948,04 kJ/hour, on treatment condition was 1.260.729,5 kJ/hour. The most optimum of condition of operation (pretreatment) was 8 minutes. It rose the temperature to 206,33°C and Aluminum HD2 pretreatment process before charging to melting furnace could reduce the energy into 58,4 kW.

Keywords: *aluminium HD2, melting furnace, pretreatment, heat balance, energy consumption*