

ABSTRACT

Utilization of biomass as a fuel is the right solution for handling the depleting fossil energy sources. In this study using type biomass gasification stoves *downdraft* and *updraft* with fuel (*wood pellet*) and using the Indonesian National Standard method (SNI 7926: 2013) Biomass Furnace. This study aims to determine the performance of the gasification stove from two variations of air blowing patterns, namely *cyclone* and *direct*. In this study, using a *gasifier* with a height of 20 cm and 40 holes. Each test was carried out with four variations of velocity (m/s), namely 4.5; 5; 5,4 and 5,7 and three variations of the amount of fuel (gr), namely 400, 600 and 800. According to the SNI Method, the minimum thermal efficiency value is 20 % and the maximum FCR value is 1 kg/hour. The results of testing type gasification stove *updraft* with air blow pattern *cyclone* have better performance. This type of gasification stove has the highest thermal efficiency value, namely 13.52 %, FCR of 1.64 kg/hour, percentage of *char* is 1.88 %, the fastest time to boil water is 562 seconds (9.3 minutes), the highest heat rate is 964.402 kcal/hour, the maximum fire temperature is 824.56 °C, and the percentage of blue flame color is 30,38 % and red flame color is 40,32 % at air velocity of 5.4 m/s and 800 gr of fuel.

Key words : gasification stove; air blow pattern; biomass; *updraft cyclone*; *wood pellet*.