

ABSTRACT

Fossil energy sources are becoming limited one of them is kerosene. Therefore, more handling is needed in utilizing alternative energy sources such as waste management that comes from biomass. One technology that can be used is a gasification stove with the Up Draft system. This study aims to determine how the performance of biomass gasification stoves with many variations of air flow velocity with several types of biomass fuels such as wood pellets and the effect of high gasifier on reactor temperatures (flame color). The testing of gasification stoves is in accordance with SNI procedures. Each test is carried out using variation of biomass fuel types namely sengon wood pellets with the test method using five variations of air flow velocity, namely: 1 m/s, 2,5 m/s, 3,5 m/s, 4 m/s, 5 m/s and many variations in the gasifier height, namely: 30 cm, 32,5 cm, 35 cm, 37,5 cm, 40 cm. The results of the up-draft biomass gasification gas stove fueled by sengon wood pellet with the amount of boiling water as much as two liters obtained an average time of boiling water by 10 minutes per variation of tube height and air flow velocity. The thermal efficiency of the biomass gasification stove with a range of 6,89% to 20,48%, with the highest efficiency is the 35 cm gasifier tube with an air flow velocity of 5 m / s. Even though the biomass gasification stove test results still produce a reddish-yellow color, the up-draft biomass gasification stove is capable of producing heat of $Q = 2938,76$ kcal / hour on a 35 cm gasifier obtained when the air flow velocity is 5 m / s and the temperature the highest reactor that can be achieved is $802,21$ °C with an air flow velocity of 4 m / s in the gasifier tube 37,5 cm.

Key words : wood pellet; Up draft; gasification stove; biomass