SUMMARY

Aldi Kurnia Agung Pradana, *Department of Mechanical Engineering, Faculty of Engineering, University of Brawijaya,* Desember, 2016, *The influence of the air-fuel ratio to the efficiency of heating systems using infrared gas stove (porous radiant burner), Academic Supervisor* : Agung Sugeng Widodo and Rudianto Raharjo.

In ordinary gas stove (conventional burner), combustion in a conventional burner is characterized by the free flame combustion (the combustion process occurs in the gas environment), where convection is the dominant heat transfer. Characteristic of this combustion is the presence of a thin reaction zone and a large temperature gradient. This condition causes inefficient combustion system so that resulting low thermal eficiency and the establishment of pollution or gas emissions of carbon monoxide (CO) and nitrogen oxide gases (NO_x) high. However, on infrared gas stove (porous radiant burner) there is a modifications form of the burner. Porous Radiant Burner is a gas stove that uses porous media on his burner. Porous media will radiate heat from combustion to preheat the mixture of fuel and air will enter the fuel space.

Fuel and air are essential components in the combustion. Comparison of the amount of fuel and air is expressed with the air-fuel ratio. From the air-fuel ratio we can know the value of equivalence ratio (Φ). The purpose of this study was to determine the effect of variations in equivalence ratio (Φ), ie Φ = 2.78; Φ = 1.85; Φ = 1.39; Φ = 1.11; Φ = 0.93 and Φ = 0.79 on the efficiency of the heating system using infrared gas stove, so we can obtain the optimum efficiency. In this study, the mass flow of the fuel is made constant while the mass flow of air was varied, ie 10; 15; 20; 25; 30; and 35 L / min controlled using a flowmeter. From the combustion result we can know the amount of combustion energy needed, the energy absorbed by the water and energy loss.

From this study, the average efficiency is highest when Φ = 0.93, which is equal to 51.52% with the combustion energy needed 838.52 kJ, the energy absorbed by the water 400.87 kJ and energy lost 437,65 kJ. While the lowest efficiency obtained when Φ = 2.78 which is equal to 41.82% with the combustion energy needed 1016.98 kJ, the energy absorbed by the water 400.79 kJ and energy lost 616.19 kJ.

Keywords : porous radiant burner, air-fuel ratio, equivalence ratio, the efficiency of the heating system