

Effect of Equivalence Ratio on Performance of Fluidized Bed Gasifier Run with Sized Biomass

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Abstract : Recently, fluidized bed gasification becomes an attractive technology for power generation due to its higher efficiency. The main objective pursued in this work is to investigate the producer gas production potential from sized biomass (sawdust and pigeon pea) by applying the air gasification technique. The size of the biomass selected for the study was in the range of 0.40-0.84 mm. An experimental study was conducted using a fluidized bed gasifier with 210 mm diameter and 1600 mm height. During the experiments, the fuel properties and the effects of operating parameters such as gasification temperatures 700 to 900 °C, equivalence ratio 0.16 to 0.46 were studied. It was concluded that substantial amounts of producer gas (up to 1110 kcal/m³) could be produced utilizing biomass such as sawdust and pigeon pea by applying this fluidization technique. For both samples, the rise of temperature till 900 °C and equivalence ratio of 0.4 favored further gasification reactions and resulted into producer gas with calorific value 1110 kcal/m³.

Keywords : sized biomass, fluidized bed gasifier, equivalence ratio, temperature profile, gas composition

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