

Gasification of Lignite in O₂ and CO₂ atmosphere at different ER and different O₂ partial pressures with a Pilot Scale Bubbling Fluidized Bed Gasifier

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In this study, gasification experiment was carried out with pilot scale bubbling fluidized bed gasifier (Figure 1) which was operated with the coal feed capacity of 133 to 621 kWth (30 - 140 kg/h coal feed rate). The mixture of oxygen and CO₂ was used as gasification agent with different ratios. The operating pressure of gasifier in this experiment was atmospheric. The effects of ER and partial pressure of O₂ on syngas composition, carbon conversion ratios and cold gas efficiencies were investigated.

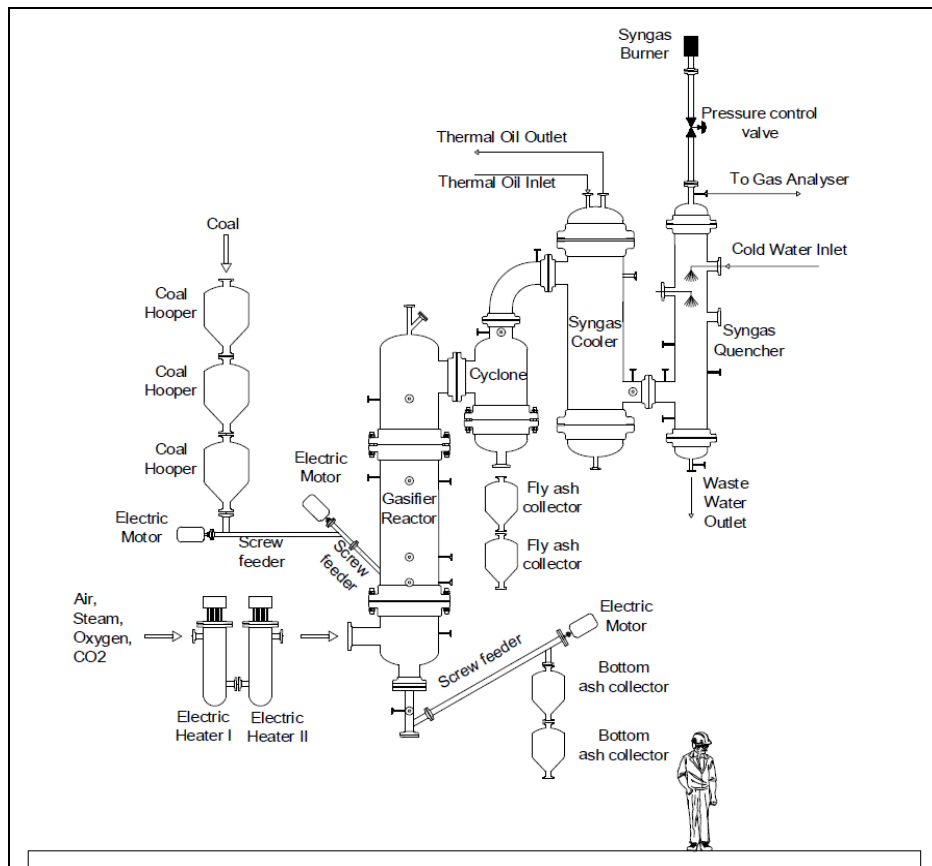


Figure 1: Pilot Scale Bubbling Fluidized Bed Gasifier

According to the results, with the increase of ER values from 0.32 to 0.41 during gasification with O₂ and CO₂ mixtures, carbon conversion ratios were increased from 68% to 89%, respectively. Similarly, with the increase of partial pressures of oxygen from 0.21 to 0.50, C conversions were decreased from 89% to 67%, respectively. In fact, it was expected that the C conversion increase with the increase of oxygen partial pressure. However, due to the thermal load of fluidized bed, which was increased from 4 MW/m³ to 18.6 MW/m³ with the increase of oxygen partial pressure, C conversion was effected and decrease with the increase of thermal load. Detail results will be presented and discussed.