COMPUTATIONAL INVESTIGATION OF INERT PARTICLE SIZE EFFECT ON HYDRODYNAMIC BEHAVIOR OF FLUIDIZED BED

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Abstract

Gasification of biomass is interested especially in synthesis of liquid fuels. The hydrodynamic behavior of fluidized bed is the key factor for effective gasification. This depends on various parameters like minimum fluidization velocity, different height to bed ratios, different grades and size of inert particles and bio mass particles.

In the present paper, CFD simulations (2D) are carried out to investigate the effect of inert particle size. Simulations are carried with ANSYS FLUENT Software. The Eulerian -Eulerian approach is considered, in which the gas phase is treated as a continuum and the solid phase is considered as continuous fluid using kinetic theory of granular flow (KTGF).

The fluidizing medium is air and inert particle is sand. Three different sizes, i.e. 0.4mm, 0.66 mm, 0.93 mm of inert particles (sand) at superficial air velocity of 0.15m/s are considered for the analysis. The results are presented in form of contours representing pressure drop across the bed and volume fraction of the sand.

Key words: Biomass gasification, Bubbling fluidized bed, Inert particle size, CFD