Samuelsberg, A.; **Hjertager, B. H.**

An experimental and numerical study of flow patterns in a circulating fluidized bed reactor.

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Summary: An experimental and a numerical study on radial profiles of axial particle velocity component in a cold flow laboratory scale circulating fluidized bed reactor. Laser Doppler anemometry (LDA) has been used to measure mean and root mean square (RMS) particle velocities for three different superficial gas velocities. A two dimensional two phase flow model with a turbulent kinetic energy equation based on kinetic theory of granular flow is verified against the experimental data. The model is based on a Eulerian description of the two phases, gas and particles. The time averaged predictions are in good accordance with the experiments. The model predicts a core annulus flow, similar to that found experimentally. The predicted maximum velocity in the core agrees well with the measurements, but the model overpredicts the downflow velocity near the wall. Calculated RMS velocity profiles are in good agreement with the experimental data.

MSC:

76Txx Multiphase and multicomponent flows

Keywords:

LDA; CFD; multi phase modelling; circulating fluidized bed; numerical simulation; kinetic theory of granular flow

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