

Computational Fluid Dynamics of a Bubbling Fluidized Bed in Wood Pellets

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Abstract : In comparison to conventional combustion technologies, fluidized bed combustion has several advantages, such as superior heat transfer characteristics due to homogeneous particle mixing, lower temperature needs, nearly isothermal process conditions, and the ability to operate continuously. Computational fluid dynamics (CFD) can help anticipate the intricate combustion process and the hydrodynamics of a fluidized bed thoroughly by using CFD techniques. Bubbling Fluidized bed was model using the Eulerian-Eulerian model, including the kinetic theory of the flow. The model was validated by comparing it with other simulation of the fluidized bed. The effects of operational gas velocity, volume fraction, and feed rate were also investigated numerically. A higher gas velocity and feed rate cause an increase in fluidization of the bed.

Keywords : fluidized bed, operational gas velocity, volume fraction, computational fluid dynamics

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