HYDRODYNAMICS STUDIES OF LOW TEMPERATURE MODEL OF FLUIDIZED BED

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ABSTRACT

Fluidization is an operation by which solid particles are transformed into a fluidlike state through suspension in a gas or liquid. Many important industrial processes rely upon intimate contact between a fluid whether it is a gas or a liquid and a granular solid materials. These processes vary widely from grain drying to a wide range of chemical reactions including combustion. Provided the material is suitable to undergo this process, great improvement in mixing and contact is achieved if the granule size is matched to the upward velocity of the fluid so that the drag forces support the particles of material. The bed of the granular material is "fluidized" in this condition. The behavior of a fluidized bed regarding its fluidization phenomena was studied with Hilton Fluidization and Fluid Bed Heat Transfer Unit H692. Few parameters were being studied and observed. They are variation bed particles sizes, variation of bed heights, variation of bed temperatures and mixture of biomass and silica sand. These are to achieve one main objective and that is to determine the minimum fluidization velocities, U_{mf} experimentally. The results were compared with the established equations. It was found that the results obtained from experimental works and the established equations are in agreement with the percentage of difference ranging from 10% to 70%. The effect of foreign particles mixing with bed materials does result a smaller value of U_{mf} compared with none mixing. The U_{mf} obtained for the mixing were compared with an established equation. The percentage of difference is less than 10%.

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