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# **FLUIDIZATION CHARACTERISTICS OF FLYASH AND FINE PARTICLES IN A FLUIDIZED BED ASSISTED WITH STIRRER**

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## **ABSTRACT**

Fluidization of fine solid particles is widely used in a variety of industrial applications because of its unusual capability of continuous powder handling, good mixing, large gas–solid contact area, and very high rates of heat and mass transfer. However, fluidization behavior is very closely related to particle intrinsic properties such as particle size, particle density, size distribution of particle and its surface characteristics. As the particle size decreases the cohesive forces between particles increases. Therefore, fluidization of fine particles becomes much more difficult as compared to the larger size particles and it needs efficient method. The stirrer assisted fluidized beds are better choice for fine particles.

In the present work, the fluidization experiments were conducted using air as fluidizing media and flyash & other fine particles (nanoparticles) in 2-dimensional fluidized bed assisted with a stirrer (Figure 1). The effect of various parameters such as particle size, initial bed height, gas superficial velocity and rotational speed of stirrer on fluidization behaviour were studied. The variations in expansion ratio and fluctuation ratio with the above mentioned parameter were calculated to characterize the fluidization behaviour. The bed expansion ratio and fluctuation ratio do vary upon the speed of the stirrer. It was found that the fluidized bed voidage increases with speed of the stirrer and thus indicating the different fluidization regimes in the column. For flyash, particulate fluidization occurs whereas for nano particles, bubbling fluidization occurs. The Richardson Zaki index was found to be 5 for flyash and it was ranging from 2 to 3.5 for nano particles.

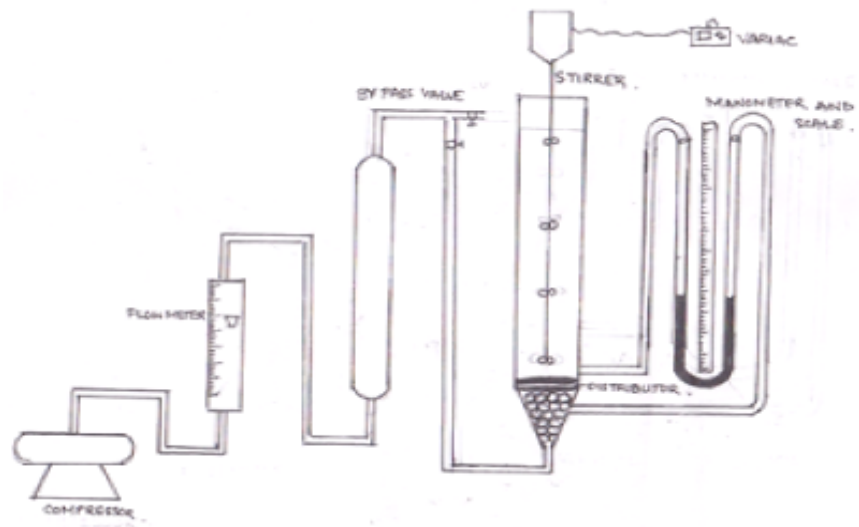


Figure 1 : Experimental Set-up of Fluidized Bed Assisted with Stirrer