

## عنوان مقاله:

Scale Effects on Gas-Solid Fluidized Bed Hydrodynamics

## محل انتشار:

پنجمین کنگره بین المللی مهندسی شیمی (سال: 1386)

تعداد صفحات اصل مقاله: 7

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## خلاصه مقاله:

Scale-up of fluidized bed reactors has been always a challenge for process engineers. There is almost no exact rule to predict the behavior changes of the system from one scale to another. The basic problem with scale-up is that the hydrodynamics of small scale fluidized beds are not the same as that of the large scale. Therefore, the primary goal in studying the scale effect is to avoid large mistakes and delays in start-up and operation of these reactors by minimizing risk and uncertainty. In this work, effect of bed diameter on the hydrodynamics of gas-solid fluidized beds has been investigated in two scales of 152 mm and 78 mm in bed diameter. Air at room temperature was injected into the bed and used as the fluidizing gas. The range of superficial gas velocity was 0.16 - 2.8 m/s. The solids employed in this work were sand particles of 300  $\mu\text{m}$  in diameter. The radioactive particle tracking technique was used to obtain the instantaneous positions of the particles at every 20 ms of the experiments. In each experiment a single tracer was placed into the bed to move freely with the other particles. Movement of the tracer was then monitored for about 5 hours. These data were used to calculate hydrodynamic parameters such as velocity of ascending and descending particles and distributions of these velocities. These hydrodynamic parameters were compared with each other at different bed scales in order to determine the scale effect on the hydrodynamics of the gas-solid fluidized bed. This study shows that mean velocity of upward-moving particles is increased by increasing column diameter in spite of downward-moving ones which their velocities are decreased by increasing column diameter.

## کلمات کلیدی:

(Scale effects; Fluidized bed; Radioactive Particle tracking (RPT

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