Abstract Submitted
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Computational and Experimental Study of Spherocylinder Particles in Fluidized Beds[1] VINAY MAHAJAN, Delft Univ of Tech, HANS KUIPERS, Eindhoven Univ of Tech, JOHAN PADDING, Delft Univ of Tech, MULTIPHASE REACTORS GROUP, TU EINDHOVEN TEAM — Non-spherical particle flows are often encountered in fluidized process equipment. A coupled computational fluid dynamics(CFD) and discrete element method(DEM) approach has been extensively applied in recent years to study these flows at the particle scale. However, most of these studies focus on spherical particles while in reality, the constituent particles are seldom spherical. Particle shape can significantly affect the hydrodynamical response in fluidized beds. The drag force acting on a non-spherical particle can vary considerably with particle shape, orientation of the particle, Reynolds number and packing fraction. In this work, a CFD-DEM approach has been extended to model a lab scale quasi-2D fluidized bed of spherocylinder (rod-like) particles. These particles can be classified as Geldart D particles and have an aspect ratio of 4. Numerical results for the pressure drop, bed height and solid circulation patterns are compared with results from a complementary laboratory experiment. We also present results on particle orientations close to the confining walls, which provides interesting insight regarding the particle alignment. Thus the capability of the CFD-DEM approach to efficiently account for global bed dynamics in fluidized bed of rod-like particle is demonstrated.

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Vinay Mahajan
Delft Univ of Tech

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