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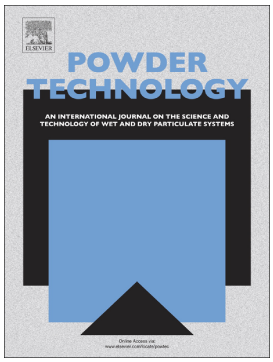

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PII: S0032-5910(18)30246-8
DOI: doi:10.1016/j.powtec.2018.03.057
Reference: PTEC 13288

To appear in: *Powder Technology*

Received date: 7 September 2017
Revised date: 4 January 2018
Accepted date: 19 March 2018

Please cite this article as: Zhenliang Meng, Mengxi Liu, Junming Xie, Wei Wang, Chunxi Lu , Comparative study on the hydrodynamics and mixing characteristics of a new-type particle mixer. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Ptec(2017), doi:10.1016/j.powtec.2018.03.057

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Comparative study on the hydrodynamics and mixing characteristics of a new-type particle mixer

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Abstract:

The characteristics of particle flow and mixing have a considerable influence on mass and heat transfer, as well as product quality. In order to further enhance the particle mixing in an internally circulating fluidized bed (ICFB), especially along the radial direction, four slots were opened on the draft tube of an ICFB mixer. Hydrodynamic characteristics were investigated by using a multi-scale computational fluid dynamics (CFD) model incorporating the EMMS drag. The prediction in terms of cross-sectionally averaged solid holdup and particle velocity were compared to experimental data for validation. Compared with a traditional ICFB mixer, the new mixer with four slots opening on the draft tube presents strong radial particle flow through the slots, and thereby provides better mixing performance. It is found that nearly 25.4% to 29.7% of gas in the draft tube bypasses and flows through the slots into the annulus. With increase in the superficial gas velocity in the draft tube from 0.3

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