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Authors: Zoe Lavrich, David R. Wagner, Zachary Taie, Devin Halliday, Christopher L. Hagen



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## Design Considerations for Small Scale Rotating Fluidized Beds in Static Geometry with Screens for Fine Particles

Zoe Lavrich<sup>1\*</sup>, David R. Wagner<sup>1</sup>, Zachary Taie<sup>1</sup>, Devin Halliday<sup>2</sup>, Christopher L. Hagen<sup>1</sup>

<sup>1</sup>Oregon State University, 1500 SW Chandler Ave, Bend, OR 97702

<sup>2</sup>Gas Technology Institute, 1700 S Mount Prospect Road, Des Plaines, IL 60018

\*Corresponding Author

### Highlights:

- Rotating Fluidized Bed design parameters are investigated
- Small diameter designs show potential for process intensification
- A fluidization quality metric was applied to evaluate device performance

### Abstract

Design of a small scale rotating fluidized bed (RFB) with diameter of 4-6 cm to fluidize 40-80 micron diameter particles was investigated using computational fluid dynamics (CFD).

Simulations explored the impact of the following components on pressure drop and fluidized behavior of the device: particle size, particle density, outer diameter, solids loading, height, number of inlet slots, inlet slot width, angle of inlet slots, chimney diameter, chimney number of slots, chimney slot width, chimney slot angle, and position of the chimney relative to the inlets.

Fluidized behavior was evaluated based on a “fluidization quality” metric yielding information about the distribution of particles in the device. Although additional work is required to elucidate design guidelines for small scale RFBs for fine particles, the initial designs evaluated in this work indicate potential for developing a fluidized bed of relatively small diameter, presenting opportunities for process intensification for numerous potential applications.

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