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Fluidization of Geldart A particles: Experiments and Validation[1]
AVINASH VAIDHEESWARAN[2], RUPENDRANATH PANDAY[3], MARY ANN CLARKE[4], WILLIAM ROGERS, National Energy Technology Laboratory — We will present results from fluidization experiments performed at US Department of Energy's National Energy Technology Laboratory (NETL). Glass particles classified as Geldart A are used and the experiments are conducted over a broad range of air flow rates. The relative humidity is controlled to minimize short-range inter-particle forces and to ensure reproducibility. The design of experiments includes randomization and replicates to minimize uncertainty in measurements. Besides aiding in understanding multiphase dynamics in a fluidized system, the data provides valuable benchmark for computational codes used to analyze gas-solid flows. NETL's open-source software MFiX (Multiphase Flow with Interphase Exchanges) is used for validation in our current study. The results from Two-Fluid model (Eulerian-Eulerian) and Particle-In-Cell (Eulerian-Lagrangian) approaches are compared. The applicability of MFiX Particle-In-Cell methodology for a large particle count system is highlighted, which offers considerable potential for industrial applications.

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