

Influence of material thermal properties and dispersity on thermal bed mixing in rotary drums

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ABSTRACT

Experimental investigation on transversal thermal bed mixing was conducted in a batch rotary drum with a diameter of 0.6 m and a length of 0.45 m. The drum was filled with two fractions of granular material with different thermal conditions and the mixing temperature in the solid bed was measured with thermocouples located at different radial positions inside the bed. The thermal mixing behavior was analyzed for various materials such as quartz sand, glass beads, expanded clay and steel spheres with different disperse system. The parameters such as particle size, bed thermal properties and particle size ratio were varied and the influence of these parameters on thermal mixing time was evaluated. Furthermore, the thermal mixing behavior was shown in terms of time constant, number of bed revolution, bed revolution time and mixing number.

Keywords: Rotary drum; Granular material; Thermal mixing; Material properties; Dispersity; Mixing quality