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Improvement on Gas-Solid Two-phase Flow Separation in U-beam Separator by Inlet Fins XIAOYING ZHOU[1], XIAOPING CHEN[2], HUASHU DOU[3], Zhejiang Sci-Tech University, FLUID MECHANICS RESEARCH TEAM — Inertia separation is widely used in gas-solid separation and dusting technology due to advantages such as low resistance, high abrasion resistance and low manufacturing cost. In order to achieve high separation efficiency and low pressure drop, a traditional U-beam is altered with inlet fins. The fin angle of the separator is from 30 to 60 dregree. Then, numerical simulation is carried out for gas-solid two-phase flow in the traditional U-beam separator and the inlet fined U-beam separator, and their performances are compared. It is assumed that the gas phase is continuous and the solid particle phase is discrete for low volume fraction. The governing equation for gas phase is the Reynolds-averaged Navier-Stokes equation with the k-epsilon turbulent model, while the discrete phase model (DPM) and the stochastic tracking model are used for the solid phase. Results show that the maximum separation efficiency is obtained at the fin angle of 35 degree, but there is no obvious increase in the pressure drop. It is found that fin induces generation of a stagnation region which could collect particles and lead to change of vortical structures. The fin induced flow also causes the turbulent intensity inside the baffle to decrease which helps separation.

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