159a Mp-Pic Simulations Dense-Bed Reactors: Chlorinators and Fluid Cokers

Ken A. Williams and Shibu Banerjee

The MP-PIC formulation forms the numerical basis of the Eulerian/Lagrangian CFPD software Arena-flow and has enabled simulation of industrial-scale dense-phase gas-solid flows inclusing a full range of particle size distributions. One important application area is dense-bed reactors. Simulations are presented for a full-scale chlorinator and for a fluid coker reactor section that illustrate details of bed behavior. Simulations results include local solids volume fraction, gas velocity and particle velocity profiles, pressure gradients and the behavior of multiple solids species and eleutriation of fines. Insights are given into the complex three-dimensional gas-solids behavior in industrial reactors.