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Particulate Flow over a Backward Facing Step Preceding a Filter Medium FRANK CHAMBERS, KRISHNA RAVI, Oklahoma State University — Computational Fluid Dynamic predictions were performed for particulate flows over a backward facing step with and without a filter downstream. The carrier phase was air and the monodisperse particles were dust with diameters of 1 to 50 microns. The step expansion ratio was 2:1, and the filter was located at 4.25 and 6.75 step heights downstream. Computations were performed for Reynolds numbers of 6550 and 10000. The carrier phase turbulence was modeled using the k-epsilon RNG model. The particles were modeled using a discrete phase model and particle dispersion was modeled using stochastic tracking. The filter was modeled as a porous medium, and the porous jump boundary condition was used. The particle boundary condition applied at the walls was "reflect" and at the filter was "trap." The presence of the porous medium showed a profound effect on the recirculation zone length, velocity profiles, and particle trajectories. The velocity profiles were compared to experiments. As particle size increased, the number of particles entering the recirculation zone decreased. The filter at the farther downstream location promoted more particles becoming trapped in the recirculation zone.

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