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Plume Outflow and Deflection Time for a Line Plume in a Filling Box NIGEL KAYE, ROMANA AKHTER, Clemson University — We examined the behavior of a line plume that spans the full width of a rectangular filling box. For the case of a centrally located plume the flow s symmetric, and the plume falls vertically throughout the filling process. However, if the plume is off-center then the symmetry is broken and after a finite time, the plume is significantly deflected toward the nearest end wall. The plume deflects when the plume outflow returns to the plume having reflected off the end wall. Experimental results for the outflow thickness, outflow velocity and plume deflection time were compared to a theoretical model and showed good agreement. The experimental and model results show that the line plume outflow is substantially thicker than that of a round plume. Further, the line plume outflow has a constant velocity which again differs from a round plume that has an outflow that slows with distance from the plume. Finally, the deflection time is shown to scale on the filling box time for the portion of the box between the plume and near wall.

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