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Fluid Flow and Particles Transport in 3-D Packed Beds of Spheres: the Effect of Periodicity of Fixed Beds

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A 3-D numerical study is performed to investigate the effects of periodicity (geometry) on fluid flow and particles transport through fixed beds of spheres. The following packing geometries are studied: cubic-orthorhombic simple, hexagonal, orthorhombic, rhombic-hexagonal, rhombic-pyramidal and tetragonal. The effect of the geometry both on fluid flow characteristics (permeability and inertia parameter) and transport of aerosol particles is studied. Simulations are carried out at Reynolds numbers ranging from 0.001 and 100. The transport of solid particle (size 0.2, 2 and 10 micron) with different temperatures is also analyzed.

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[2] R. S. Maier, D. M. Kroll, Y. E. Kutsovsky, H. T. Davis, R. S. Bernard Simulation of flow through bead packs using the lattice Boltzmann method. *Phys. Fluids* 10, 60-74, 1998