Title of article: Experimental Study of Darcy and Non-Darcy Flow in Porous Media

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Abstract

A simple experimental set-up is used to validate capillary-tube models of flow in porous media for (non-) spherical particles and coarse grains of particular/specific mesh sizes. Of the two models used, one model characterizes the structure of the media apart from particle diameter or equivalent particle diameter for non-spherical objects compared to the other model. The magnitude of computed tortuosity for particles/grains studied is in order, however, that of the spherical particles was slightly higher than published values for spheres. Likewise, the ratio of dynamic to static specific surface area was below anticipated and known results in literature. For the non-spherical particle that was approximated as a half-oblate spheroid, the possible error in computed volume and surface area may be the reason for the deviation of computed equivalent diameter from the effective diameter obtained by fitting Ergun correlation to experimental result. The deviation of computed results based on the conducted experiment may in fact be due to error in appropriately fitting straight line to plotted data and precision error of gauges, and possible hysteresis at low flow velocity due to experimental procedure.