1092-35-16 **Thinh Tri Kieu*** (thinh.kieu@ttu.edu), 4306 16th Street Quaker Pines Apt#5, Lubbock, TX 794126, **Luan T Hoang** (luan.hoang@ttu.edu), Department of Mathematics and Statistics, Box 41042 Lubbock, TX 79409–1042, Lubbock, TX 79409, and **Tuoc Phan** (phan@math.utk.edu), Department of Mathematics, 227 Ayress Hall, 1403 Circle Drive, Knoxville, TN 37996. *Properties of generalized Forchheimer flows in porous media.*

The nonlinear Forchheimer equations are used to describe the dynamics of fluid flows in porous media when Darcy's law is not applicable. In this article, we consider the generalized Forchheimer flows for slightly compressible fluids and study the initial boundary value problem for the resulting degenerate parabolic equation for pressure with the time-dependent flux boundary condition. We estimate L^∞-norm for pressure and its time derivative, as well as other Lebesgue norms for its gradient and second spatial derivatives. The asymptotic estimates as time tends to infinity are emphasized. We then show that the solution (in interior L^∞-norms) and its gradient (in interior $L^{2-\delta}$-norms) depend continuously on the initial and boundary data, and coefficients of the Forchheimer polynomials. These are proved for both finite time intervals and time infinity. The De Giorgi and Ladyzhenskaya-Uraltseva iteration techniques are combined with uniform Gronwall-type estimates, specific monotonicity properties, suitable parabolic Sobolev embeddings and a new fast geometric convergence result. (Received June 10, 2013)