

ABSTRACT

Convective heat transfer coefficients at the fluid-particle interface were obtained for shear flow in a holding tube to simulate aseptic processing of particulate-containing liquid foods. The particles were made of polymethyl methacrylate and were suspended in a solution of glycerin in water. The particle temperatures were monitored by placing at the particle center a melting point indicator that changed color at a specific temperature. The fluid-particle heat transfer coefficient varied between 58.3 and 1301.3 W/m² K for Reynold numbers of 73.1 and 369.4, and increased with increasing flow rate and particle to tube diameter ratio. The solid fraction enhanced heat transfer between 80 and 200% when the solid fraction was changed to 3.22% from a single particle suspension. The density difference between the particle and fluid was found to influence significantly the residence time of the particles within the holding tube.