International J. of Engg. Research & Indu. Appls. (IJERIA).
ISSN 0974-1518, Vol.4, No. II (May 2011), pp 349-358

# VOLUMETRIC LIQUID PHASE MASS TRANSFER COEFFICIENT IN A THREE PHASE STIRRED TANK REACTOR

**P. RAVICHANDRAN**

**Abstract**

In the majority of the processes taking place in two and three-phase reactors with mechanical agitation, the mass transfer resistance in the gas phase is negligible compared to the liquid phase. The design of mechanically agitated reactors have drawn considerable attention, for a detailed understanding of hydrodynamic and mass transfer characteristics of three-phase systems. The knowledge of gas-liquid mass transfer rates characterized by volumetric mass transfer coefficient $k_La$ is needed for reliable design of such reactors. A very few comprehensive articles concerning the effect of inert solids on $k_La$ in mechanically agitated contactors have appeared recently. The effect of solid phase in low concentrations on gas –liquid mass transfer bears much importance for industrial systems. The lack of experimental data makes the investigation of gas-liquid mass transfer in mechanically agitated reactors with low volume fraction of solids necessitates gives importance to this study. The main purpose of this work is to obtain more data for the effect of solid particles on gas-liquid mass transfer in Newtonian systems under the variations of impeller speed, gas flow rate and particle concentration. Since the volumetric mass transfer coefficient is important for the design of the column, in the present study an attempt has been made to generate data on $k_La$ for two-phase and three-phase systems and to develop a generalized correlation for the estimation of the same in terms of operating variables namely, superficial gas velocity, impeller speed and solid concentration. In the present investigation, the experimental data on volumetric liquid phase mass transfer coefficient