

## STUDY OF HEAT TRANSFER COEFFICIENTS OF A LABORATORY SCALE THREE PHASE INVERSE FLUIDIZED BED SYSTEM

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### Abstract

The aim of this work is to study the effect of heat transfer coefficient of three phase in inverse fluidized beds, The experimental work of gas-liquid-solid fluidized beds system was carried out in QVF glass column 0.106m I.D. and 2 m height. A perforated teflone plate was used as gas distributor, with 53 holes , 7 mm diameter and free surface area of 23.11%.Four of Carboxy Methyl Cellulose concentrations 0.1 % , 0.5 % , 1 % , and 2 wt% , were used as non-Newtonian (pseudoplastic) liquids were used with superficial velocity between 0.5- 16 m/s and air used with superficial velocity between 0.1-0.4 m/s. Granules of Cork with diameter 14-18 mm and wood, Ash with diameter 20-15 mm were used as solid phase. The heat transfer coefficient was correlated with dimensionless groups and independent parameters with correlation coefficient is 0.95. The following correlation is obtained.

$$h = 0.059 \left( \frac{C_{pl} \rho_l}{u_l} \right) (Re)(Fr)^{-0.12} (Pr)^{0.5} (\varepsilon_g \rho_g + \varepsilon_l \rho_l + \varepsilon_s \rho_s)$$
$$\left( \frac{u_g}{u_l} \right) \frac{\rho_l}{\rho_l}$$

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