

Experimental Study of Heat Transfer in Pulsation Mist Flow in Rectangular Duct Partially Filled with a Porous Medium

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Abstract : The present thesis studies the effect of different factors such as frequency of oscillatory flow, change in constant wall heat flux and two-phase current state, on heat transfer in a pipe in presence of porous medium. In this experimental study is conducted for Reynolds numbers in a range of $Re=850$ to $Re=10000$ and oscillatory frequencies of 5, 20, 10, 30 and 40 Hz with constant heat flux of 585 w/m² and 819 w/m². The results indicate that increase in oscillation frequency in higher frequencies for heat flux of 585 w/m² leads to an increase in heat transfer; however, in the rest of tests it results in a heat transfer decrease. Increasing Reynolds number in a pulsation mist flow causes an increase in average Nusselt number values. The effect of oscillation frequencies in a pulsation mist flow for different Reynolds numbers has revealed different results, in a way that for some Reynolds numbers an increase of frequency has led to a heat transfer decrease.

Keywords : Reynolds numbers, frequency of oscillatory flow, constant heat flux, mist flow

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