HEAT TRANSFER AND FRICTION CORRELATIONS FOR R134a WITH OFFSET STRIP FIN SURFACE

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Abstract

Single phase heat transfer analysis of R134a refrigerant (liquid phase) has been carried out using Computational Fluid Dynamics (CFD) approach for offset strip fin. Colburn j factor and Fanning friction factor are predicted for offset strip fin. The correlations are developed at Reynolds number range of 100-15000. The effect of fin geometry (fin spacing, fin height, fin thickness and lance length) on the enhanced heat transfer and pressure drops were investigated. Colburn j factor and fanning friction factor f, correlations have proposed in terms Re and geometry parameters (h/s, t/s, t/l) for liquid refrigerant R134a in the present study. Two separate correlations have proposed for the low and high Re regions i.e. Between Re of 100-1000 and Re of 1000-15000. The numerical results are validated with experimental results, results are found in good agreement with experimental results. Variation is found less than 5%.

Keywords: Compact Heat Exchanger, Friction Factor, Colburn Factor, Offset Strip Fin, Heat Transfer Coefficient, Refrigerant