An Experimental Solution of Two-Phase Parameter Correlation Involving Heat Transfer Characteristics for Liquid-Liquid Flow

V. Alagesan

School of Chemical and Biotechnology, SASTRA University, Thanjavur – 613401 Tamilnadu, India.

Abstract: In petrochemical and allied industries, the commonly encountered two-phase flow is simultaneous flow of two immiscible phases. In the present work, experiments were conducted in a shell and tube heat exchanger with hot water as the heating fluid and different compositions of two-phase system as the process fluid. A new parameter called modified two-phase multiplier (MTPM) has been proposed and correlated with Lockhart-Martinelliparameterand Quality for different compositions of liquid-water systems.The experimental data was statistically analyzed to develop a correlation for MTPM of two-phase liquid systems on shell side. The developed correlation predictsMTPM of two-phase liquid systems as well as two-phase heat transfer coefficients from single phase data with a maximum error of ±10 % for 7 different two-phase liquid systems.

Keywords : Two-phase flow, Heat transfer, Lockhart-Martinelliparameter,Quality, Modified two-phase multiplier, Nusselt number.

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