

Heat Transfer Characteristics of the Inclined Circular Fin-Tube Heat Exchanger

Mooyeon Lee, Taehyung Kang, Haewon Jung and Hyunjoon Chung

Graduate School of Mechanical Engineering, Anam-dong, Sungbuk-ku, Korea University, Seoul, Korea

Yongchan Kim^{C, S}

Department of Mechanical Engineering, Anam-dong, Sungbuk-ku, Korea University, Seoul, Korea

Jaejung Park

Research and Development Team, Korea Bundy Corporation, Pyungtaek-city, Kyunggi-do, Korea

The objective of this study is to provide the air-side heat transfer characteristics for the circular fin-tube heat exchangers used as evaporators for household refrigerators. In this study, the circular fin-tube heat exchangers were investigated by varying fin pitch, number of tube row, L-fin length, and tube alignments. Air-side heat transfer correlations for the circular fin-tube heat exchangers were developed as functions of Reynolds number, number of tube rows, and dimensionless fin pitch and hydraulic diameter, F/D_h . The present correlations showed good predictions with the measured data. The developed correlations showed better agreement with Kim and Kim (2005) correlations than the Wang et al. (2000) correlations. The mean deviation of the Colburn j-factor between the measured data and predicted data for the circular fin-tube heat exchangers was 7.1%. The present correlation was guaranteed as follows: number of tube rows = 1 - 5, fin pitch=5.0 - 12.5 mm, and Reynolds number= 340 ~ 1050 ranges.