

HEAT TRANSFER AND PRESSURE DROP CHARACTERISTICS FOR FLAT OVAL ALUMINIUM TUBES

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ABSTRACT

Flat oval tubes are used in small air-conditioning units designed for e.g. cars. The units are often compact in design and constructed with aluminium tubes to reduce the weight of the unit. The oval shape gives the tube a number of special heat transfer and pressure drop characteristics, which are different from the characteristics of a circular tube.

The scope of this work is to investigate and describe the performance and characteristics of both single flat oval tubes and flat oval tube-in-fin heat exchangers.

The heat transfer during condensation and evaporation inside a single flat oval tube will be investigated to determine the heat transfer performance under a variety of different conditions. The parameters will be the vapour quality, the mass flux and the heat flux. The working fluids are R410a and R717.

Flat oval tube-in-fin heat exchangers for air-to-refrigerant operation with different geometrical configurations will be investigated under a variety of conditions. The tube refrigerant used is water.

Parallel to the heat transfer investigation, pressure drop investigations will be performed on both the single tube and the heat exchanger.

The test results for the single tubes will be compared to different heat transfer and pressure drop models. The models are based on circular tubes. The test results for the heat exchangers will also be compared to different heat transfer and pressure drop models.

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