s15p15

EXPLICIT EQUATIONS FOR THE HFC-134a FLOW THROUGH NON-ADIABATIC CAPILLARY TUBES

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This work reports the results of an experimental study on concentric capillary tube-suction line heat exchangers commonly used as expansion devices in household refrigerators and freezers. Heat exchanger performance (mass flow rate and temperature at the outlet of the suction line) with the hydrocarbon R-134a was experimentally evaluated for a range of heat exchanger assemblies (internal diameter and length of the capillary tube, length and relative position of the heat exchanger) and operating conditions (condensing pressure and subcooling). The tests were planned and performed following a statistical based methodology. Based on the resulting database a set of explicit equations to predict the refrigerant mass flow rate and the suction line outlet temperature was developed. The equations were compared with a large set of experimental data and a reasonable agreement was achieved. It is therefore anticipated that the equations will become a powerful tool for designers modeling refrigeration systems.

Keywords: *Household refrigerator, Capillary tube, Heat exchanger, Expansion device*

Instrumentation and Experimental Techniques

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THE ADAPTATION OF A MAGNETIC FLOW METER FOR NATURAL CIRCULATION EXPERIMENTS

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The paper describes problems with a magnetic flow meter used in a natural circulation process, subjected to extremely low mass flows rates and temperature changes. The paper discuss the flow measurement principle, and also installation and operation issues. Experimental results with a sensor installed in a Natural Circulation Loop and with another sensor installed in a laboratory setup are presented. The results showed non-linear characteristics of the instrument, offset temperature dependence, and the need of an efficient grounding system. Additional tests with an electrical isolated system (batteries) will be performed to check if the drift variation is due grounding effect. Also the signal shielding integrity will be checked.

Keywords: *Magnetic Flow Meters, Natural Circulation*