

EXPERIMENTAL CHARACTERIZATION OF CONDENSER OF AN AUTOMOTIVE A/C SYSTEM UNDER STEADY STATE CONDITION

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Abstract

This paper reports the results of performance of condenser of an automotive A/C system under steady state condition with R-134a as a refrigerant. The micro channel parallel flow and micro pore tube condensers were chosen to represent the actual A/C system of a compact medium size passenger vehicle. Effects on performance of condenser of operational parameters such as DBT, air and refrigerant flow rates, refrigerant temperature and physical dimensions of the condenser etc; have been evaluated by conducting experiments on sophisticated highly precise test bench calorimeter. The systematic experimental results obtained for this real size test components depicts the relationships between the above mentioned operating parameters of automotive A/C system, which constitute a useful source for component selection, design and analysis. The increase in air inlet temperature decreases the performance of condenser by 9.25% and air and refrigerant side pressure drop increases by 5.17% and 23.6% respectively, with the micro pore tubes the heat rejection rate increases maximum by 2.86%.

Keywords: Condenser, refrigerant, automotive air conditioning, performance