

An Experimental Study Of A Simple Vapour Compression Refrigeration System With Varying Parameters

1st Ashutosh chand , 2nd Anurag kumar pandey , 3rd Devanand Chauhan, 4rd harikesh dwivedi,
5rd Vishnu pratap singh

¹Team leader , ²Team member , ³Team member , ⁴Team member , ⁵ Project guide

¹Mechanical engineering ,

¹Buddha institute of technology , Gorakhpur ,India

Abstract - Studying a simple vapor compression refrigeration System (VCRS) cycle is very important to understand the overall performance of the system and the parameters that affect it. The experimental investigations was supervised by using a vcrs with different different scales and parameters such as capillary tube diameter variation, condenser fan speed variation , capillary tube configuration as well as using different different type of refrigerants Based on the results below, it can be concluded that the capillary tubes of 30 gauge (0.31 mm) and 35 gauge (0.21 mm) have three different capillary configurations (expansion valves), ie. spiral tube, straight coil tube and serpentine coil configuration. The overall performance of the system was investigated with the effect of coil configuration and capillary tube diameter. It found that the cooling effect and heat transfer rate were maximum for the spiral tube design and lowest for the straight coil configuration, while the performance of the serpentine coil was average

Index Terms – condenser , compressor , evaporator , expansion value , refrigerant, filter

I Introduction

A vapour compression refrigeration system is a system which is works on the law of thermodynamics and it is consist of five components such as hermetically sealed compressor , condenser evaporater, expander as well as filter/ drier. The following study focuses on the effect of various parameters such as capillary tube configuration, capillary tube diameter, condenser fan speed variation and refrigerant type on the performance of the cooling system..A small diameter capillary tube is used to expand the flowing liquid..As we know, the pressure difference between the inlet and outlet points of the capillary tube is always equal to the pressure difference between the condenser and the evaporator..The capillary tube used in cooling equipment has a diameter of 0.5 mm to 2.5 mm.



Fig.1 Vapour compression refrigeration system

II Literature survey

M.S.Kim have experimentally investigated the performance of a heat pump with two azeotropic refrigerant mixtures of R290/R134a and R134a/R600a with the mass fractions of 45%/55% and 80%/20%. The performance parameters of the azeotropes were compared with pure R12, R134a, R290 and R22 at the both heating and cooling conditions with suction-liquid heat exchanger. The COP of R134a/R290

The effects of the different geometries of capillary tubes have been studied by many researchers. Mr. Mutulubi Aremu Akintunde (17,18) investigated the performance of capillary tube geometries having R-134a as the working fluid.

III METHODOLOGY

The refrigeration method is based on the throttling effects. The vapour cycle involves the process of lowering the pressure of liquid refrigerant as it goes through the expansion device. Due to the low pressure, the liquid refrigerant flashes into the vapour, which is used to cool the whole system.

IV CONCLUSIONS

In the present work fabrication of a vapour compression refrigeration system and experimental investigation is carried out to investigate the performance of vapour compression refrigeration system of a domestic refrigerator of 170 liters capacity, with R-134a as refrigerant with differentiated differently.

Experiments, conclusions

Refrigeration effect of a vapour compression refrigeration system decreases with increase transformation refrigeration.

Comprehensive transformation.

high-performance.

compressors within load.

concentrations refrigeration

V REFERENCES

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