A Review on Experimental Analysis of Domestic Refrigerator Using Air cooled and Evaporative Type Condensers

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Abstract- **Air cooled condensers are mostly used condensers in the domestic refrigerators as they are widely acceptable and perform well. But its performance is depended upon the air (as a cooling medium) present around it. To increase its performance we can use evaporative cooling. This can improve the performance within the wide range of cooling. As water is used, it definitely give better results than air cooled condensers. This paper deals with implementation of evaporative condensers. This application is further used in industrial plants also.**

Index Terms- **Air cooled condenser, Evaporative cooling.**

1. INTRODUCTION

Refrigeration is a process used to abstract heat from a body of lower temperature and releases it to higher temperature (atmosphere). It is generally used to take care of perishable goods. Refrigerator is used as a house hold appliance. At present Vapor Compression Refrigeration Process is used.

The basic elements of Vapor Compression Refrigeration system are as follows:

1. Compressor
2. Condenser
3. Expander

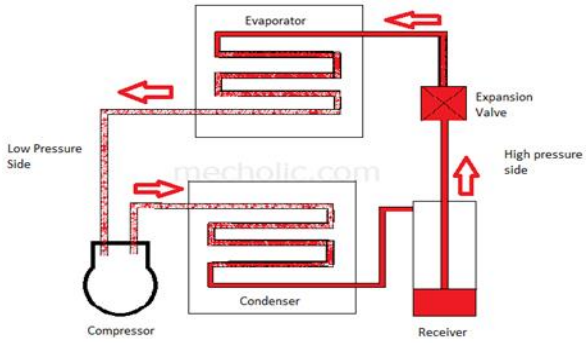

FIG:1 Layout of Domestic refrigerator components.

CONDENSER: These are the most important component of a refrigerator as it is used to change the phase of refrigerant from vapor to liquid at constant pressure. It actually cools the vapor and let it to condense into liquid. Condensers play an important role not only in refrigerators but also in various fields like power plants, nuclear plants, air conditioners etc. talking about the domestic refrigerators they are assembled at the back side of refrigerator.

They are of following three types:

(1) Air cooled condensers
(2) Water cooled condensers
(3) Evaporative condensers

(1)Air cooled condensers: These are the most commonly used condensers used in the domestic refrigerators. These are assembled in the back side of the refrigerator. These are known by their names as the air is used as cooling agent in it. These are highly recommended condensers as they require zero maintenance and install easily.

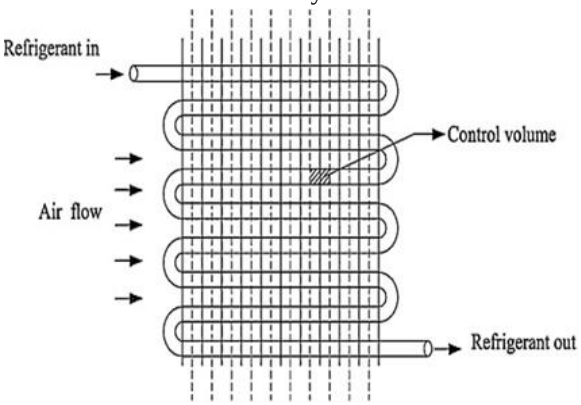

FIG:2 Layout of Air Cooled Condenser

(2)Water cooled condensers: Water cooled condensers are known as water is used as cooling agent in it. They are further classified into two as tube in tube condensers and shell & tube condensers.

These are costly and require routine maintenance as the rust is the major factor taken into concern. Continuous cold water is also required for its smooth operation.

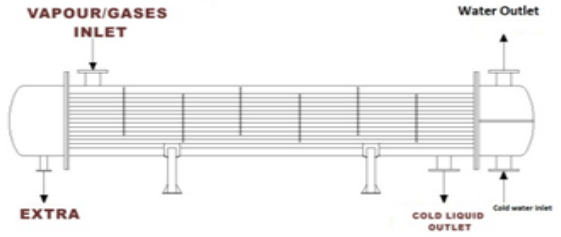

FIG:3 Layout of Water Cooled Condenser.

(3)Evaporative condensers: These are comparatively more effective condensers than the air cooled within the lower cost and low maintenance. They give better results in the limited amount of water. Actually these are the combination of both water cooled and air cooled condensers. It rejects the heat by evaporating water into air stream while passing through the condensing coil. It has a chamber where the water is sprayed over the coils. We can also use a blower fan its better functioning.

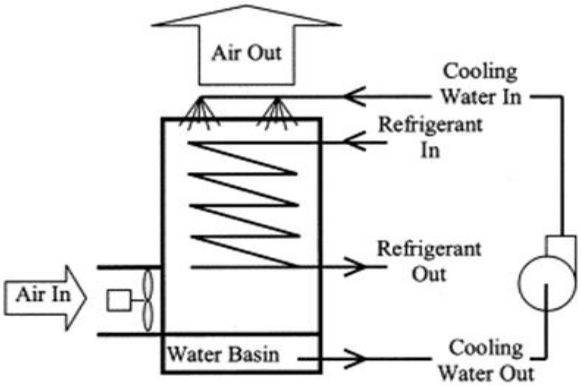

FIG:3 Layout of Evaporative Condenser.

II. LITERATURE REVIEW

Dr. Dheya Ghanim Mutasher Paper descibe the method to increse the performance of domestic refrigerator using shell and tube type heat exchanger. On the basis of parameter such as flow rate, compressor work, temperature the COP is evaluated. R-12 is to be used for the aspect of a investigation purpose to used it in domestic refrigerator.

Prof.Gaffar, G.Momin Paper describes the method to increase the performance of domestic refrigerator using shell and tube type heat exchanger. On the basis of parameter such as flow rate, compressor work, temperature the COP is evaluated. R-12 is to be used for the aspect of a investigation purpose to used it in domestic refrigerator.

Mr. Sagar Patil Prof. Kiran Devade Here paper port the hybrid refrigeration system that combines the Thermo Electric Module and Vapour Compression System for enhancing the cooling capacity and also swing the energy. The result of combination of air cooled and water cooled compress along with Thermo electric module is the decrease in energy consumption by 10.92% annually. It means we can save up to 80 units per year.

Sreejith K., T.R. Sreesastha Ram, Rizwan, Sachin M The main aim of this paper is to address the improvement of performance of the domestic refrigerator by using evaporative type condenser which R134ais used as a refrigerant. After the experiment it is observed that the performance of refrigerator is increased by 13.44% by using evaporate type condenser as compared to the air cooled condensers.

Sreejith K This paper tries to cover the experimental investigation of enchantment of performance of domestic refrigerator by using various compress oil linked with water cooled condensers. In the setup mineral oil (SUNISO -3GS) is used against poly-astral oil (POE). It is observed that for various load condition the mineral oil system reduces the energy consumption up to 11%. The hot water out can be used for house hold work.

III. CONCLUSION

After approaching many research papers related to this I surely concluded that there is a possibility that the performance of refrigerator will increase on using evaporative condenser. There are various design parameters are available to use for enhancement of COP, but it is noted that the evaporative condensers give better heat transfer result with minimum losses under same working condition.

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