

PERFORMANCE AND EVOLUTION OF DOMESTICAL REFRIGERATOR USING LIQUEFIED PETROLEUM GAS CYLINDER

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ABSTRACT

We have designed and analyzed a refrigerator using LPG refrigerant. As the pressure of LPG is high this stored in cylinder. As this pressurized LPG is passed through the capillary tube of small internal diameter, the pressure of LPG is decreased due to expansion and phase change of LPG occurs in an isenthalpic process. Due to phase change from liquid to gas latent heat of evaporation is gained by the liquid refrigerant and temperature decreased. In this way LPG can produce refrigerating effect in the surrounding. From experimental investigations, we have found that the COP of a LPG refrigerator is higher than the domestic refrigerator.

Keywords: LPG refrigeration, Capillary tube, Evaporator, COP, Vapour Compression Refrigeration system, Refrigerating effect.

1. INTRODUCTION

Due to the huge demand of electricity over the world, we think of recovering the energy which is already spent but not being utilized further, to overcome this crisis with less investment. The climatic change and global warming demand accessible and affordable cooling systems in the form of refrigerators and air conditioners. Annually Billions of dollars are spent in serving this purpose. Hence forth, we suggest COST FREE Cooling Systems. LPG is stored in liquefied state in cylinder before its utilization as fuel. According to the energy survey, the refrigerator is one of the heaviest power consumers amongst household appliances. The energy consumption of refrigerators has improved steadily year over year. It works on the principle that the expansion of LPG will be takes place during the conversion of liquid LPG into gaseous form. As a result of this, LPG gas pressure drops and the volume of gas will be increase this will be result into dropped in temperature of gas and it acts as refrigerant. According to second law of thermodynamics, this process of cooling can only be performed with the aid of some external work.

Hence, the power supply is regularly required to drive a refrigerator. The substance which works in a refrigerator to extract heat from a cold body and to deliver it to a hot body i.e.to Surrounding is called refrigerant. Globally 17500 metric tons of conventional refrigerants is consumed by domestic refrigeration like CFC, HFC which causes high depletion if ozone layer (ODP) and Global Warming Potential (GWP). The use of LPG instead of CFC 22 has made a better progress since it has an environment friendly orientation with no ODP. Good product efficiency is resulted by the use of LPG because of its characteristics. Thus we have to examine these two types of refrigerants (LPG and CFC 22) in a modified domestic refrigerator comparing their performance characteristics parameters like pressure, temperature etc. in refrigerator and considering safety while conducting the practical experiment. It indicates LPG can be used as an alternative refrigerant to CFC 22 after performing the test on new system.

1.1 Objectives

The Objectives of this project "Performance evolution of Domestic Refrigerator using LPG Cylinder" are as follows: 1) to identify the form of residual waste in traditional refrigeration system. 2) Compare the important characteristics between LPG refrigeration system and traditional refrigeration system. 3) To distinguish between the current existing refrigerators cost and estimated cost of LPG refrigerator. 4) The performance of existing refrigerator and LPG refrigerator is to be compared.