

Performance Analysis of Air Conditioning System Working on the Vapour Compression Refrigeration Cycle under Magneto hydrodynamic Influence

Authors : Nikhil S. Mane, Mukund L. Harugade, Narayan V. Hargude, Vishal P. Patil

Abstract : The fluids exposed to magnetic field can enhance the convective heat transfer by inducing secondary convection currents due to Lorentz force. The use of magneto hydrodynamic (MHD) forces in power generation and mass transfer is increasing steadily but its application to enhance the convective currents in fluids needed to be explored. The enhancement in convective heat transfer using MHD forces can be employed in heat exchangers, cooling of molten metal, vapour compression refrigeration (VCR) systems etc. The effective increase in the convective heat transfer without any additional energy consumption will lead to the energy efficient heat exchanging devices. In this work, the effect of MHD forces on the performance of air conditioning system working on the VCR system is studied. The refrigerant in VCR system is exposed to the magnetic field which influenced the flow of refrigerant. The different intensities of magnets are used on the different liquid refrigerants and investigation on performance of split air conditioning system is done under different loading conditions. The results of this research work show that the application of magnet on refrigerant flow has positive influence on the coefficient of performance (COP) of split air conditioning system. It is also observed that with increasing intensity of magnetic force the COP of split air conditioning system also increases.

Keywords : magneto hydrodynamics, heat transfer enhancement, VCRS, air conditioning, refrigeration

Conference Title : ICTFDFM 2018 : International Conference on Thermodynamics, Fluid Dynamics and Fluid Mechanics

Conference Location : London, United Kingdom

Conference Dates : February 15-16, 2018