

Commercial refrigerator is widely used for restoring food and drinks in restaurants and department stores. The unit is a vapor compression of system which the refrigerant is R12. However, this refrigerant is going to be phased out in the near future because of its high depletion of the earth's protective ozone layer.

In this research work , the alternatives of R12 which are refrigerant blends developed by Dupont namely SUVA MP52 and SUVA MP39 have been used in a commercial refrigerator. The refrigerants are the blends of R22/R152a/R124 with 33/15/52 and 53/13/34 mass fraction , respectively. A property of the blends is that the temperature is not constant during the phase change. Their potentials in destroying ozone layer are considered to be relatively low comparing with R12 and R22. According to the manufacturer data (Dupont), the ozone depletion potential (ODP) of both SUVA MP 52 and MP 39 are 0.03, their ODP values are rather low compare to R-12 and R-22 which have ODP value equal to 1 and 0.05, respectively.

The study has been separated into 2 parts. The first part is a study of the heat transfer coefficients of the blends during boiling and condensation. The second part is performance tests of a commercial refrigerator using the refrigerant blends with different levels compared with those of R12.

It could be found that the boiling and condensation heat transfer coefficients of MP-39 refrigerant are higher than more of MP-52 and R-12. The unit with MP-39 refrigerant also shows the higher COP followed by these of MP-52 and R-12. It could also been found that the condenser area when MP-39 is the refrigerant could be reduced about 7 % with slightly performance change.