

The effect of MC-134 refrigerant as R-134a substitute refrigerant on vapour compression refrigeration machine's perform

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ABSTRACT

Musicool is one of hydrocarbon refrigerants which potentially substituted for synthetic refrigerants because it have smaller value of ODP (Ozon Deplating Potential) and GWP (Global Warming Potential). This study aims to develop hydrocarbon refrigerants (MC-134) as a substitute of synthetic refrigerants (R-134a) on refrigeration machines. Data is collected every five minutes for one hour, then calculated using EES program V9. Parameters that will be observed is COP and exergy efficiency. Based on this research , MC-134 able to reach COP 7,101 for 1 hour and temperature in the cooling room is -14,2 °C , while R-134a able to reach COP 5,323 and temperature in the cooling room is -5,7 °C. Based on exergy efficiency analysis, exergy efficiency of R-134a is 36.49% and MC-134 is 62.84%. Based on COP and exergy analysis, MC-134 performance is better than R-134a.

Keywords: MC-134, R-134a, cooling system, refrigerant