

## INTISARI

Mesin pendingin banyak dimanfaatkan dalam kehidupan sehari-hari terutama di daerah beriklim tropis. Mesin pendingin dapat dijumpai pada setiap rumah tangga, supermarket, penginapan, perkantoran, rumah sakit, perindustrian, tempat-tempat hiburan dan sarana transportasi. Penelitian ini bertujuan untuk mengetahui karakteristik mesin pendingin sekunder

Penelitian ini merupakan penelitian eksperimental dengan variabel bebas yaitu refrigeran R-134a dan R-404a dan variabel terikat nilai  $Q_{in}$ ,  $Q_{out}$ ,  $W_{in}$ , COP dan efisiensi mesin pendingin. Prinsip kerja mesin pendingin dibuat sesuai dengan siklus kompresi uap. Pengujian dilakukan di Laboratorium Konversi Energi Universitas Sanata Dharma Yogyakarta. Objek dalam penelitian ini adalah mesin pendingin refrigeran primer R-134a dan mesin pendingin refrigeran primer R-404a dengan masing-masing mesin pendingin menggunakan refrigeran sekunder *ethyleneglycol*.

Hasil penelitian ini menunjukkan bahwa kerja kompresor R-404a lebih besar dibandingkan dengan R-134a, kalor yang dilepas kondensor R-134a lebih besar dari pada R-404a, kalor yang diserap evaporator R-134a lebih besar daripada R-404a, COP (*Coefficient of Performance*) aktual R-134a lebih besar daripada R-404a dengan  $COP_{aktual}$  tertinggi R-134a didapat 3,002 dan R-404a didapat 2,343, COP (*Coefficient of Performance*) ideal R-134a lebih besar daripada R-404a dengan  $COP_{ideal}$  tertinggi R-134a didapat 3,901 dan R-404a didapat 3,434 dan efisiensi dari mesin pendingin R-134a lebih besar daripada R-404a dengan efisiensi tertinggi R-134a didapat 78,70% dan R-404a didapat 68,69%.

**Kata Kunci:** Mesin pendingin refrigeran sekunder, COP, siklus kompresi uap.

## ABSTRACT

Cooling machines are widely used in daily life, especially in the tropical Country. Cooling Machine can be found in every household, supermarkets, lodging, offices, hospitals, industrial, entertainment venues and transportation. The aims of this research is to investigate the characteristic of the secondary refrigerant cooling machine.

This research is an experimental research with the independent variables are the refrigerant R-134a and refrigerant R-404a and the dependent variable are  $Q_{in}$ ,  $Q_{out}$ ,  $W_{in}$ , COP, and the cooling machine efficiency. The working principle of the cooling machine obey the vapor compression cycle. The research is conducted in Energy Conversion Laboratory Sanata Dharma University Yogyakarta. The object of this study are the engine primary coolant R-134a and engine primary coolant R-404a with each primary refrigerant machine using a secondary refrigerant: ethyleneglycol.

The results of this reseach show that the R-404a compressor work is greater than R-134a, the heat released condensor R-134a is greater than the R-404a, the heat absorbed by the evaporator R-134a is greater than R-404a, COP (Coefficient of performance) actual R-134a is greater than R-404a with the highest R-134a  $COP_{aktual}$  obtained 3.002 and R-404a obtained 2,343, COP (Coefficient of performance) ideal of R-134a is greater than R-404a with the highest R-134a  $COP_{ideal}$  obtained 3.901 and R-404a obtained 3,434 and efficiency of the engine coolant R-134a is greater than R-404a with the highest efficiency R-134a obtained 78.70% and R-404a obtained 68.69%.

**Keywords:** secondary refrigerant cooling machine, COP, the vapor compression cycle.