INTISARI

Saat ini *showcase* sangat banyak digunakan untuk berjualan minuman kemasan yang sering dijumpai di supermarket, warung-warung, bahkan di pasar-pasar. karena kegunaannya tersebut *showcase* sering sekali dijumpai pada depan warung-warung, hal ini dimaksudkan agar pembeli mudah melihat bahwa warung tersebut menjual minuman kemasan dingin. Dengan penempatan *showcase* di luar ruangan, membuat *showcase* sering bersentuhan dengan angin, terutama kondensor yang merupakan alat pembuang panas dari sistem mesin *showcase*, dimana penempatan kondensor pada umunya terletak di bagian belakang *showcase* dan kontak langsung dengan udara luar. Dengan adanya angin yang sering berhembus berpengaruh terhadap proses pembuangan panas dari kondensor ke lingkungan sekitar. Tujuan dari penelitian ini adalah (a) merakit mesin pendingin *showcase* dengan siklus kompresi uap, (b) mengetahui karakteristik mesin pendingin *showcase,* meliputi : energi kalor yang diserap evaporator, energi kalor yang dilepas kondensor, kerja kompresor, nilai COP aktual dan COP ideal, laju aliran refrigeran serta nilai efisiensi mesin pendingin *showcase* untuk berbagai variasi kecepatan kipas.

Penelitian ini menggunakan mesin *showcase* yang bekerja dengan siklus kompresi uap. Komponen utama *Showcase* meliputi kompresor, evaporator, kondensor, dan pipa kapiler. Daya kompresor sebesar 115 watt, komponen yang lain menyesuaikan dengan daya kompresor, refrigeran yang dipergunakan adalah R-134a. Variasi yang dilakukan pada penelitian yaitu kecepatan putaran kipas yang mengaliri udara melewati kondensor : (a) Tanpa kipas (b) Kecepatan kipas *medium* dan (c) Kecepatan kipas *high*. Daya kipas yang digunakan 35 W dan beban pendinginan 4,8 L air. Pengambilan data setiap 20 menit, suhu maksimal ruang evaporator diatur 4°C.

Penelitian ini memberikan hasil (a) *Mesin showcase* berhasil dirakit dan bekerja dengan baik, dengan tekanan kerja terendah pada evaporator sebesar 1,45 bar dan tekanan terendah pada kondensor sebesar 10 bar (b) Karakteristik mesin *showcase* terbaik dialiri oleh udara dengan kecepatan *high*, dengan nilai rata-rata untuk kerja kompresor sebesar 45,43 kJ/kg, kalor yang dilepas kondensor sebesar 212,00 kJ/kg, kalor yang diserap evaporator sebesar 164,43 kJ/kg, COP_{aktual} sebesar 3,64, COP_{ideal} sebesar 4,45, laju aliran refrigerant sebesar 0,00447 kg/s, dan efisiensi sebesar 81,35%.

Kata kunci : kondensor, *showcase,* siklus kompresi uap, kecepatan udara.

ABSTRACT

In this time, the showcase very much to used for sell of beverage packaging, which is often found in supermarket, small shop, even in the markets. Because of its usefulnes, the showcase is often to finded in the front of shops, it's the mean for easy buyers to see thats the shop for sell cold beverage packaging. With placement the showcase out of the room, make it have exposed to the wind, especially condensers, it's heat dissipation tool of the showcase engine system, in the general the condensers placement have a located back of the showcase and have direct contach with out air. With the wind has often blowing effect to heat dissipation process from condensers to environment. The purpose from research is (a) assemble the cooling machine showcase with vapor compresion cycle, (b) to know characteristics of the cooling machine showcase, that is : kalor energy have the absorbed by evaporator, kalor energy has removed condensers, compressor work, coefficient of performance (COP), refrigerant flow rate and efficiency value of cooling machine showcase for fan speed variation.

This study used the showcase machine that's worked with vapor compression cycle. The main component the showcase is compressor, evaporator, condensers, and capillary tube. The power of compressor is 115 W, others component have adjust with compressor power,the used refrigerant is R-134a. Variety of research is speed of fan which flowing air and then past the condenser : (a) without fan (b) medium fan speed and (c) high fan speed. The power of fan have to used 35 W and cooling load 4,8 L water. The taked data every 20 minute, maximum temperature evaporator room has setting 4°C.

The study give to results (a) the showcase machine got assembled succeed and worked well, with minimum work pressure on the evaporator as big as 1,45 bar and minimum pressure on the condenser as big as 10 bar (b) the best characteristics of showcase machine is flowed by air with high speed, with the average to compressor work as big 45,43 kJ/kg, the heat that condensers released as big as 212,00 kJ/kg, the heat that evaporator absorbed as big as 164,43 kJ/kg, COP_{aktual} as big as 3,64, COP_{ideal} as big as 4,45, the refrigerant flow rate as big as 0,00447 kg/s, and efficiency as big as 81,35%.

Keywords : condenser, showcase, vapor compression cycle, air speed.