ABSTRAK

Penelitian ini menggunakan mesin pendingin buah yang menggunakan siklus kompresi uap dengan panjang pipa kapiler 200 cm , daya kompresor 1/5 Hp, refrigeran 134a, kondensor yang memiliki lekukan sebanyak 12U dan evaporator standar yang digunakan kulkas 2 pintu. Data yang diambil yaitu (a) suhu refrigeran saat masuk kompresor (T_1), (b) suhu refrigeran saat keluar kondensor (T_3), (c) suhu beban pendinginan (T_{beban}), (d) tekanan rendah refrigeran masuk kompresor (P_1), (e) tekanan tinggi refrigeran keluar kompresor (P2), (f) tekanan tinggi refrigeran masuk pipa kapiler (P_3), (g) tekanan rendah refrigeran keluar pipa kapiler (P_4), (h) besar tegangan listrik untuk kerja kompresor (V) dan (i) besar arus listrik untuk kerja kompresor (I).

Penelitian ini memberikan hasil (a) mesin pendingin buah telah berhasil dibuat dan bekerja dengan baik, suhu evaporator mesin pendingin buah mencapai -23°C, mampu mendinginkan buah hingga mencapai suhu 4°C, (b) kerja kompresor per satuan massa refrigeran (W_{in}) rata–rata 52,16 kJ/kg, (c) kalor yang dilepas kondensor per satuan massa refrigeran (Q_{out}) rata-rata 187,83 kJ/kg, (d) kalor yang diserap evaporator per satuan massa refrigeran (Q_{in}) rata-rata 135,50 kJ/kg, (e) COP_{aktual} rata-rata 2,59, (f) COP_{ideal} rata-rata 3,58, (g) laju aliran massa refrigeran ($\dot{m}$) rata-rata 0,00343 kg/detik, dan (h) Efisiensi (η) rata-rata 72,16%.

Kata Kunci : Refrigeran, $COP_{aktual,}$ $COP_{ideal,}$ Efisiensi.

ABSTRACT

This research used cooler fruit machine that using the vapor compression cycle with 200 cm length of capillary pipe, 1/5 Hp compressor power, 134a refrigerant, condenser that has 12U curvature and standard evaporator that is used by 2 doors refrigerator. The data that gathered such as (a) the temperature when enters compressor (T1), (b) the temperature when leaves condenser (T3) (c) the temperature of cooling burden (Tburden), (d) the refrigerant low pressure enters compressor (P1), (e) refrigerant high pressure leaves compressor (P2), (f) the refrigerant high pressure enters capillary pipe (P3), (g) the refrigerant low pressure leaves capillary pipe (P4), (h) the electric tension for compressor (V) and (i) the electric flow for compressor.

This research results are (a) the cooler fruit machine has finally made and works well, the temperature of its evaporator reach -23°C, can refrigerate fruits reaching 4°C. (b) the work of compressor for each refrigerant mass (Win) average is 52,16 kJ/kg, the heat which is heated condenser for each refrigerant mass (Qout) average is 187,83 kJ/kg, the heat which was absorbed by evaporator for each refrigerant mass(Qin) average is 135,50 kJ/kg, COPactual average is 2,59, COPideal average is about 3,58, the rate of refrigerant mass flow average is 0,00343 kg/seconds and Efficiency (η) average is 72,16 %.

Keywords : Refrigerator, COPactual, COPideal, efficiency.