ABSTRAK

Tujuan mesin *Chest Freezer* dengan menggunakan siklus kompresi uap adalah sebagai berikut (1) membuat mesin *chest freezer* (2) menghitung karakteristik mesin *chest freezer* yang dibuat antara lain (a) menghitung Q_{in} (b) menghitung Q_{out} (c) menghitung W_{in} (d) menghitung COP_{ideal} dan COP_{aktual} (e) menghitung laju aliran massa refrigerant (f) menghitung Efisien *Chest Freezer*.

Penelitian dan pelaksanaan di Laboratorium Teknik Mesin USD, adapun batasan – batasan dalam pembuatan mesin *Chest Freezer* menggunakan siklus kompresi uap antara lain (1) *Chest Freezer* mempergunakan siklus kompresi uap dalam bekerjanya (2) komponen mesin pendingin terdiri dari komponen utama seperti kompresor, kondensor, pipa kapiler, filter, dan evaporator (3) refrigeran yang digunakan dalam mesin pendingin *chest freezer* adalah R134a (4) kompresor yang dipergunakan adalah kompresor hermetik berdaya 1/5 PK (5) evaporator dan kondensor yang dipergunakan adalah evaporator dan kondensor standar yang dipakai pada mesin kulkas berdaya 1/5 PK (6) peralatan tambahan yang digunakan adalah filter.

Dari pengujian mesin pendingin *Chest Freezer* untuk mendinginkan air dengan siklus kompresi uap yang telah dilakukan (1) mesin pendingin *Chest Freezer* dengan siklus kompresi uap yang dibuat dapat mendinginkan air dengan volume 0,5 liter sampai menjadi es pada suhu (-27,22°C) selama 210 menit (2) energi kalor persatuan massa refrigeran yang diserap evaporator (Q_{in}) terendah sebesar 172,12 kJ/kg, energi kalor persatuan massa refrigeran yang diserap evaporator tertinggi sebesar 181,43 kJ/kg dan energi kalor persatuan massa refrigeran yang diserap evaporator nilai rata-rata sebesar 176,48 kJ/kg (3) energi kalor persatuan massa refrigeran yang dilepas kondensor (Q_{out}) terendah sebesar 225,63 kJ/kg, energi kalor persatuan massa refrigeran yang dilepas kondensor tertinggi sebesar 239,57 kJ/kg dan energi kalor persatuan massa refrigeran yang dilepas kondensor nilai rata-rata sebesar 236,96 kJ/kg (4) kerja kompresor persatuan massa refrigeran (W_{in}) terendah sebesar 48,85 kJ/kg, kerja kompresor persatuan massa refrigeran tertinggi sebesar 67,45 kJ/kg dan kerja kompresor persatuan massa refrigeran nilai rata-rata sebesar 60,47 kJ/kg (5) koefisien Prestasi COP_{aktual} terendah sebesar 2,55, Koefisien Prestasi COP_{aktual} tertinggi sebesar 3,61 dan Koefisien Prestasi COP_{aktual} nilai rata-rata sebesar 2,93 (6) koefisien Prestasi COP_{ideal} terendah sebesar 3,81, Koefisien Prestasi COP_{ideal} tertinggi sebesar 4,74 dan Koefisien Prestasi COP_{ideal} nilai rata-rata sebesar 3,89 (7) laju aliran massa refrigeran ($\dot{m}$) terendah sebesar 0,0035 kg/detik, laju aliran massa refrigeran ($\dot{m}$) tertinggi sebesar 0,0049 kg/detik dan Laju aliran massa refrigeran ($\dot{m}$) nilai rata-rata sebesar 0,0039 kg/detik (8) efisiensi *Chest Freezer* terendah sebesar 0,66, Efisiensi *Chest Freezer* tertinggi sebesar 0,8 dan Efisiensi *Chest Freezer* nilai rata-rata 0,75.

Kata Kunci : *Chest Freezer*, siklus kompresi uap, COP, laju aliran massa refrigeran, efisiensi.

ABSTRACT

The machine by using chest freezer cycle compressions steam is as follows (1) made a chest freezer (2) the counting characteristic of a freezer chest made among others (a) count counting Q_{in} (b) count counting Q_{out} (c) count W_{in} (d) count COP_{ideal} and COP_{aktual} (e) count mass flow rate refrigerant (f) count effiecient chest freezer.

Research and implementation in engineering laboratory bucks, the limits to machine fabrication chest freezer use compression cycle steam among others (1) chest freezer cycle use the compression of a vapor in an undeveloped (2) the components cooling machine consisting of the main components of the compressor, as a condenser; capillary, pipe the filter, and evaporator (3) a refrigerant used in cooling machine chest freezer is R134a (4) a compressor in which work is done is a compressor hermetic defenseless 1/5 PK (5) evaporator and a condenser in which work is done is evaporator and a condenser standard that is worn on a defenseless a refrigerator 1/5 PK (6) auxiliary apparatus that is used is filter.

From cooling machine testing chest freezer to cool water with a cycle of the compression of steam has been done (1) the cooling machine chest freezer compression of the cycle with steam made can be cool water with the volume of 0.5 liters up to be ice at temperatures (-27,22 °C) for 210 minutes (2) the energy heat engine the union of a mass of refrigerant absorbed evaporator (Q_{in}) lowest of 172,12 kJ/kg, the association of energy heat engine mass refrigerant absorbed evaporator highest of 181,43 kJ/kg and energy heat engine the union of a mass of refrigerant absorbed evaporator average value of 176,48 Kj/kg (3) the energy heat engine the union of a mass of refrigerant that is removable a condenser (Q_{out}) lowest of 225,63 kJ/kg, the association of energy heat engine mass refrigerant that is removable of a condenser highest 239,57 kJ/kg and energy heat engine the union of a mass of refrigerant that is removable a condenser average value of 236,96 kJ/kg (4) the work of the compressor of the union of a mass of refrigerant (W_{in}) lowest of 48,85 kJ/kg, the work of the compressor of the union of a mass of refrigerant highest 67,45 kJ/kg and the work of the compressor of the union of a mass of refrigerant average value of 60,47 kJ/kg (5) the lowest of the coefficients 2,55 COP_{aktual} achievement , supreme achievement of the coefficients COP_{aktual} 3,61 achievement and the coefficients 2,93 COP_{aktual} the value of an average of (6) the lowest of the coefficients 3,81 COP_{ideal} achievement , supreme achievement of the coefficients COP_{ideal} 4,74 achievement and the coefficients 3.89 COP_{ideal} the value of an average of (7) the rate of the flow of refrigerant mass ($\dot{m}$) lowest of 0,0035 kg/second, the rate of the flow of refrigerant mass ($\dot{m}$) of the highest kg/second and the rate of the flow of refrigerant mass ($\dot{m}$) the value an average of 0,0039 kg/second (8) the freezer 0,66 lowest of the chest the chest the freezer is 0.8 and efficiency chest freezer average value of 0.75.

Keyword : Chest freezer , the cycle of the compression of steam , COP , the rate of the flow of refrigerant mass , efficiency .