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論文名稱: 自然冷媒CO2/NH3二元式冷凍系統熱交換器最佳熱導度配比之研究

英文論文名稱: Optimum Allocation of Heat-Exchanger Thermal Conductance in CO2/NH3 Cascad

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[摘要]

本文主要研究目的在於藉冷凍循環理論分析方式，在總熱導度固定之限制條件下，尋找自然冷媒CO2/NH3二元式蒸
交換器在不同設計參數下之最佳熱導度配比，以及所對應之最大性能係數COP。所採用之冷凍循環包含逆卡諾循環
三種，考量之設計參數則爲冷卻水平均溫度、冰鹵水平均溫度、製冷能力與總熱導度等四項。研究結果得知：當自
時，在任何設計參數組合下系統蒸發器、二元冷凝器與冷凝器間之最佳熱導度配比爲1：1：1。對於以理想蒸氣壓
均溫度在31℃～32℃範圍內、冰鹵水平均溫度在-42℃～-46℃範圍內，總熱導度爲120kW/K～140 kW/K、製冷能
配比爲1：1.0625：1.0625；然而當總熱導度在170kW/K以上時，最佳熱導度配比會趨近逆卡諾循環之1：1：1比

[英文摘要]

This study mainly discusses the optimum allocation of heat-exchanger thermal conductance in CO2/NH3 cascad
condenser, condenser. Using cold-water temperature, chillier fluid temperature, cool capacity and total thermal c
three models of Reversed Carnot Cycle and Ideal Vapour Compressor Refrigeration Cycle and Real Vapour Cor
dynamics analysis and Klein thermal conductance equation. The system produced Heat-exchanger thermal conc
maximum COP with different parameters and thermal conductance allocation.
The result of this research articulated that the principle of three heat-exchangers optimum allocation in CO2/NH3
1.Heat-exchanger thermal conductance optimum allocation in Reversed Carnot Cycle is 1：1：1.
2.Heat-exchanger thermal conductance optimum allocation would be 1：1.0625：1.0625 in Ideal Vapour Compr
Refrigeration Cycle, of which restricted conditions are that average chiller fluid temperature is from -42℃ to -46℃
32℃, total thermal conductance is from 120kW/K to 140kW/K, and cool capacity between 120kW to 160kW. If To
exchanger thermal conductance optimum allocation should approach 1：1：1.

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