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[摘要]

水冷式箱型冷氣機是直膨蒸氣壓縮冷凍系統，應用在商業與工業領域中之空氣調節設備。箱型冷氣機之性能的評量 CNS-3615 中有規定，然而這些性能指標均是利用熱力學第一定律觀點所建立的，只能來代表冷凍系統整體效率。源效率比的要求，經常去更改各元件的設計，但只能瞭解冷凍系統整體效率，卻無法進一步去瞭解改善各元件對其著手。

因此本文之主要研究目的為：藉由熱力可用能分析，發展可供應用於分析水冷式箱型冷氣機系統與元件能源效率之於元件可用能毀滅(exergy destruction)、可用能效率(exergy efficiency)及其比重排序的影響。最後，利用三組實驗作為診斷水冷式箱型冷氣機系統與元件能源效率改善成效之可行性。研究結果顯示：在實務上水冷式箱型冷氣機可媒側、空氣側與冷卻水側，邊界溫度直接採用環境溫度 T_o 來進行分析較為方便。所有實驗案例均顯示各主要元件中，最後為膨脹裝置；各主要元件的可用能效率最小為蒸發器，其次為壓縮機，第三為冷凝器，最後為膨脹裝置。對於系統的能源效率改善之診斷工具，應從可用能毀滅最大、可用能效率最小的元件著手改善。

[英文摘要]

Water-Cooled type air-conditioner is direct expansion vapor compression refrigeration system and application to According to CNS-3615, the air-conditioner performance's usually express energy efficiency ratio (energy efficiency first law of thermodynamics to establish, and it can represent whole efficiency of the refrigeration system. Toward energy efficiency ratio must be to obey CNS-3615, so designers often go to change component's design, but can't be able to go to understand and improve increasing the benefit to energy efficiency of component, and offer the conclusion. Therefore the main research purposes of this study is developing an exergy analysis mode for system component. Conditioner. The control volume and boundary temperature will be discuss exergy destruction, exergy efficiency experience case verify to establish mode's applicability, bring up by means of by exergy analysis as consultation energy efficiency ameliorate effect feasibility. The results show : Water-Cooled type air-conditioner can use Model element, refrigerating side, air side, and cooling water side. The boundary temperature directly adopt environment temperature. experience case show the evaporator's exergy destruction will be the biggest, secondly is compressor, thirdly is condenser, finally is expansion valve. evaporator's exergy efficiency is the smallest, secondly is compressor, thirdly is condenser, finally is expansion valve. This study conclusion will supply Water-Cooled type air-conditioner designer and developer towards to promote it should to improve component's energy efficiency from exergy destruction is the biggest and exergy efficiency is the smallest.

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