研究生: 李振宇

研究生(英文姓名): Jeng-Yu Lee

論文名稱: 除濕空調系統能源運用之最佳化研究

英文論文名稱: A Study of Optimal Energy Conservation for Dehumidifying Air Conditioning System

指導教授: 王文博

學位類別: 碩士

校院名稱: 國立臺北科技大學

系所名稱: 冷凍空調工程系所

學號: 92458523

學年度: 93

語文別: 中文

論文頁數: 156

關鍵詞: 化學除濕；除濕轉輪

英文關鍵詞: honeycomb rotary dehumidifier

被引用次數: 0

[摘要]

濕度在工業製程環境中對廠內原料，生產及成品庫存等非常重要，是影響品質之成敗關鍵因素之一。尤其技術密集
競爭力。本研究以目前空調廣泛使用的兩類除濕系統(一)冷卻除濕(二)化學(劑)除濕之能源運用做最佳化研究。
在空調系統中除濕方式種類甚多，目前市場上較常被採用如冷卻除濕法及化學除濕法。除濕應用範圍以露點區分:
般高濕均採用冷卻除濕法，低濕均採用化學除濕法。而在介於0℃DP-10℃DP之間屬於中濕一般因應系統之整體及
故此段除濕的耗能並沒有相關資料可供參考，爲了要瞭解確實耗能實情以獲得達到節約能源之最佳化系統。本研究
業製程環境爲基礎，設備分爲三項:預冷段，除濕段以及後置段。出風溫度15-20℃DB分別對兩系統耗能探討出耗能
本研究在冷卻與化學除濕系統架構中，分別比較各段設備與總耗能關係，結果獲得兩系統耗能差異比最大部分在後
下，出風乾球溫度由15℃~20℃DB上升，但能源消耗是下降的；而冷卻除濕系統則相反隨出風乾球溫度15℃~20℃
以上耗能比化學除濕耗能高，出風17℃DB以下時冷卻除濕耗能較低。因此在採用除濕系統時，此段耗能評估必須

[英文摘要]

Humidity Control is considered as an important factor for the environments of industrial and manufacturing plant.
stocks. Therefore, it plays a significant role that influenced the product success/failure rate, especially in hi-tech i
products and company’s image. This study will focus on the most common type of dehumidification methods ar
Refrigerant Condensate Dehumidification (2) Sorbents Dehumidification.
There are varieties of dehumidification methods in air conditioning system. Refrigerant Condensate and Sorbents
the market today. The applications range of dehumidification is often differentiating by dewpoint temperature. As
Refrigerant Condensate Dehumidification is more likely to be adopted. Relatively speaking, when the dew point b
Dehumidification is more commonly used. However, there is no distribution or alternatives for system application
Application usage of both dehumidification methods are often adopted in the range of dew points between 0℃DP
referring to the energy consumption at this range. Therefore, the main purpose is to analyzing and determines a
the study, it demonstrates and compares the energy consumption analysis on both methods. The testing can be
after heating/cooling based on dew points from 0-10℃DP and air volume of 5000~15000CMH with the supply-air
A theoretical framework of this study is to compare both total energy consumption at different stages. As the resu
been discovered between both systems at the final stage as the after heating/cooling. Based on the test; as dew
5000~15000CMH with the supply-air temperature at 15-20℃DB, total energy consumption for Sorbents Dehumid
Dehumidification has increased. Furthermore, the study clearly shows both dehumidification on the same conditi
above, energy consumption for Refrigerant Condensate Dehumidification is greater then Sorbents Dehumidificat
Refrigerant Condensate Dehumidification has lower energy consumption. Therefore, the analysis of this final sta
consideration for preliminary design and selecting a system.

[論文目次]

[參考文獻]

[1] 經濟部能源委員會，中華民國能源簡介，民國92年3月。

[2] Air conditioning Technology, part 70, Vol.17, No 10, 11, pp.34, 36, July 2001.

[3] Understanding What Humidity Dees and Why, ASHRAE Journal, April 1999.

[4] ‘ ‘ASHRAE Chapter 22 System and equipment,” ASHRAE Handbook -Desiccant Dehumidification and p

[5] Lew Harriman, Geoff Brundrett, Reinhold Kittler, ‘ ‘Humidity Control Design Guide,” Chapter 2, Chapter 3

[6] Applied Thermal Engineering 20(2000) 309-322 measurements of effectiveness in a silica gel rotary exchang

[7] Air conditioning Technology, part 70, Vol.17, No 10,11, pp.34, 36, July 2001

[8] ARI Standard 940-1998, ‘ ‘Desiccant Dehumidifiers, ” Air-Conditioning & Refrigeration Institute, Arlington

[9] 呂錫民、顏文治「太陽能除濕輻射式冷卻技術測試分析」，線上冷凍空調雜誌，工研院能資所

[10] J.G. Vian, D. Astrain, M. Domguez, ‘ ‘Numerical modeling and a design of a thermoelectric dehumidier,” 2001.

[11] Carl Munters Company, How Dry Air Method. (manual)

[12] 陳克俊，「功率掃描之直徑五釐米粉末燒結式熱管性能測試」，國立國立臺北科技大學冷凍空調工程系碩士論

[13] 陳良銅，「潔淨室外氣空調箱特性與節能之研究」，國立國立臺北科技大學冷凍與低溫研究所碩士論文，民9

[14] Dehumidification Issues of standard 02-1989, ASHRAE Journal, March 1998.