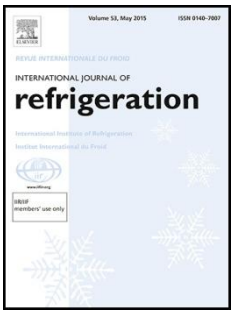
Accepted Manuscript



Title: An experimental study on the dehumidification performance of a counter flow liquid desiccant dehumidifier

Author: Lingshi Wang, Fu Xiao, Xuejun Zhang, Ritunesh Kumar

PII: S0140-7007(16)30167-0
DOI: http://dx.doi.org/doi: 10.1016/j.ijrefrig.2016.06.005
Reference: JIJR 3349

To appear in: *International Journal of Refrigeration*

Received date: 29-10-2015
Revised date: 16-5-2016
Accepted date: 5-6-2016

Please cite this article as: Lingshi Wang, Fu Xiao, Xuejun Zhang, Ritunesh Kumar, An experimental study on the dehumidification performance of a counter flow liquid desiccant dehumidifier, *International Journal of Refrigeration* (2016), http://dx.doi.org/doi: 10.1016/j.ijrefrig.2016.06.005.

An experimental study on the dehumidification performance of a counter flow liquid desiccant dehumidifier

Lingshi Wang[1], Fu Xiao[1,*], Xuejun Zhang[2], Ritunesh Kumar[3]

[1]Department of Building Services Engineering, The Hong Kong Polytechnic University, Kowloon, Hong Kong

[2]Institute of Refrigeration and Cryogenics, Zhejiang University, Hangzhou 310027, China

[3]Mechanical Engineering Department, Indian Institute of Technology, Indore, MP, India-453446

*****Corresponding author. Tel.: +852 2766 4194; Fax: +852 2765 7198.

E-mail address: linda.xiao@polyu.edu.hk

Highlights

- An experimental study on a compact packed-type dehumidifier is conducted.
- New empirical correlations for moisture and enthalpy effectiveness are developed.
- The present packing can reduce the size of dehumidifier to meet installation demand.
- The critical height of pacing is proposed and it increases with desiccant flow flux.
- Packing height should not exceed 0.4m when desiccant flow flux is less than 1.3 kg/m^{2}s.

ABSTRACT

This paper presents an experimental study on the dehumidification performance of a counter flow liquid desiccant dehumidifier using structured packing with a high specific surface area (650m^2/m^3). New empirical equations correlating the moisture effectiveness and the enthalpy effectiveness with critical inlet parameters are developed, which can be used to conveniently predict the performance of a similar dehumidifier. The empirical correlations are validated using the experimental data of this study, and compared with the experimental data reported by another researcher. The deviations are within ±10% for the former and within ±15% for the latter. The performance of the present type of packing is also compared with other two types of structured packing available in