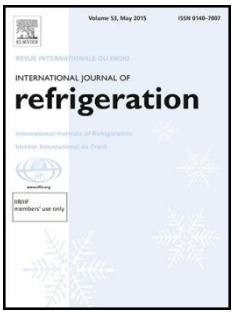
Accepted Manuscript



Title: Application of interleaved circuitry to improve evaporator effectiveness and COP of a packaged AC system

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PII: S0140-7007(17)30134-2
DOI: http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.03.026
Reference: JIJR 3601

To appear in: *International Journal of Refrigeration*

Received date: 22-1-2017
Revised date: 16-3-2017
Accepted date: 26-3-2017

Please cite this article as: Ammar M. Bahman, Eckhard A. Groll, Application of interleaved circuitry to improve evaporator effectiveness and COP of a packaged AC system, *International Journal of Refrigeration* (2017), http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.03.026.

Application of interleaved circuitry to improve evaporator effectiveness and COP of a packaged AC system

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Highlights

- This paper investigates the interleaved circuitry application in a packaged air-conditioner.
- Airflow maldistribution was simplified with a continuous air velocity profile measurement.
- Interleaved circuitry homogenized superheat distribution, improved cooling capacity and COP.
- Interleaved circuitry compensated for airflow maldistribution.
- Implicit interleaved evaporator model predicted cooling capacity/performance within acceptable margin of error.

Abstract

Highly constrained air flow pathways as experienced in tightly packaged air conditioning systems result in air flow maldistribution problems in the evaporators. The interleaved circuitry method, where the refrigerant from a circuit with high air flow is routed to a circuit with low air flow and vice-versa, has been investigated to passively reduce the air maldistribution effect. Air velocity measurements have been conducted in psychrometric chambers and the measurement locations have been defined by the log-Tchebycheff rule. The velocity profile was obtained by Lagrange Interpolation method as percentage values. The performance of the interleaved circuitry method was compared to the baseline circuitry at different operating conditions. The results show that the interleaved circuitry method uniforms the superheat of the individual