

Accepted Manuscript

Title: Generalized effects of refrigerant charge on normalized performance variables of air conditioners and heat pumps

Author: Mehdi Mehrabi, David Yuill

PII: S0140-7007(17)30066-X

DOI: <http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.02.014>

Reference: IJR 3558

To appear in: *International Journal of Refrigeration*

Received date: 22-11-2016

Revised date: 23-1-2017

Accepted date: 13-2-2017

Please cite this article as: Mehdi Mehrabi, David Yuill, Generalized effects of refrigerant charge on normalized performance variables of air conditioners and heat pumps, *International Journal of Refrigeration* (2017), <http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.02.014>.

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Generalized effects of refrigerant charge on normalized performance variables of air conditioners and heat pumps

Mehdi Mehrabi*, David Yuill

University Of Nebraska-Lincoln, Architectural Engineering,
Omaha, NE 68182, US
mmehrabi@unomaha.edu

* Corresponding Author

HIGHLIGHTS

- Detailed response to reviewers is provided
- The manuscript is modified addressing the reviewers' comments. The details of modification are described in the detailed response to reviewers.
- Some other minor editorial issues are also modified in the current revision of the paper, which is described in the detailed response to reviewers.

ABSTRACT:

Several laboratory experiments have studied the effect of faults on vapor compression cycle air-conditioning systems. There has been a particular focus on refrigerant charge variation, which is believed to be quite common in air conditioners. The current paper summarizes the effects on several normalized performance variables for all of the results available in the literature for refrigerant charge variation, and provides generalized relationships. The generalizations were developed for operation at ANSI/AHRI 210/240 standard test conditions and are provided separately for fixed orifice and thermostatic expansion valve equipped systems in both cooling and heating mode. The level of variation found in the summary shows that for many applications, it is reasonable to use generalized relationships to estimate the effect of faults on systems that have not been tested in a laboratory.

Keywords: Air conditioner; Heat pump; Refrigerant charge; Fault; Generalized effect

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