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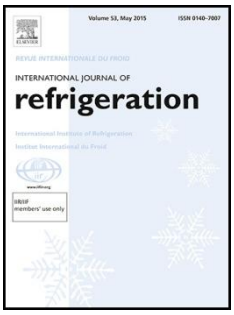

Title: Generalized effects of refrigerant charge on normalized performance variables of air conditioners and heat pumps

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

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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 the 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