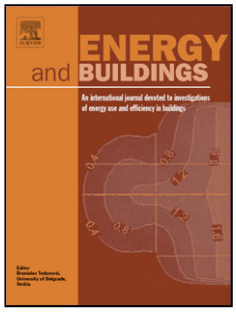

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Author: Handong Wang

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A steady-state empirical model for evaluating energy efficient performance of centrifugal water chillers

Handong Wang

M. & E. School of Shenzhen Polytechnic, Guangdong Province 518055, China

Email: zlwhd@szpt.edu.cn

Research highlights

- Proposed a novel COP model cost-effectively and easily used on field
- Model variables are the parameters on water side: Δp_x, ΔT_{chw}, and ΔT_{cw}
- The model is independent of cooling load or chilled water flow rate
- Models are validated and analyzed with both internal and external on-field data
- Model *CV*s for chillers vary from 2.956% to 4.295% with *MRE*s from 2.14% to 3.41%

Abstract

A multivariate polynomial empirical model for evaluating the coefficient of performance (*COP*) of centrifugal chillers was proposed in this work. The model variables are common parameters (i.e. pressures and temperatures) on chilled water side in chiller systems. It is independent of the cooling load or partial load ratio (*PLR*) required by most of empirical chiller models so that it can provide a new method to evaluate the *COP* of a chiller without measuring the chilled water flow rate which is anyway difficult to measure directly and accurately in many on-field operating chiller plants. This makes it easy and convenient to use for on-field engineers. On-field measurement and analysis indicate that the accuracy of the proposed model is near to the compared three empirical models quoted from literatures—Gordon-Ng universal