

# Accepted Manuscript

Research Paper

Thermodynamic analysis of a cascaded compression- absorption heat pump and comparison with three classes of conventional heat pumps for the waste heat recovery

L. Garousi Farshi, S. Khalili, A.H. Mosaffa

PII: S1359-4311(17)31593-4

DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.09.032>

Reference: ATE 11089

To appear in: *Applied Thermal Engineering*

Received Date: 8 March 2017

Revised Date: 9 August 2017

Accepted Date: 7 September 2017

Please cite this article as: L. Garousi Farshi, S. Khalili, A.H. Mosaffa, Thermodynamic analysis of a cascaded compression- absorption heat pump and comparison with three classes of conventional heat pumps for the waste heat recovery, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.09.032>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Thermodynamic analysis of a cascaded compression- absorption heat pump and comparison with three classes of conventional heat pumps for the waste heat recovery

L. Garousi Farshi<sup>1\*</sup>, S. Khalili<sup>1</sup>, A.H. Mosaffa<sup>2</sup>

<sup>1</sup> Faculty of Mechanical Engineering, University of Tabriz, Tabriz, Iran

<sup>2</sup> Department of Mechanical Engineering, Azarbaijan Shahid Madani University, Tabriz, Iran

Corresponding author: [l.garousi@tabrizu.ac.ir](mailto:l.garousi@tabrizu.ac.ir) (L. Garousi Farshi)

## Abstract

In present study, a new heat pump named cascaded compression-absorption heat pump (CCAHP) is introduced, thermodynamically analyzed and compared with that three other classes of heat pumps (compression, absorption, and hybrid compression-absorption) with identical waste heat source. Ammonia-water solution is used in the absorption as well as hybrid systems and pure ammonia in the compression system. The simulations are performed in EES (Engineering Equation Solver) software. Low-grade heat is externally supplied to the systems and upgraded heat is transferred to a medium with high temperature. Comparison of the results shows that with increasing the temperature lifts, the *PER* (Primary energy ratio) and second law efficiency of the cascaded system reach to the values of these parameters of the compression system. Even at higher values of temperature lifts, that compression system cannot perform, cascaded system operates with higher values of *PER* and second law efficiency compared to those of hybrid compression-absorption system. Advantages of the proposed cascaded system are small value of compression ratio, maximum pressure and exit

Download English Version:

<https://daneshyari.com/en/article/4990820>

Download Persian Version:

<https://daneshyari.com/article/4990820>

[Daneshyari.com](https://daneshyari.com)