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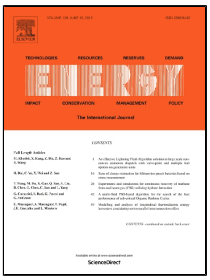

Analysis on maximum internal heat recovery of a mass-coupled two stage ammonia water absorption refrigeration system

S. Du, R.Z. Wang, X. Chen

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S. Du, R.Z. Wang, X. Chen

Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, 800 Dongchuan Road, Shanghai 200240, China

*Corresponding author: R.Z. Wang, Tel: (86-21) 34206548, E-mail: rzwang@sjtu.edu.cn

Abstract: Two stage ammonia-water absorption refrigeration system is applicable for low driving temperature heat source and large temperature lift applications. However, low system performance weakens its advantages because the large heat dissipation brings unacceptable power consumption. Better internal heat recovery is significantly effective for system performance improvement. This paper presents an analysis on maximum internal heat recovery of a mass-coupled two stage ammonia-water absorption refrigeration system by pinch technology. Two sets of freezing conditions are assumed to carry out the analysis. The minimum system heat input and the relevant heat matching are determined by problem table method and grid method. Moreover, the feasible system configurations with optimal energy target are presented under the set conditions according to the grid diagram. The system performance is calculated directly from the problem table. The key point of the maximum internal heat recovery is the heat matching of the streams in the temperature intervals which are adjacent to the pinch point. Compared to a conventional system, the thermal COP of the derived system can be improved by 14.5% and 34.1% under the studied freezing conditions. The improvement is more effective when there is a temperature overlap between the generation and absorption processes.

Keywords: ammonia-water; two stage absorption refrigeration; mass-coupled; freezing; internal heat recovery