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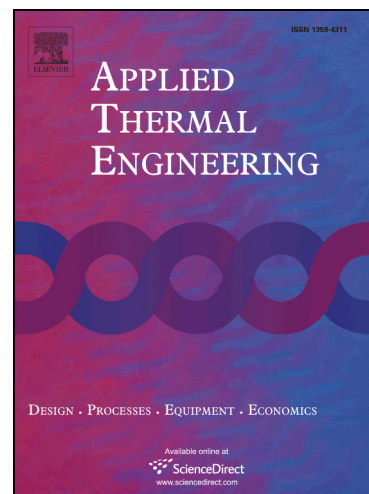
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1 Experimental Study on a Multi-evaporator Refrigeration System with Variable Area  
2 Ratio Ejector

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7 **Abstract:** This paper describes an experimental study on a multi-evaporator refrigeration system  
8 (MERS) with conventional pressure regulating valve (PRV) and variable area ratio ejector. Some key  
9 performance indicators such as cooling capacity, power consumption and ejector entrainment ratio  
10 were evaluated by switching operating modes, adjusting superheat and tuning ejector spindle and so on.  
11 The results indicated that: 1) the energy efficiency of the MERS can be improved by up to 12% by  
12 replacing the conventional pressure regulating valve with the variable area ratio ejector, 2) sufficient  
13 superheat or superheat degree greater than 2°C is conducive to high entrainment performance of the  
14 ejector, large cooling capacity of the low-temperature evaporator and low power consumption of the  
15 system, and 3) the effect of nozzle spindle position on the performance of the system is evident.

16 **Keywords:** Multi-evaporator refrigeration system; Variable area ratio ejector; Spindle; Cooling  
17 capacity allocation; Power consumption; Entrainment ratio

18 **1. Introduction**

19 The term of *refrigeration* can be defined as a process that removes heat to cool  
20 articles or substances down to, and maintain them at a temperature lower than the  
21 ambient temperature. It has many applications including but not limited to: air  
22 conditioning, household refrigerators and industrial freezers. In the present society,  
23 refrigeration has become one of the most energy-intensive sectors. Estimates are

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