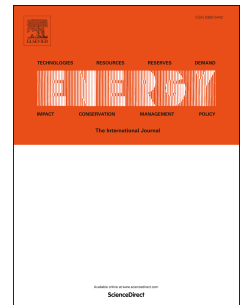


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The impact of internal ejector working characteristics and geometry on the performance of a refrigeration cycle

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Abstract

Improvement of the refrigeration cycle performance and the proper design of ejectors for compression energy recovery require a detailed analysis on the internal ejector working characteristics and geometry. To this aim, an experimental and numerical investigation of an ejector refrigeration system (ERS) is conducted to determine the effect of the most important ejector dimensions and main operating conditions on ejector working characteristics and cycle performance. Experimental results show that the best performance of the ejector and consequently the refrigeration cycle were achieved for the maximum pressure ratio at the critical condenser temperature point. At this condition, ejector internal exergy losses are minimal according to the carried out numerical studies. Furthermore, it has been found that the primary nozzle diameter is the most influential factor for ejector performance and pressure ratio improvement. Results show that an increase in the primary diameter leads to the double improvement of the overall ejector efficiency. In addition, it has been found that most of the exergy losses inside the ejector are located in three regions, respectively: the constant area mixing section, the mixing chamber and the primary nozzle.

Keywords: Ejector Refrigeration cycle; Pressure ratio; Experimental study; Numerical simulation; Internal exergy losses

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