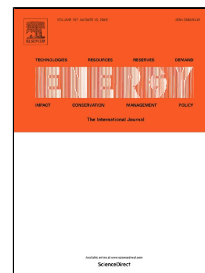


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Comparative performance evaluation of conventional and condenser outlet split ejector-based domestic refrigerator-freezers using R600a

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1 **Comparative performance evaluation of conventional and condenser outlet**
2 **split ejector-based domestic refrigerator-freezers using R600a**

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7 **ABSTRACT**

8 The objective of this study is to investigate the performance characteristics of an R600a domestic
9 refrigerator-freezer (RF) adopting a condenser outlet split (COS) ejector cycle. Experiments are
10 conducted to measure the performances of conventional and COS ejector-based domestic RFs using
11 R600a. A test bench is used to analyze the pressure lifting effect, mass flow rate variation, and
12 coefficient of performance (COP) improvement with respect to the entrainment ratio (ER). For entire
13 cycle operation at similar cooling capacity condition, the overall COP improvement of the test bench
14 adopting COS ejector cycle over the baseline cycle is 11.4% at the ER of 0.18. Moreover, the COS
15 ejector-based domestic RF is tested to examine its feasibility in actual applications. The COS ejector-
16 based domestic RF with a compressor speed of 1450 rpm exhibits a temperature profile in the freezer
17 compartment that is similar to that of the baseline domestic RF. At similar cooling capacity condition,
18 the energy consumption of the COS ejector-based domestic RF with the compressor speed of 1450
19 rpm is 10.9% lower than that of the baseline domestic RF, owing to the pressure lifting effect.

20 **Keywords:** Condenser outlet split, Domestic refrigerator-freezer, Ejector, Coefficient of performance
21

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