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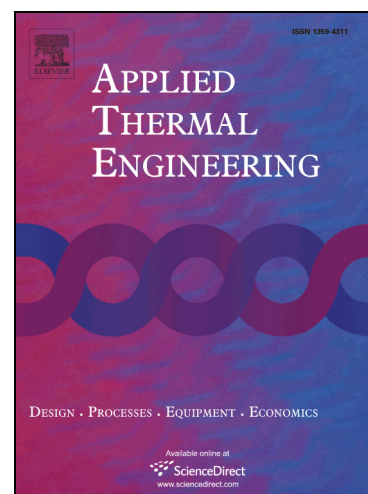
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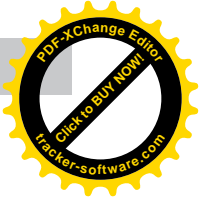
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**Numerical study on the operating performances of a novel frost-free air-source heat pump  
unit using three different types of refrigerant**

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**Abstract**

Air-source heat pump (ASHP) is a promising device using in residential buildings because of its energy-savings. Besides, R134a and R407C as environmental friendly refrigerant have advantage to apply into heat pump system. In this study, an investigation of a novel frost-free ASHP system, integrated with dehumidification and thermal energy storage, working with R134a and R407C as an R22 alternative, was presented. A mathematical model of the system is constructed and verified by comparison with experimental data that shows the measured results are in good accordance with the numerical ones. According to the mathematical model, the dynamic performance of the system is characterized by dehumidification and regeneration efficiency, suction and discharge pressure, COP

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