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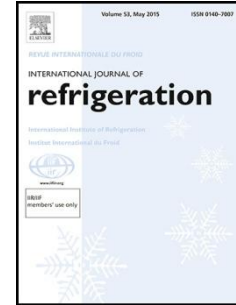
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Experimental assessment of a split air conditioner working with R-417A under different indoor and outdoor conditions

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Research Highlights

- Performance of R-417A in split air conditioner is experimentally investigated.
- R-417A has the same pressure levels, lower discharge temperature as compared with R-22.
- Cooling capacity and COP increase as the indoor air relative humidity increases.
- Compared to R-22, cooling capacity and COP decrease using R-417A.

Abstract

The present paper aims to evaluate the performance characteristics of a split air conditioner working with R-417A under different indoor and outdoor operating conditions. A test facility was constructed and experiments were carried out to achieve the research objectives. The indoor conditions were varied in a wide range of air temperature (21 to 31.4°C), air relative humidity (40.3 to 61.9%) and air velocity (2.8 to 4.7 m s⁻¹) while the outdoor conditions were changed in range of air temperature (35 to 51.2°C) and air relative humidity (40.8 to 81.2%). Experimental results showed that the increase in the indoor air temperature causes an enhancement in the system coefficient of performance by about 59.7%, while increasing the outdoor air temperature decreases the system coefficient of performance by about 51.6%. The system cooling capacity using R-417A was lower than that of R-22 by about 33.2% at indoor air temperature of 24.5°C.

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