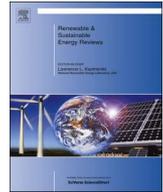


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## Potential of nanorefrigerant and nanolubricant on energy saving in refrigeration system – A review



W.H. Azmi<sup>a,b,\*</sup>, M.Z. Sharif<sup>a</sup>, T.M. Yusof<sup>a,b</sup>, Rizalman Mamat<sup>a,b</sup>, A.A.M. Redhwan<sup>a,c</sup>

<sup>a</sup> Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

<sup>b</sup> Automotive Engineering Centre, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

<sup>c</sup> Faculty of Manufacturing Engineering Technology, TATI University College, 24000 Kemaman, Terengganu, Malaysia

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### ABSTRACT

Refrigeration system is one of the biggest reason of the expanding pattern of energy consumption, thus, energy saving is one of the best approach to overcome this issue. Nanofluids show extraordinary potential in upgrading the thermodynamic and mechanical performance of the refrigeration system. In the refrigeration system, the effort to improve the efficiency of the system is by introducing nanoparticles in refrigerant (nanorefrigerant) and in lubricant (nanolubricant). In this paper, a comprehensive review is carried out to investigate the impact of nanorefrigerant and nanolubricant on energy saving. The overview consists of properties enhancement of nanorefrigerant and nanolubricant, tribological performance, heat transfer enhancement, performance in heat exchanger, improvement in refrigeration system and pressure drop characteristic. The previous results showed that the best energy saving with 21% less energy used was with the use of 0.5% volume ZnO-R152a refrigerant nanolubricant. Both the suction pressure and discharge pressure were brought down by 10.5% when nanorefrigerant was utilized. The evaporator temperature was lessened by 6% with the utilization of nanorefrigerant. The replacement of R134a with R152a gives a green and clean environment, with zero ozone depleting potential (ODP) and less global warming potential (GWP). The performance of refrigeration system was significantly enhanced.