

## **Cooling Performance of Alternative Refrigerant R429a in Domestic Water Purifiers**

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In this study, the cooling performance of R429A is examined both numerically and experimentally in an effort to replace HFC134a used in the refrigeration system of domestic water purifiers. Even though HFC134a is used predominantly in such systems these days, it needs to be phased out in the near future in Europe and most of the developed countries due to its high global warming potential. To solve this problem, cycle simulation and experimental measurements are carried out with a new refrigerant mixture of 10%R152a/60%RE170/30%R600a using actual domestic water purifiers. This mixture is numbered and recently listed as R429A by ASHRAE. Test results show that the system performance with R429A is greatly influenced by the amount of charge due to the small internal volume of the refrigeration system of the domestic water purifiers. With the optimum amount of charge of 21 grams, about 50% of HFC134a, the energy consumption of R429A is 28.9% lower than that of HFC134a. The compressor discharge temperature of R429A is 13.4°C lower than that of HFC134a at the optimum charge. Overall, R429A, a new long term environmentally safe refrigerant, is a good alternative for HFC134a requiring little change in the refrigeration system of the domestic water purifiers.