

Experimental Investigation of R600a as a Retrofit for R134a in a Household Refrigerator

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Abstract : This paper presents an experimental study of R600a, environment-friendly refrigerants with low global warming potential (GWP), zero ozone depletion potential (ODP), as a substitute for R134a in domestic refrigerator. A refrigerator designed to work with R134a was used for this experiment, the capillary for this experiment was not varied at anytime during the experiment. 40, 60, 80g, charge of R600a were tested against 100 g of R134a under the designed capillary length of the refrigerator, and the performance using R600a was evaluated and compared with its performance when R134a was used. The results obtained showed that the design temperature and pull-down time set by International Standard Organisation (ISO) for small refrigerator was achieved using both 80g of R600a and 100g of R134a but R134a has earlier pulled down time than using R600a. The average coefficient of performance (COP) obtained using R600a is 17.7% higher than that of R134a while the average power consumption is 42.5 % lower than R134a, which shows that R600a can be used as replacement for R134a in domestic refrigerator without necessarily need to modified the capillary.

Keywords : domestic refrigerator, experimental, R600a, R134a

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