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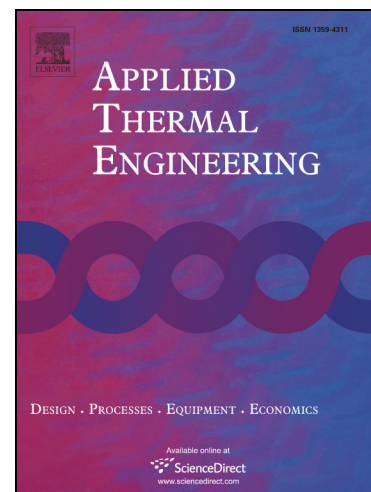
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**HFOs and their binary mixtures with HFC134a working as drop-in refrigerant in a household refrigerator: energy analysis and environmental impact assessment**

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**Abstract**

Global warming is a worldwide common theme. Due to the Regulation (EU) no. 517/2014, refrigerants with a GWP (Global Warming Potential) higher than 150 are not allowed from January 1<sup>st</sup>, 2015 in new domestic refrigerators. Thus, a replacement for HFC134a is needed. In this paper attention is devoted to the drop-in substitution of HFC134a with HFO refrigerant fluids in a domestic refrigerator. An experimental evaluation of the environmental impact in term of the greenhouse effect of the substitution of HFC134a with HFOs has been reported. The greenhouse effect is accounted for the experimental evaluation of the LCCP (Life Cycle Climate Performance) index. The refrigerant fluids that have been tested as a drop-in are: pure HFO1234yf, the mixture HFO1234yf/HFC134a (90/10 % in weight), pure HFO1234ze (E) and the mixture HFO1234ze (E)/HFC134a (90/10 % in weight). The plant working with pure HFOs or with both mixtures achieves the same temperature levels of HFC134a in the freezer and the refrigerator cabinet. The experimental results clearly show that the lower environmental impact in term of global warming can be achieved with both mixtures. The lower LCCP index can be obtained with HFC134a/HFO1234yf (with a 17 % reduction respect to HFC134a).

**Keywords:** HFC134a, HFO1234ze (E), HFO1234yf, Binary Mixtures, Drop-in Refrigerants, Domestic Refrigerator, LCCP

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