

Thermal Conductivity and Diffusivity of Alternative Refrigerants as Retrofit for Freon 12

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Abstract : The negative impact on the atmosphere, of chlorofluorocarbon refrigerants (CFC) radical changes and measures were put in place to replace them. This has led to search for alternative refrigerants over the past decades. This paper presents thermal conductivity, diffusivity and performance of two alternative refrigerants as replacement to R12, which has been a versatile refrigerant which had turned the refrigeration industries around for decades, but one of the offensive refrigerants. The new refrigerants were coded RA1 (50%R600a/50%R134a;) and RA2 (70%R600a/30%R134a). The diffusivities for RA1 and RA2 were estimated to be, 2.76384×10^{-8} m²/s and 2.74386×10^{-8} m²/s respectively, while that of R12 under the same experimental condition is 2.43772×10^{-8} m²/s. The performances of the two refrigerants in a refrigerator initially designed for R12, were very close to that of R12. Other thermodynamic parameters showed that R12 can be replaced with both RA1 and RA2.

Keywords : alternative refrigerants, conductivity, diffusivity, performance, refrigerants

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