

High Pressure Density and Speed of Sound for the Binary System HFE 7100 + N-Heptane

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Hydrofluoroether fluids (HFEs) are being used as third generation alternatives to replace CFCs (chlorofluorocarbons), HCFCs (hydrochlorofluorocarbons), and PFCs (perfluorocarbons) because of their nearly zero ozone depletion, relatively low global warming potential, and short atmospheric lifetimes [1]. A variety of HFEs have been synthesized; their performance and environmental properties and hence their utility can vary widely [2]. Methyl nonafluorobutyl ether or 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxybutane, also known as HFE-7100, consists of two inseparable isomers with essentially identical properties [2]. It is a nonflammable fluid with very low global warming potential. Its boiling point and low surface tension make it ideal for use as a cleaning solvent, low temperature heat transfer fluid, refrigerant, lubricant carrier, etc. Experimental densities at high pressure and high temperature, and speed of sound at atmospheric pressure for the binary system HFE 7100 + n-heptane have been measured between 293.15 K and 393.15 K, and up to 140 MPa. The excess molar volumes and the deviations of the isentropic compressibility upon mixing have been correlated by the Redlich-Kister polynomial. No data were found in the literature for this binary mixture.

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References:

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[2] https://www.3m.com/3M/en_US/company-us/all-3m-products/~/All-3M-Products/Novec/Novec-Engineered-Fluids/?N=5002385+8711017+8717595+8736412+3294857497&rt=r3 (last visit 10/11/2017)