

Experimental Study of Thermodynamic Properties of R245fa

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The wide use of refrigerant R245fa (1,1,1,3,3-pentafluoropropane) is restrained, due to a lack of consistent data on its thermophysical properties. This paper reviews thermophysical data for R245fa available from different sources, and it is concluded that the most crucial inconsistency is between data reported by different researchers for the phase equilibrium and PVT measurements. In order to provide accurate data on fundamental properties of R245fa, the vapor-liquid equilibrium parameters and PVT surface over a wide range of parameters from 242 to 437 K and at pressures up to 9 MPa were measured by the authors. The obtained information, along with other reliable and verified data on thermodynamic properties of R245fa, was fitted with appropriate property correlation models. Independent measurements of speed of sound in the liquid phase over the temperature range 295 to 355 K and at pressures up to 7 MPa were also conducted, in order to improve the generalization and achieve better consistency between different thermodynamic data. The results of this study will allow for the significant improvement of reference data of the basic properties of R245fa, such as the parameters of liquid-vapor phase transition and volumetric behavior, and contribute to the design of effective refrigeration machinery.