

**Thermodynamic Properties of 1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone (C6F12O) and Methyl-heptafluoropropyl-ether (RE347mcc): Gaseous Speed of Sound and Equations of State**

Mark McLinden<sup>C, S</sup>, Richard Perkins and Eric Lemmon

*National Institute of Standards and Technology, Thermophysical Properties Division, Boulder, CO, U.S.A.*

*markm@boulder.nist.gov*

We present measurements of the speed of sound in gaseous 1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)-3-pentanone (C6F12O, a fluorinated ketone) and methyl-heptafluoropropyl-ether (C4H3F7O, also known as RE347mcc) over the temperature range of 320 K to 500 K. A spherical acoustic resonator was employed. The sound speed data were used to determine the ideal-gas heat capacity of these fluids. These data, together with the available literature data, were used to develop equations of state written in terms of the Helmholtz energy. The literature data (vapor pressure, density, and liquid speed of sound) were limited, and the equation of state was optimized by the use of thermodynamic constraints on the fit. These fluids are of interest as working fluids in organic Rankine power cycles.