Speed of Sound and Density of 1-Chloro-3,3,3-Trifluoropropene (R-1233zd (E))

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The speed of sound and density of a new working fluid, 1-chloro-3,3,3-trifluoropropene (R-1233zd (E)), which is a promising working fluid in the field of low-grade heat recovery, are measured. The measurement was conducted at the temperature from 270 K to 390 K while the pressure up to 5 MPa. Before measurement, the platinum resistance and pressure transducer are calibrated to the accuracy of ±0.05 K and ±1 kPa, respectively. In order to validate the apparatus, the speed of sound and density of R134a was also measured. The results of validation experiment were compared with those calculated from REFPROP. The sonic speed sensor and density sensor has the accuracy of 0.1 m/s and 1 x 10-4 g/cm3, respectively. The measurement results will be used in verifying consistency of developed equation of state.