

# Measurement and Correlation of the Liquid Density and Viscosity of HFO-1336mzz(Z) (*cis*-1,1,1,4,4,4-hexafluoro-2-butene) at High Pressure

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Hydrofluoroolefins (HFOs) are considered as the new generation of refrigerants and working fluids because of their zero ozone depletion potential (ODP) and low Global Warming Potential (GWP). Thermophysical properties and technical applications of fluorinated propylenes including HFO-1234yf or HFO-1234ze(E) have attracted much attention. HFO-1336mzz(Z) (*cis*-1,1,1,4,4,4-hexafluoro-2-butene, *cis*-CF<sub>3</sub>CH=CHCF<sub>3</sub>, CAS No. 692-49-9), also known as DR-2, was recently discussed as a potential working fluid for various applications, including air conditioning chillers, high temperature heat pumps, and Organic Rankine Cycles [1]. HFO-1336mzz(Z) is nonflammable with chemical and thermal stability at high temperatures. The thermophysical properties of HFO-1336mzz(Z) such as *ppT*, vapor pressure, density along saturation line, and critical parameters have been reported [2]. However, available information on the density and viscosity at high pressures is very limited. In this work, the density and viscosity of HFO-1336mzz(E) for the compressed liquid phase were measured. Measurement of the density was carried out by a vibrating-tube densimeter over the temperature range of (283 to 373) K and at pressures up to 100 MPa. The viscosity was measured at temperatures from 253 to 373 K and pressures up to 100 MPa using two vibrating-wire viscometers according to different temperature ranges. The combined expanded uncertainty with a confidence level of 0.95 (*k* = 2) of the reported density and viscosity data was 0.2 % and 2 %, respectively. The experimental data were used to develop the correlations of density and viscosity over wide temperature and pressure ranges.

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## References

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