Density and Viscosity of Reference Fluids Diisodecylphthalate and S20 Over a Wide Range of Temperature and Pressure

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Reference materials for viscosity are available from National Standards Laboratories and from a variety of commercial sources and are supplied with certified densities and viscosities at discrete temperatures between 293 K and 373 K and at atmospheric pressure. Some suppliers will also provide equations for the viscosity as a function of temperatures. The chemical compositions of these reference materials are not specified and because of their chemical composition, changes in composition and oxidation can occur, so the certification is only valid within a specific time period. National Laboratories and the International Association of Transport Properties have initiated a project to study thoroughly a commercially available material, diisodecylphthalate (DIDP), that has moderately high viscosity (100 mPa s at 298 K), as a possible reference standard. The temperature range and pressure range studied in the work so far is limited.

Here we report viscosity and density data for this compound as well as the commercially available reference material S20 (viscosity approximately 30 mPa s at 298 K) at temperatures from 293 K to 423 K at pressures to 70 MPa. The viscosity was measured with a vibrating wire viscometer while the density was measured with a vibrating tube densimeter. The results at a pressure of 0.1 MPa will be compared with the extensive literature data on samples from different commercial sources.