

Viscosity of Dense Fluids



The physical properties of fluids are perhaps among the most extensively investigated physical constants of any single group of materials. This is particularly true of the thermodynamic properties of pure substances since the condition of thermodynamic equilibrium provides the simplest considerations for experimental measurement as well as theoretical treatment. In the case of non equilibrium transport properties, the situation is significantly complicated by the necessity of measurement of gradients in the experiment and the mathematical difficulties in handling non equilibrium distribution functions in theoretical treatments. Hence, our knowledge of the transport properties of gases and liquids is perhaps one order of magnitude lower than for equilibrium thermodynamic properties. This situation is very much apparent when examining the available numerical data on the viscosity of fluids particularly at high pressures. In this work, the authors have performed an outstanding contribution to the engineering literature by their critical evaluation of the pressure dependence of the available data on the viscosity of selected substances. The recommended values reported in the tables and figures also incorporate the saturated liquid and gas states as well as the data of the dilute gas in an attempt to integrate the present work with the recently published work by CINDAS/Purdue University on the viscosity of fluids at low pressures [166]. A deliberate effort was made to treat as many of the substances in the CINDAS volume as possible for which adequate high pressure data exist.

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