Reference Correlations for the Viscosity and Thermal Conductivity of Ammonia from the Triple Point to 750 K and up to 50 MPa

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This paper presents new wide-ranging correlations for the viscosity and thermal conductivity of ammonia based on critically evaluated experimental data. The equations are based in part upon a body of experimental data that have been critically assessed for internal consistency and for agreement with theory whenever possible. In the case of the viscosity of ammonia, a reference correlation was developed by Fenghour at al. [1] in 1995. However, a new equation of state [2], and measurements performed after 1995, allow us to develop a better correlation. In the case of the thermal conductivity, the reference correlation was developed by Tufeu et al. [3] in 1984. As already mentioned, the development of a new equation of state, recent measurements but also advances in the theory in the critical region, allow us to develop also in this case a new reference correlation.

References:

[1] A. Fenghour, W. A. Wakeham, V. Vesovic, J. T. R. Watson, J. Millat, E. Vogel, and J. P. C. R. D., "The Viscosity of Ammonia", J. Phys. Chem. Ref. Data 24, 1649 (1995).

[2] Gao, K., Wu, J., Bell, I.H., and Lemmon, E.W., "An equation of state for the thermodynamic properties of ammonia", to be submitted to J. Phys. Chem. Ref. Data, 2018.

[3] R. Tufeu, D. Y. Ivanov, Y. Garrabos, and B. Le Neindre, "Thermal Conductivity of Ammonia in a Large Temperature and Pressure Range including the Critical Region", Ber. Bunsenges. Phys. Chem. 88, 422 (1984)