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Thermophysical properties of pure polar and nonpolar compounds with a modified VdW-711 equation of state

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Abstract

A modification of the VdW-711 Equation of State (EoS), applicable to nonpolar and polar compounds is presented that provides: (i)excellent description of vapor pressures from the triple point to the critical; (ii)very good prediction of saturated liquid and vapor volumes in the same range; (iii)extrapolation of high P′ values to lower ones with declining, however, accuracy as the triple point is approached; (iv)reasonably accurate values of vapor volumes in the superheated subcritical region and at high T_r values with - the typical for cubic EoS - poor results at T_r equal to or just over one; and (v)good predictions of enthalpy and entropy departures and excellent ones of enthalpies of vaporization. Values for the necessary parameters for a large number of compounds are also presented.

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