A New Fundamental Equation of State for *cis*-1-Chloro-2,3,3,3-tetrafluoropropene [R1224yd(Z)]

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A new fundamental equation of state is presented for cis-1-chloro-2,3,3,3-tetrafluoropropene [R1224yd(Z)]. The first equation published in 2017 was an interim model based on limited experimental data, and it has been sometimes less accurate particularly in calculations of the vapor pressures at temperatures below 300 K and of the isobaric heat capacities of the liquid phase. Recently additional experimental data obtained with higher purity samples have become available for the vapor pressure, liquid density, and liquid-phase sound speeds. The amount of these data was sufficient to update the first equation. More sophisticated and highly optimized fitting techniques were employed in this work, and two novel terms were introduced to the exponential terms so that the equation exhibits very reasonable extrapolation behavior at extremely low and high temperatures and at high pressures. The new equation is valid at temperatures from the triple point (157.8 K) to 473 K and pressures up to 35 MPa. All the selected experimental data in this range are represented within their uncertainties. Typical deviations in calculated properties compared to experimental values are 0.03% for the vapor pressures, 0.05% for the liquid densities including those at saturation, 0.3% for the vapor densities, 0.03% for the vapor-phase sound speeds, and 0.03% for the liquid-phase sound speeds. Since the sound speeds are calculated accurately, it is also expected that the heat capacities are estimated with acceptable accuracies.