The determination of the critical parameters of several metals by means of their relation with the Zeno – line parameters.

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The critical parameters of several metals were determined on the basis of the low temperature binodal measurements and their connection with the line of unit compressibility factor. (Below this line is referred as to Zeno – line, $Z = P/\rho T = 1$ is the compressibility factor, P is the pressure, T is the temperature, ρ - is the particle density.) For a wide class of substances this line is the straight line in the density – temperature plane. Zeno – line is also the tangent line to the liquid branch of binodal at $T \to 0$ in this plane. These facts allow us to construct general expression for the coexistence curve liquid – vapor (liquid branch), which is transformed into the Zeno – line at low temperatures. This expression depends on the four parameters, which were determined by the condition of minimum deviation of calculated and experimental binodals. The analysis of a large number of experimental data for non-metallic substances (Ar, Ne, CO_2, O_2, CH_4 and others) and metals (Hg, alkali metals) with known critical parameters and coexistence curves have shown good agreement between calculated and measured binodals. At that time we find that two factors are weakly dependent on the substance sort. These factors are $\rho_c/\rho_B + T_c/T_B$ and $(\rho_c T_c - P_c)/\rho_B T_B$, where subscript "c" refers to the critical point parameters, subscript "B" refers to the Zeno=line parameters. Thus, these factors can be considered as the correspondence relations. Another classification parameter is the compressibility factor at the critical point. It defines the binodal opening. The less this factor is, the more the binodal opening is. We showed that the compressibility factor at the critical point for classical substances $Z_c \le 0.32$. Hg and quantum substances (H_2, He^4, He^3) belong to another group where $Z_c \ge 0.37$. At this time the binodal opening for quantum liquids is defined by effective compressibility factor $Z^* = Z_c(1 + aB)$, where a is some constant, B is the de Boer parameter. We applied the technique in hand to found the critical parameters of several metals (Al, Cu, W, U и Zr), located at high temperatures inaccessible for measurements. Our critical parameters were compared with estimates of other researchers.