# The conditions of thermodynamic equilibrium of one-component substance at the critical point of the liquid-gas equilibrium

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*Modeling Laboratory. Kutateladze Institute of Thermophysics of SB of RAS. Pr. Lavrenteva, 1. Novosibirsk, 630090. Russia. Phone: +7 (383) 354-20-17. E-mail: tepliza@academ.org*

## Abstract

It is shown that the to zero of the value of second partial derivative of the pressure on the volume at the critical point is the consequence of equality of chemical potentials of liquid and gas of one-component substance being in the thermodynamic equilibrium with each other. It is shown that the equality to zero of the values of first and second partial derivatives of the pressure on the volume at the critical point are the conditions of thermodynamic equilibrium of the state of the one-component substance at the critical point. It is proved that the negative value of the first nonzero odd-order partial derivative of pressure on the volume at the critical point with order greater than two is the condition of thermodynamic stability of the substance at the critical point.