# Isochoric Heat Capacity of Fluid in the Two-Phase Region

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The behavior of the isochoric thermal heat capacity of a one-component thermodynamic system with continuously varying state parameters is analyzed in this work in the two-phase liquid-vapor region. We found that over the entire two-phase liquid-vapor region, the isochoric heat capacity is finite and positive. A well-known equation for the isochoric heat capacity was transformed into a new form: the difference of the partial derivatives of the internal energy with respect to volume at constant temperature and pressure [1]. The indeterminacy of the equation of the isochoric heat capacity of the spinodal is eliminated using the analysis of a function that is equal to the difference of the internal energy at constant temperature and pressure that pass this point on the spinodal. Thus, we have demonstrated that from two criteria for the thermodynamic stability (the mechanic stability – for which the isothermal compressibility would be negative, and the thermal stability – for which the isochoric heat capacity would be positive) the thermal stability criterion is not violated and is valid everywhere on the thermodynamic surface.

[1] Kaplun A.B., Meshalkin A.B. Doklady Physics, 2005, Vol. 50, No 9, p. 434-437.