

APPROXIMATION OF THE THERMODYNAMIC PROPERTIES OF AMMONIA

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Abstract: Ammonia (NH₃) is one of the most important products of the chemical industry widely used for the production of fertilizers, explosives, polymers, etc. The most recent examples of the use of ammonia can be attributed to the use of selective catalytic converters of nitrogen oxides and as a component of liquid rocket fuel named “acetam.” Derived in the paper are the thermal and caloric equations of state (EOS) of ammonia in the single- and two-phase regions of thermodynamic parameters. Thermal EOS of ammonia is presented in the form of two components — the “cold” component, which depends only on the density, and “thermal” component proportional to temperature. This form of EOS is theoretically justified for solids and holds asymptotically for an ideal gas. With respect to the dense gas and liquid, such an EOS is the approximation, the accuracy of which is estimated by comparing the calculations with the available reference data. The EOS are represented by mathematical formulae and are accurate enough for gasdynamic applications.

Keywords: ammonia; thermal equation of state; caloric equation of state; single-phase region; two-phase region

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