

TECHNIQUE OF USE A WIDE-RANGE EQUATION OF STATES IN GASDYNAMIC CALCULATIONS.

A.S.Smetannikov

Institute of Heat and Mass Transfer National Academy of Sciences of Belarus

In many gasdynamic problems connected to research of properties of matter at high thermodynamic parameters (taking into account phase transitions solid state - liquid - vapor etc.) are used wide-range semi-empirical equation of states. The direct application of the equation of states (EOS) in an analytical form for gasdynamic calculations is impossible because of the large expenses of machine time. Therefore usually use results of calculation EOS in a tabulated form $P = P(E_i, R_j)$ for a set of density R_j and энергий E_i . For gasdynamics the important meaning has jump of compressibility at crossing a curve of phase transition (for example on binodal at transition from liquid to liquid - vapor). In this connection, the usual technique of definition of pressure and temperature with the help of tabulated interpolation on density and energy can give incorrect results. For elimination of this error in addition to tabulated EOS the thermodynamic values on a line of phase transition are set and these values are used at interpolation near to it. The given technique was applied at modeling various gasdynamic problems (discharges on the basis of exploding conductors, high-velocity impact etc.) and has shown acceptable accuracy and efficiency.