Equation of state for cold matter at high compression ratios

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Interest in the study of the thermodynamic properties of matter in extreme states at high pressures and compression ratios is due to the need to know the equation of state to solve various fundamental and applied problems of high energy density physics. This paper is devoted to a brief review of known models for describing the dependences of the specific internal energy and pressure of a cold (at zero absolute temperature) substance upon the compression ratio (density divided by the density value at zero pressure). The range of compression ratios up to one million is considered. Examples of calculated dependences for different models are given, including the quantum-statistical Thomas–Fermi model with corrections, in comparison with available experimental data at high pressures.