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A comparison of two new approaches for fast and accurate hydrodynamic simulations of HE detonations OLIVIER HEUZE, CEA/DIF , B.P. 12 , 91680 Bruyeres-le Chatel CEDEX, France, BORIS KHASAINOV, LCD, UPR 9028 CNRS, ENSMA, BP 109, 86960 Futuroscope, France, SERGEY VICTOROV, Moscow Engr. Physics Inst. (State University), Moscow, Russia — The use of the up-to-date theoretical and semi-empirical equations of state (EOS) in modern thermochemical codes allows one to predict the thermodynamic properties of the detonation products of high explosives (HE) very accurately. However, in most cases the direct incorporation of such EOS into hydrocodes is impossible due to too high computer time expanses. In this work, by the example of NM detonation we demonstrate two new approaches to hydrodynamic simulations that make it possible to gather high predictive abilities of modern thermochemical codes and low expanses of computer time. The first approach employs the pre-calculated EOS in table form. This EOS is generated by means of the TDS thermochemical code of Victorov using the up-to-date theoretical EOS for the fluid detonation products based on thermodynamic perturbation theories and intermolecular potentials, and a semi-empirical model for carbon nanoparticles. The second approach uses the CW2 EOS recently suggested by Heuze. It has a compact analytical form and allows for very fast computations so that it may be probably suitable even for 3-D simulations. The CW2 parameters can be determined from TDS calculations. Both approaches are being investigated and compared to each other using the EFAE hydrocode of Khasainov.

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