

Abstract Submitted
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An Improved Temperature-Dependent Specific Heat Model for Unreacted Explosive Equations of State NICHOLAS KERSCHEN, DAVID KITTELL, Sandia National Laboratories — The any Mie-Grüneisen Equation of State (AMEOS) model in CTH was calibrated for four unreacted homogeneous explosives in temperature-volume space: HMX, TATB, PETN, and RDX. AMEOS uses a multi-term Einstein oscillator function to fit the specific heat over a range of temperature values. This model is then used to calculate the Hugoniot temperatures, which are much lower than for a constant specific heat approximation. Moreover, there is limited thermal EOS data which must be extrapolated to the classic Dulong-Petit limit. Mesoscale simulations with Arrhenius burn models require this type of EOS for accurate temperature predictions. The improvements with temperature dependent versus constant specific heats will be presented, in addition to the Einstein oscillator coefficients for the four high explosives considered. Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S .Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

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