Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Modeling a Material's Instantaneous Velocity during Acceleration Driven by a Detonation's Gas-Push Process JOSEPH E. BACKOFEN[1], BRIGS Co. — This paper will describe both the scientific findings and the model developed in order to quantfy a material's instantaneous velocity versus position, time, or the expansion ratio of an explosive's gaseous products while its gas pressure is accelerating the material. The formula derived to represent this gas-push process for the 2nd stage of the BRIGS Two-Step Detonation Propulsion Model was found to fit very well the published experimental data available for twenty explosives. When the formula's two key parameters (the ratio Vinitial / Vfinal and ExpansionRatioFinal) were adjusted slightly from the average values describing closely many explosives to values representing measured data for a particular explosive, the formula's representation of that explosive's gas-push process was improved. The time derivative of the velocity formula representing acceleration and/or pressure compares favorably to Jones-Wilkins-Lee equation-of-state model calculations performed using published JWL parameters.

[1]2668 Petersborough Street, Herndon, VA 20171

Joseph E. Backofen
BRIGS Co.

Date submitted: 17 Jan 2005 Electronic form version 1.4