

Abstract Submitted
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The Velocity of Detonation and Reaction Zone Profile in PBX 9502 as a Function of Initial Density CHRISTOPHER ARMSTRONG, PHILIP RAE, Los Alamos National Laboratory — It is known that PBX 9502 changes sensitivity¹ and performance² as a function of temperature. Presumably, due to void morphologically driven change in density. These experiments will examine both the velocity of detonation (VOD) and reaction zone profile (particle velocity vs. time) as a function of pressed density. The rate sticks are 2 inches in diameter with an aspect ratio of 1:8. The reaction zone profile is characterized by photonic Doppler velocimetry (PDV) at an aluminized lithium fluoride window and VOD is measured by both piezoelectric pins, and time domain reflectometry (TDR). The density range examined is 1.700 - 1.895 g/cc (1.895 is production density). The results obtained are compared to those of in-situ heated rate stick experiments, and the void structure characterized by small-angle neutron scattering (SANS) methods in order to elucidate the differences in detonation performance as influenced by thermal insult and compaction.

¹Shock Initiation of Energetic Materials at Different Initial Temperatures (Review), P. A. Urtiew, & C. M. Tarver. Combustion, Explosion, and Shock Waves, (2005)

²The effect of density on the detonation response of a TATB-based explosive, P.J. Rae, C. L. Armstrong, & E. H. Haroz. International Detonation Symposium, (2018)

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