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Particle Size Effects on the Detonation Velocity of Nitramine Containing Compositions VICTOR BELLITTO, Naval Surface Warfare Center-IHEODTD, MIKHAIL MELNIK, Kennesaw State University, MARY SHERLOCK, JOSEPH CHANG, JOHN OCONNOR, JOSEPH MACKEY, Naval Surface Warfare Center-IHEODTD — Predictive tools are often employed to determine detonation parameters of explosives prior to development. However, thermodynamic-hydrodynamic based theoretical codes seldom take into account particle size as a basis for the computational analysis as they primarily focus on the equation of state of the detonation products, heat of formation and density of the explosive composition. The microstructure effects on the detonation velocity of RDX containing compositions have previously been reported. It was demonstrated that compositions containing smaller average particle sizes of RDX generated higher detonation velocities. The study utilized regression analysis to model the relationship between the microstructure characteristics and detonation velocity of the compositions. The principal characteristics examined were the average particle size, impurity within the explosive particles, method of manufacture, and compositional density. Statistical analysis demonstrated the relevancy of the microstructure influence on the detonation velocity of the experimental compositions. The developed model underscored the significance of the relationship between the average particle size and detonation velocity. In this study, we have continued the investigation to include other nitramines, such as HMX.

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