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Yield Stress Model for Molten Composition B-3 STEPHEN DAVIS, DAVID ZERKLE, Los Alamos National Laboratory — Composition B-3 (Comp B-3) is a melt-castable explosive composed of 60/40 wt% RDX/TNT (hexahydro-1,3,5-trinitro-1,3,5-triazine/2,4,6-trinitrotoluene). During casting operations thermal conditions are controlled which along with the low melting point of TNT and the insensitivity of the mixture to external stimuli leading to safe use. Outside these standard operating conditions a more rigorous model of Comp B-3 rheological properties is necessary to model thermal transport as Comp B-3 evolves from quiescent solid through vaporization/decomposition upon heating. One particular rheological phenomena of interest is Bingham plasticity, where a material behaves as a quiescent solid unless a sufficient load is applied, resulting in fluid flow. In this study falling ball viscometer data is used to model the change in Bingham plastic yield stresses as a function of RDX particle volume fraction; a function of temperature. Results show the yield stress of Comp B-3 (τ_{y}) follows the expression $\tau_y = B\left(\phi - \phi_c\right)^N$, where Φ and Φ_{c} are the volume fraction of RDX and a critical volume fraction, respectively and B and N are experimentally evaluated constants.

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