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Experiment and Reactive-Burn Modeling in the RDX Based Explosive XTX 8004 CARL JOHNSON, MICHAEL MURPHY, RICHARD GUSTAVSEN, Los Alamos National Laboratory — XTX 8004 consists of 80 wt. % cyclotrimethylenetrinitramine (RDX), and 20 wt. % Sylgard 182, a silicone rubber used as a binder. Nominal density is 1.5 g/cm^3. We conducted four gas-gun driven plate-impact experiments that were instrumented with embedded electromagnetic particle velocity gauges. These provided wave profiles to which we calibrated an Ignition and Growth reactive burn model in ALE3D. A reactant Hugoniot and Pop-plot parameters were also extracted from the data and model calibration. Initiation of XTX 8004 in divergent flow was studied using SWIFT and photonic Doppler velocimetry (PDV). We used a gap test geometry in which the donor and acceptor charges consisted of cylinders of XTX 8004 nominally 4.65 mm in diameter by 15 mm long. Acceptor and donor were extruded into polymethylmethacrylate (PMMA) blocks and separated by a brass attenuator plate. Detonation and re-initiation (or failure) in the XTX 8004 was recorded using multiple SWIFT images of the position of the shock front in the PMMA. Input to the acceptor charge was estimated from PDV measurements of the free surface velocity of the attenuator plate, and output of the acceptor charge was also measured using PDV. Parameterization of Ignition & Growth to 1-D vs. 2-D experiments will be discussed.

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