Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Evaluating Mixing Length Scale using Coaxial Explosive Composites MICHAEL GRAPES, BRADLEY WHITE, KEO SPRINGER, DENIS RICHARD, ROBERT REEVES, Lawrence Livermore National Lab — Blends of explosive formulations with different characteristics may provide the means for a formulator to balance safety and performance; however, the level of mixing necessary to treat the materials as a single, homogeneous material is not known. To evaluate the intimacy of mixing necessary to propagate a homogenous detonation front in mixtures of an HMX-based formulation and a TATB-based formulation, binary periodic composites of the two explosive formulations have been fabricated and tested. The composites consist of alternating cylindrical shells of the formulations, arranged coaxially and with the overall materials ratio set to 50/50 by volume. To evaluate the importance of mixing, five different periodicity wavelengths were tested, ranging from 12.7 mm to 2.54 mm. Initial results from detonation velocity and front curvature experiments on these articles will be presented, with conclusions drawn regarding their implications for a critical mixing length in the context of the estimated reaction zone sizes for these formulations. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. LLNL-ABS-768210

Michael Grapes
Lawrence Livermore National Lab

Date submitted: 25 Feb 2019 Electronic form version 1.4