Abstract Submitted
for the SHOCK19 Meeting of
The American Physical Society

Extension of the window correction for Kel-F 800: a near-impedance matched window for high explosives LLOYD GIBSON, DANA DATTELBAUM, JOHN LANG, JUSTIN JONES, ANDREW HOULTON, BRIAN BARTRAM, Los Alamos National Laboratory — The chemical reaction zone (CRZ) of detonating explosives is defined by the leading, inert shock front, which compresses the explosive to the von Neumann (vN) spike condition on the unreacted Hugoniot, and the Chapman-Jouget (CJ) sonic locus condition according to the Zel'dovich/von Neumann/Doering (ZND) 1-dimensional theory of detonation. The CRZ is often measured using optical velocimetry techniques at a windowed interface; the window affects the reaction zone dynamics due to wave interactions at the interface. Fluoropolymer windows are attractive as they provide a near-impedance match to most common explosives, with initial densities ρ >2.0 g/cm^3. Poly(chlorotrifluoroethylene-*co*-vinylidene fluoride) (Kel-F 800, Lot 30013) was purchased from 3M, Inc. St. Paul, Minnesota. Small (150 mm150 mm50mm) billets were prepared by compression molding (Afton Plastics) the polymer at 90 °C and ˜50,000 psi. This method resulted in a semi-transparent, golden-colored billet from which window samples were machined, and polished to an optical clarity for experiments. To extend the window correction for Kel-F 800 (see D. M. Dattelbaum *et al.* Proceedings of the 14$^{\text{th}}$ International Detonation Symposium), a series of symmetric gas gun driven plate impact experiments were performed using both VISAR (532 nm) and PDV (1550 nm) velocimetry methods to extend the window correction to a larger range of initial shocked pressures and densities.

Lloyd GIbson
Los Alamos National Laboratory

Date submitted: 27 Feb 2019 Electronic form version 1.4