

Abstract Submitted
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One-Dimensional Thermal Violence Cook-Off Test. MALCOLM COOK, AWE plc, CHRISTOPHER STENNETT, Cranfield University, UNIVERSITY OF CRANFIELD, SHRIVENHAM, SWINDON, SN6 8LA TEAM, AWE PLC, ALDERMASTON, READING BERSHIRE, RG7 4PR, UK TEAM — The One-Dimensional Thermal Violence (ODTV) test is designed to quantify and rank the violence of HE charges when heated to elevated temperatures. The test design consists of a central spherical explosive pellet encased in two aluminium barrel shaped halves, fitted with a copper sealing ring, encased by two aluminium locking rings placed over them from either end. The outer surface of the capsule is heated uniformly by placing in a pre-heated molten solder bath. This allows the time-to-explosion to be recorded for different initial bath temperatures. The ODTV capsule can hold samples up to 30mm in diameter. Diagnostics include both thermocouples and Photon Doppler Velocimetry (PDV). A series of live firings have been carried out on a range of bespoke HMX/HTPB explosives. These include HMX/HTPB mix ratios of 95/5, 92/8, 90/10, 88/12 and 85/15. These tests showed that the ODTV capsule had sufficient confinement and size that it could capture the spectrum of events expected from these formulations. It has been demonstrated that the deformation of the heater cup (that houses the molten solder) can be used as an additional violence metric along with the fragmentation and PDV wall velocities of the aluminium ODTV capsule.

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