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Live Decomposition Imaging of HMX/HTPB Based Formulations During Cook-Off in the Dual Window Test Vehicle. NATHAN WHITE, TOM REEVES, PHIL CHEESE, DE&S, MoD Abbey Wood, Bristol, UK, BS34 8JH, CHRISTOPHER STENNETT, Cranfield University Dept. of Engineering and Applied Science, Defence Academy of the United Kingdom, Shrivenham, Swindon, SN6 8LA, ANDREW WOOD, MALCOLM COOK, Syanco Ltd, PO Box 411, West Malling, Kent, ME6 9EZ, UK, SYANCO LTD TEAM, CRANFIELD UNIVERSITY TEAM, DE&S, MOD ABBEY WOOD TEAM — Thin, cylindrical samples of HMX/HTPB formulations with solids loadings from 85-95% by mass have been heated at 1oC/minute until a reaction occurred in the new dual window cook-off test vehicle. The test vehicle has captured the response of these formulations, and shown the influence of variables such as confinement, heating rate and sample size. Live imaging of the heated samples revealed that as with pure nitramine samples, three distinct stages of change take place during heating; phase changes, melting and slow, flameless decomposition with production of gaseous intermediates and finally burning with a luminous flame of the gaseous intermediates. In addition, the binder appears to undergo decomposition before the HMX, darkening along the edge closest to the thermal input before the HMX melts. Prior to violent reaction, flame speeds were measured at approximately 30m/s for high confinement, which reduces by 2-3 orders of magnitude when confinement is lowered. The melting point of HMX has been observed below the widely reported value at 220oC, and requires further investigation.

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