

## HIGH PERFORMANCE IM COMPLIANT ARTILLERY PROJECTILES WITH ENHANCED THROUGH LIFE SURVIVABILITY

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BAE SYSTEMS Land Systems is developing a range of IM compliant artillery projectile natures to meet the requirements of the UK MOD's mandatory Insensitive Munitions policy. These ammunition natures utilise a suite of generic technologies which include a castable-curable main charge PBX (ROWANEX 1100) filling, a reduced vulnerability booster explosive (ROWANEX 3601) and a patented liner system. In hazard assessment trials the PBX filled rounds exhibit low order responses and have demonstrated an inability to support deflagration to detonation transition (DDT). In terms of lethality the PBX filled projectiles have been designed to at least match the performance of conventional rounds filled with Composition B (RDX/TNT 60/40). The rubbery mechanical properties of the castable PBX coupled with the unique liner system also impart enhanced environmental survivability compared with traditional, brittle, TNT-based explosives. In addition to worldwide deployability these attributes offer opportunities for reduced levels of surveillance and prolonged service life with concomitant reduction in through life costs. So as to bring PBX filling costs in line with those for conventional ammunition the Company has also invested in advanced high throughput filling processes.

This paper describes programmes of work undertaken to evaluate the effects of accelerated ageing and environmental testing on a range of projectile natures which comprise 105mm, 4.5" and 155mm calibres. The status of the PBX fillings was monitored using such techniques as radiography and visual inspection in association with sectioning, chemical analysis and assessment of hazard and mechanical properties. On conclusion of the ageing trials shell were gun-fired to demonstrate robustness to high-g launch. The trials have shown that, with an appropriate munition design, explosive filling quality can be maintained after an accelerated ageing programme equivalent to a significant service life. The performance and ageing characteristics of ROWANEX 1100 are also discussed making reference to the qualification programme conducted to secure STANAG 4170 certification.