

## Colorimetric Reconnaissance Explosives Squad Screening (CRESS) Kit

Tasked by the Army Technology Objective (ATO) for the Detection of Unknown Bulk Explosives to develop a screening kit for specific homemade explosives HME fuels and oxidizers, the Innovative Development Engineering Acquisition (IDEA) Team at ECBC created the CRESS Kit through an advanced rapid prototyping process in cooperation with the Advanced Design & Manufacturing (ADM) Division. The CRESS kit features an innovative form factor combined with proven colorimetric chemistry that enables soldiers to easily and safely sample bulk solids and screen for materials used in HME in-theater.

**Abilities.** Kit can distinguish between urea (safe fertilizer) and urea nitrate (powerful HME). When paired with acid screening ability, kit reveals production of urea nitrate from urea. Also allows for screening of dangerous oxidizer chemicals used in HME production (perchlorate, nitrate) and for screening of ammonium nitrate with dual reactions.

**Tiered Concept.** With the CRESS Kit, the MOS immaterial Soldier can screen bulk material discovered in chance encounters or planned searches for HME making materials. Any positive result for dangerous material can cue a higher tier of increased capability, but less density, in theater. Thus, the CRESS Kit fits into a strategy of tiered assets in an enduring force structure for the U.S. Army.

**Accomplishments.** A Military Utility Assessment (MUA) was completed at Fort Leonard Wood in June 2011, which concluded that the kit successfully enabled Soldiers to rapidly screen samples presented to them with a high degree of accuracy and confidence, with minimal training. After feedback and lessons learned from the assessment, the Kit was modified and a second MUA, in February 2012, was successfully completed to obtain Soldier feedback and to demonstrate tactile interface.

**Future Efforts.** Develop additional reagent chemistries to include more HME precursors, classic high explosives, and narcotics; conduct Soldier ensemble compatibility analysis; develop Mod 4 design improvements; conduct system-level performance testing; develop an Android App to digitize data reporting; and support transition to a Program of Record.

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