PROCESS DEVELOPMENT FOR HIGH BLAST PAX EXPLOSIVES AT HOLSTON ARMY AMMUNITION PLANT

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Thermobaric and metal accelerating explosives belong to a class of fuel-rich products that release energy over a longer period of time than conventional explosives formulations. When detonated, thermobaric explosives typically exhibit higher sustained blast pressures and increased lethality in confined spaces such a structures, tunnels and underground facilities. As a result, various Thermobaric explosive formulations, including PAX-3 and PAX-28, have been developed and evaluated in a number of submunition, projectile, and warhead systems. Additional formulations are being developed, utilizing non-traditional ingredients; that optimize IM properties while increasing impulse and duration.

Thermobaric explosives are typically supplied as a molding powder that can be pressed directly into a warhead. Traditionally, molding powders have been produced by a very economical a water-slurry process. However, a specific issue associated with the production of these Thermobaric explosive powders made from the traditional, low-cost water slurry method is the oxidation of Aluminum and other metals of interest in water. A “water replacement” fluid has been used as a substitute for water in the traditional water-slurry processing methods. This fluid allows the conventional solvent / anti-solvent coating process to be carried out in the absence of water, and hence eliminates the undesired water-Aluminum reaction.

This paper details the development and approach taken for the targeted Thermobaric formulations with a summary of the process utilized at HSAAP, laboratory experimental data, production scale-up data, and performance test results. IM testing data on the various Thermobaric formulations will be presented along with production cost of the Thermobaric materials produced.