MANUFACTURING PROCESS FOR THERMOBARIC EXPLOSIVE PBXIH-18 (PBXN-12) AT HOLSTON ARMY AMMUNITION PLANT

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Thermobaric weapons are the newest type of blast enhanced weaponry the US DOD has to offer. These types of weapons offer sustained blast overpressures and high temperatures which are used to reach targets sited in buried structures, mutli-room structures and tunnels. Designed to incorporate the oxygen from the surrounding atmosphere, these weapons offer greater lethality potential than conventional blast and fragmentation ordnance.

As a result a thermobaric explosive formulation designated PBXIH-18 was developed by the Naval Surface Warfare Center Indian Head Division, Yorktown Detachment. PBXIH-18 has been tested and evaluated in a number of sub and main charge munitions. This type of explosive was traditionally supplied as a molding powder that can be pressed into a desired charge configuration. Traditionally, molding powders at HSAAP have been manufactured using a water slurry technology. This type of manufacturing process has historically generated excellent product exhibiting uniform binder coating and good bulk densities. However, the coating of PBXIH-18 and other thermobaric explosives present the unique challenge of using slurry technology without oxidizing the aluminum powder due to the use of water.

The Navy conducted extensive research into the oxidation of aluminum and identified a fluid that is used as a substitute for water in the traditional water-slurry processing method. This fluid allows the conventional solvent / anti-solvent coating process to be carried out in the absence of water, which in turn eliminates any concern for a water-aluminum reaction. This fluid has been successfully used at NSWC Yorktown to formulate and manufacture PBXIH-18. The NSWC processing method has now been successfully transitioned to Holston Army Ammunition plant (HSAAP), with process development and full scale production of PBXIH-18 as part of a Navy funded development contract.

This paper details the development and approach taken for the targeted thermobaric formulation with a summary of the process utilized at HSAAP, experimental data, and conclusions resulting from the program.