SYNTHESIS AND SCALE UP OF SYM- TRIAMINOTRINITROBENZENE (TATB) AT HOLSTON ARMY AMMUNITION PLANT

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1,3,5-triamino-2,4,6-trinitrobenzene (TATB) exhibits remarkably high thermal stability and shock insensitivity and is generally regarded as the benchmark for insensitive energetic materials. However, due to its high cost and limited availability, TATB has thus far seen very limited use in secondary munitions fills.

The manufacture of TATB has traditionally been accomplished via nitration of 1,3,5-trichlorobenzene and subsequent ammonolysis of the resultant sym-trichlorotrinitrobenzene in toluene. 1,3,5-trichlorobenzene is no longer produced domestically and both steps require extreme reaction conditions. BAE Systems has developed a new two-step process for the synthesis and manufacture of TATB which uses a domestically available starting material, mild reaction conditions and a proprietary, environmentally friendly process and synthetic route. Additionally, it will provide TATB at a cost significantly lower than any other currently available source

BAE Systems at Holston Army Ammunition Plant is in the process of scaling the TATB chemistry to full-scale production in the Holston Agile Manufacturing Plant previously described. To date, the BAE Systems TATB chemistry has been developed via a six-sigma process-optimization study.

This paper describes the BAE Systems developed synthesis route, the manufacturing method (equipment, scale, process etc.), results of the lab-scale optimization study and scale-up in the Agile Manufacturing Plant; and the properties of the Holston produced material as compared to other sources of TATB.