

## 1,3,5-Triamino-2,4,6-Trinitrobenzene (TATB)

1,3,5-triamino-2,4,6-trinitrobenzene (TATB) is a thermally stable high explosive material with reasonable shock insensitivity and is a potential candidate for active armour and advanced warheads. The technology for production of 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) in pilot plant scale has been developed at HEMRL following persistent R&D efforts.

The process for preparing TATB consists of two steps. The first step involves a consecutive nitration reaction of trichlorobenzene (TCB) to trichlorotrinitrobenzene (TCTNB) under strong nitrating condition using mixed acid at elevated temperature. This reaction step is highly hazardous and highly prone for transition to runaway condition hence requires precise control over reaction parameters. The intermediate compound, TCTNB is then aminated to TATB in the second step using ammonia gas (NH<sub>3</sub>) under pressurized condition. The crude product is digested under hot water to remove soluble impurities. The process developed includes other unit operations like filtration, washing and drying of the intermediate and finished products. The product characteristics are highly dependent on reaction parameters such as temperature, agitation, ammonia feeding rate, drying condition etc. The yield of TATB is realized to be ~85%. The effluent generated during production of the intermediate compound is strongly acidic and requires prior treatment before discharging to the ground. Further, the effluent generated from amination reaction is rich in solvent which is recovered through distillation and can be re-used, if purity is maintained.

The pilot plant scale process for TATB has been developed ab-initio and no process details are available in the literature. The properties of TATB developed in this process are at par with the reported values in the literature.

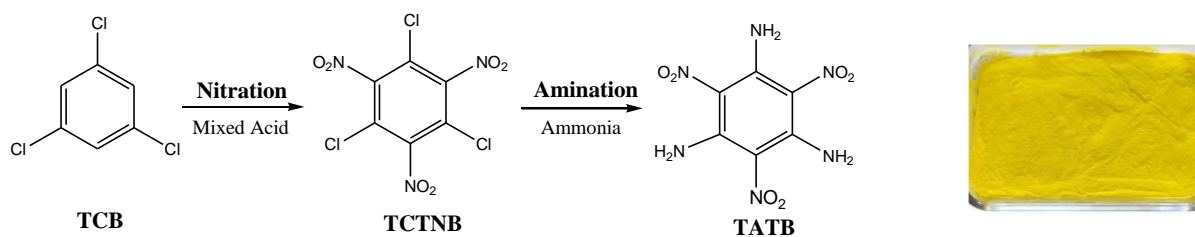


Figure: TATB Reaction Scheme

