

Abstract Submitted
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Dynamics of the detonation products of a TATB based high explosive: Photon Doppler Velocimetry and high-speed digital shadowgraphy of expanding species ARNAUD SOLLIER, CEA, DAM, DIF, VIVIANE BOUYER, LOUIS-PIERRE TERZULLI, MICHEL DOUCET, PHILIPPE HEBERT, LIONEL DECARIS, CEA, DAM, Le Ripault — The present investigation attempts to further improve our experimental characterization of the reaction zone in plastic bonded high explosives, by focusing on the dynamic of expansion of the detonation products during its initial stage. To this purpose, we performed measurements of the free surface velocity history of the detonating explosive using a PDV velocimeter system developped at CEA. We also used digital high-speed shadowgraphy to characterize the shape and speed of the products as they release from the bare charge free surface. In our experiments, we used cylindrical samples of an insensitive triaminotrinitrobenzene (TATB) composition having a density about 1.86 g/cc. Most of the experiments were performed in a cylindrical chamber under vacuum, but some shots were also performed with air at atmospheric conditions. The results of these experiments are compared with those of thin push-plate and explosive-window interface velocity measurements performed in the same conditions, which allow to give new insight into the reactions zone. Numerical simulations with different reactive flow models are also presented and found to be in good agreement with experiments.

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