

Abstract Submitted  
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**Study of detonation wave structure in solid and liquid tetranitromethane** DMITRY NAZAROV, ANATOLY MIKHAILOV, ALEXEY FEDOROV, ALEXEY MEN'SHIKH, STANISLAV FINUSHIN, VALERY DAVYDOV, TATIANA GOVORUNOVA, RFNC-VNIIEF TEAM — Investigations of detonation front structure and parameters in solid and liquid tetranitromethane were done using Doppler Fabry-Perot velocimeter. We recorded the particle velocity of explosion products, braking on the HE/window interface. Smooth front of the detonation wave and concave negative-going mass velocity profile were recorded for liquid TNM, i.e. breaks of registration on the interferograms and mass velocity fluctuations on an unloading wave were not observed. The evaluated Neumann spike value was  $P_N^{liq}{}_{TNM}=21.6$  GPa,  $U_N^{liq}{}_{TNM}=2.07$  mm/ $\mu$ sec. Solid TNM becomes heterogeneous, obtains polycrystalline structure and its density grows from  $\rho_0^{liq}=1.64$  g/cm<sup>3</sup> up to  $\rho_0^{sol}=1.82$  g/cm<sup>3</sup> ( $\rho_0^{sol(TMD)}=2.00$  g/cm<sup>3</sup>). The experimental records indicates, that because of solid TNM heterogeneity flow turbulization occurs behind detonation wave front. Fluctuation on the particle velocity U(t) profile appears with amplitude  $\Delta U=20 \dots 220$  m/s duration -  $\Delta t= 40 \dots 180$ nsec. The registered Neumann spike value in solid TNM  $P_N^{sol}{}_{TNM}=28.7$  GPa and  $U_N^{sol}{}_{TNM}=2.27$  mm/ $\mu$ sec exceeds C-J value in solid TNM in 1.33 times.

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