Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

The model of particle ejection from a metal free surface ALLA GEORGIEVSKAYA, MICHAEL ANTIPOV, VLADISLAV IGONIN, ALEXANDER LEBEDEV, MARGARITA LEBEDEVA, KONSTANTIN PANOV, VADIM KNYAZEV, VICTOR RAEVSKY, VALERIY SADUNOV, ALEXANDER UTENKOV, RFNC-VNIIEF — We present theoretical and computational results of ejecta investigations. We have developed a new model of ejecta taking into account the influence of a shock wave profile on an areal mass (unit area) of ejected particles, a temporal and spatial particle density distribution. According to our analytic solution when the metal free surface interacts with the Taylor wave the mass of ejected particles is less than in case of interaction of the free surface with a supported shock wave. Furthermore, according to this model the total mass of ejecta is independent of shock wave pressure but depends on a correlation of initial perturbations on the free surface and a shock wave pulse duration Δx, i.e. $m_{\mathrm{s}} = f(k^2 \cdot a_0 \cdot \Delta x)$, where a_0 –a perturbation amplitude, $k = 2\pi/\lambda$ – –a mode number, λ – a perturbation wavelength. The model also determines the ejecta time which depends on the metal free surface velocity, the shock wave pulse duration and the initial perturbations. This solution is applied to metals when the strength does not affect the Richtmyer-Meshkov instability. We evaluated the total mass of ejected particles and particle density distribution. These estimates conform to the experimental results.

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Date submitted: 19 Feb 2013 Electronic form version 1.4