

Thermodynamic approach to the evaluation of the impulse strength of materials

Krivosheev S I[®], Adamian Y E and Magazinov S G

Peter the Great Saint-Petersburg Polytechnic University, Polytechnicheskaya
29, Saint-Petersburg 195251, Russia

[®] ksi.mgd@mail.ru

Numerous studies of the properties of materials under conditions of pulsed intense impacts demonstrate a significant increase in the magnitude of destructive loads with a decrease in the duration of exposure. The analysis of experimental data on the destruction of materials based on the thermodynamic approach has shown the possibility of estimating the limiting destructive stresses in the pulse/dynamic range of durations in various loading schemes. This approach also revealed a specific parameter of the material that determines the start of the process of destruction of the material under pulsed loading mode—the energy accumulation time. A generalized dependence of the pulsed mechanical strength on the loading duration for solid dielectric materials is obtained.