

THEORETICAL MODELS OF HOTSPOT-PULSED COMBUSTION OF DOUBLE-BASE PROPELLANTS AND EXPERIMENT

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Abstract: Hotspot-pulsed combustion of double-base propellants — multidimensional nonstationary regime of combustion is studied. This regime generates a cellular structure consisting of hotspots. Hotspots are shaped as a collection of transverse waves. Characteristic scale of hotspot-cellular structures of combustion wave is determined by the term of ignition of “secondary” transverse wave on the base of the previous wave. The sizes of hotspot are obtained by measurement on extinguished samples and respective videoframes as well as by measurement of the wave front speed and the time of ignition of the secondary wave. The experimental data are compared with estimates of the size of the hotspot, which are obtained in the framework of theoretical models by B. V. Novozhilov and A. G. Istratov.

Keywords: combustion; propellant; multidimensional front; hotspot; transverse wave; hotspot-cellular structure

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