

A new method for determination of deflagration point of explosives

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Abstract

The article presents an experimental study on the development of practical methods for assessing the sensitivity of energetic materials (EM) to various types of thermal effects to which they are exposed during their formation, storage and official use.

The article shows the results of studies on the development of a new methodology for estimating the deflagration point, which, in Russia, is characterized by the sensitivity of EM to long-term thermal effects. In the most general sense, deflagration point is defined as a temperature of the media surrounding the EM, at which, with a certain time delay, the process of chemical decomposition of EM is fixed, accompanied by visible phenomena – the release of decomposition products, light or sound effects.

For the first time, the possibility of increasing the accuracy of the experimental estimation of the deflagration point of high-explosives (HE) was estimated. The research was carried out by such powerful HE's of different classes as pentaerythritol tetranitrate (PETN) and cyclotrimethylenetrinitramine (RDX).

The technique used in GOST R 22.2.07-94 (Detonating powder. Method for determination of flash point) was taken as the basis of the experimental procedure for estimating the deflagration point of EM. To increase the accuracy of visual fixation of the appearance of gaseous products at the initial moment of chemical decomposition of HE at different temperatures, it was proposed to enhance the visible effect of this stage of the process by using oxidizing properties of the EM decomposition products. A combustible component – several granules of high-porous activated carbon – on a metal grid was placed above the test substance. As a result of the active reaction of nitric acid vapors and nitrogen oxides with excess carbon of the combustible component, an aerosol (smoke) of the products of the interaction formed, which significantly increased the visual effect of this stage of the process.

The developed method for estimating the HE deflagration point can be used, after additional experimental testing, in the student's laboratory course and for carrying out research on the theory of explosives.

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