

Bout framework conditions of spherical powder with increased density granules obtaining by waterborne technology

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Abstract

The propellant charge efficiency is determined by its energy intensity, the maximum value of which is determined by the force and powder tap-density. The density index is one of the main factors which influence on the tap-density.

Brief analysis of main factors which influencing on the waterborne manufacturing powder granules density (physic-chemical characteristics of components and manufacturing specifications) and ways of leveling the negative prescription effects of the density reducing are carrying out. The calculated values of binary cellulose nitrate compounds density are presented. It shows that density and tap-density of compounds are significantly different at the same compounds mass fraction.

The potential opportunity of increasing the powder density by using components with higher density (in comparing with cellulose nitrate (CN)) isn't always realized in practice because thermodynamic affinity of compounds is not taking into account at computational and theoretical prediction. There is shown that using CN plasticizer, using obsolete powders as a raw material and special technological methods of granules compact will contribute to forming a more dense granules structure even with using low-density components. In particular, there is considered the influence of next technological factors: enlarged introduction of a dehydrator after dispersion, using of vacuum at the end of solvent distillation, rolling of sphere granules to give them disk-like form.

In the review the motivation for the use of such methods is noted. They are especially useful in production of dense single-base spherical powders which are characterized by large lacquer “fragility” and a slower diffusion process occurring as a result. There is considered the questions which are connected with obtaining the dense central core which is subject to desensitization for increasing combustion progressiveness of spherical powders. It is a necessary condition for achieving the maximum bullet flying speed.

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