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Development of paste-like shock-igniting compositions that do not contain heavy metals

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Abstract

Based on the analysis of existing technologies for equipping primers used in the Russian Federation and abroad, the choice of the component base and the method of equipping products have been carried out. As a promising, modern and safe method of equipping primers with igniters, the method of equipping with a moistened paste-like composition was chosen. At the pilot plant, laboratory testing of the technology for obtaining components for pasty shock – igniting compositions (UVS) that do not contain heavy metals was carried out. A comparative analysis of the equipment of primers – igniters made according to standard and moistened equipment technologies is carried out. UVS equipment in a pasty state will increase the safety of the technological process of equipping products by using initiating explosives in a wet state both at the stage of their manufacture, and when mixing compositions and equipping initiation means. This will increase the safety of the technological process of equipping products and achieve the following technical and economic indicators: the exclusion of particularly dangerous operations due to the use of initiating explosives in a wet state both at the stage of their manufacture and when mixing compositions and equipping initiation means; reducing equipment downtime, including due to the absence of flashes when equipping SI with the use of paste-like compositions; improving the quality and reliability of products, by

increasing the stability of functional characteristics of initiation means; increasing the environmental friendliness of production due to the absence of dust formation.

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References

- [1] A.G. Gorst. Gunpowder and explosives. *Moscow: Oborongiz*. **1957**. 181p. (Russian)
- [2] L.I. Bagal. Chemistry and technology of initiating explosives. *Moscow: Mashinostroenie*. **1975**. 456p. (Russian)
- [3] D.I. Dementieva, I.S. Kononov, R.G. Mamashev, V.A. Kharitonov. Introduction to the technology of energy-saturated materials: a textbook. *Alt. state Technical University. un-t, BTI. Biysk: Publishing house of Alt. State Technical University*. **2009**. 254p. (Russian)
- [4] P.P. Karpov. Means of initiation. *Moscow: NKAP Oborongiz*. **1945**. 274p (Russian)
- [5] P.F. Bubnov. Means of initiation. *Moscow: NKAP Oborongiz*. **1945**. 166p. (Russian)
- [6] *Pat. 2110505 Russian Federation, IPC7 C 06 B 25/06, C 06 C 7/00*. Pyrotechnic shock composition for central battle igniter caps for small arms cartridges. A.E. Vogelsang; applicant and patent holder of JSC "Bi-West Import-Russian Branch". No. 97103612/02; declared on 18.03.97; published on 10.05.98. (Russian)
- [7] Robert Matyas, Jiri Pachman. Primary Explosives. *Springer-Verlag Berlin Heidelberg*. **2013**. 338p.
- [8] M.I. Gelfman. Colloidal chemistry. *St. Petersburg: Publishing house "Lan"*. **2004**. 336p. (Russian)
- [9] S.B. Ulitovsky. Means of individual oral hygiene: powders, pastes, gels. *St. Petersburg: Publishing House "Man"*. **2002**. 296p. (Russian)
- [10] M.B. Generalov. Basic processes and devices technologists of industrial explosives *Moscow: ICC "Akademkniga"*. **2004**. 398p. (Russian)
- [11] Ruslan R. Dimukhametov, Dmitry V. Fadeev, Vadim N. Ageev, Ruslan Z. Gilmanov, Nikolay E. Timofeev, Gumer G. Bogateyev, Grigory S. Grigoriev, Evgenia V. Sobennikova. Development of paste-like shock-igniting compositions that do not contain heavy metals. *Butlerov Communications*. **2021**. Vol.67. No.9. P.51-55. DOI: 10.37952/ROI-jbc-01/21-67-9-51 (Russian)