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Compact silencers with discrete baffle elements for new-generation light small arms

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This paper presents the results of the development of silencers, whose design features discrete baffle elements. The advisability of silencers of this type is confirmed by their operational reliability and shot sound suppression efficiency in their actual service as part of light small arms of different types.

To design advanced silencers, technical requirements for their design were developed. The paper describes the possibility of using discrete elements (cones, hemispheres, flat baffles, etc.) as the key component of a powder gas spreader. Differently shaped elements are used as additional elements that form a powder gas flow inside a silencer: for example, cylindrical elements, including perforated ones to provide a powder gas flow between the expansion chambers. One way to increase silencer efficiency is an additional expansion chamber that embraces the external part of the barrel and is gas-dynamically connected to a traditional muzzle silencer.

In deciding on an optimum design for compact silencers, the following was redetermined: the number of expansion chambers and the dimensions thereof, the powder gas energy converter design, the baffle type, the presence of a gas flow between the chambers near the inner surface of the silencer body, and, if so, the gas flow rate.

The silencer design was optimized based on simulating the processes inside the silencer using the authors' efficiency calculation procedure for silencers with different internal components.

Comparison tests of the silencers developed and foreign silencers confirmed a high efficiency of the former.

The silencers with discrete baffles for light small arms developed at the Institute of Technical Mechanics of the National Academy of Ukraine and the State Space Agency of Ukraine compare well in performance with their best foreign counterparts. The designs of some of them are covered by Ukrainian patents.

Keywords: *silencer, cone, hemisphere, expansion chamber, computational procedure, shot sound suppression efficiency.*

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