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O. V. PYLYPENKO, N. A. KONOVALOV, V. I. KOVALENKO

COMPACT SILENCERS FOR NEW-GENERATION LIGHT SMALL ARMS

Institute of Technical Mechanics
of the National Academy of Sciences of Ukraine and the State Space Agency of Ukraine
15 Leshko-Popel St., Dnipro 49005, Ukraine; e-mail: office.itm@nas.gov.ua

This paper presents the results of the development of silencers, whose design feature is a central perforated tube, at the institute of Technical Mechanics of the National Academy of Sciences of Ukraine and the State Space Agency of Ukraine (ITM of NASU and SSAU). 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 high-efficiency advanced silencers, technical requirements for their design were developed. The paper describes the possibility of using a central perforated tube as the key component of a powder gas spreader. Differently shaped elements or a combination thereof are used as additional elements that form a powder gas flow inside a silencer: conical and spherical axisymmetric baffles coaxial with the silencer body, cylindrical shells (including perforated ones) that provide a powder gas flow between the expansion chambers along the internal axis of the central channel, helicoidal elements, and peripheral labyrinth-vortex contours. 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 advisable design for compact silencers, the following was redetermined: the number of expansion chambers, the powder gas energy converter design, the baffle type, the presence of a gas flow between the chambers along the inner surface of the silencer body, and, if so, the gas flow rate.

The silencer design was optimized based on simulating the silencer gas dynamics using the authors' efficiency calculation procedure for silencers with a central perforated tube and different internal components. The paper describes the procedure and presents the results calculated with its help.

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

The silencers with a central perforated tube for light small arms developed at the ITM of NASU and SSAU compare well in performance with their best foreign counterparts. The designs of some of them are covered by Ukrainian patents.

Keywords: *silencer, central tube, expansion chamber, computational procedure, shot sound suppression efficiency.*

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