Research into efficiency of resonator cooling in gas-dynamic ignition system with two-phase fuel composition

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Nowadays, life-extension of gas-dynamic ignition systems (GDIS) is of great interest. GDIS are used in the present-day energy, propulsion and technological installations of different purpose. It can be achieved by reducing heat impact on the main element of GDIS, i.e. resonator. To solve this problem, systems with either a remote resonator or direct-flow cooling of its outer surface are applied. The paper considers a thermal state of both resonators: the remote resonator and the one with direct-flow cooling. Firing time of GDIS is estimated until the remote resonator starts breaking, with the system operating uninterrupted and momentum. Direct-flow cooling efficiency of the resonator is analyzed. Selection guidelines of the structural layout and resonator material are given.

Keywords: *thermal state, gas-dynamic ignition system, two-phase fuel composition, mathematical modeling, ethanol, resonator, cooling*

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