

EXPERIMENTS AND CALCULATIONS OF PRESSURE DROP IN A ROCKET ENGINE COMBUSTION CHAMBER AT OPENING OF AUXILIARY NOZZLES

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Abstract: Experimental and analytical data on pressure drop inside a rocket engine combustion chamber at opening of auxiliary nozzles are discussed. Analytical models of pressure drop were obtained using the Zeldovich–Novozhilov nonstationary combustion theory. A system of equations — thermal conductivity of the condensed phase and gas mass balance in the combustion chamber with predetermined initial and boundary conditions — were solved using the finite difference methods. Various values of the relative final nozzle diameter and the apparatus constant were used in calculations to closer match the experimental results. The analytical results showed that a very close match to experimental data can be obtained when the analytical apparatus constant exceeded its experimental value.

Keywords: nonstationary combustion; double-base propellant; pressure drop; rocket engine; combustion chamber

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