

# EXPERIMENTAL ANALYSIS OF FLOW SEPARATION IN LOW THRUST ROCKET ENGINE NOZZLES WITH A PROFILED SUPERSONIC PART OF THE NOZZLE

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The paper outlines the procedure of experimental analysis of flow separation in low-thrust rocket engine (LTRE) nozzles with a profiled supersonic part. The procedure was developed under the author's supervision at the research centre of space power engineering of SSAU. The results obtained on the basis of the procedure are presented, which show significant peculiarities of separation parameters in LTRE nozzles. These are connected, mostly, with the change in the nature of the flow in the boundary layer from laminar to turbulent due to the shock wave that causes flow separation. Limitations of the existing design procedures for flow separation in rocket engine nozzles as applied to LTRE are revealed. It is shown experimentally that the nature of the flow in the boundary layer of the supersonic part of the nozzle of a standard 400 H thrust liquid-propellant rocket engine is laminar.

*Rocket engine, profiled nozzle, flow separation, shock wave, boundary layer, Reynolds number, Mach number, vacuum stand, gas dynamic experiment, drainage point.*

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