
Experimental study of hydrodynamic processes in propellant tanks with capillary systems of fluid extraction

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The paper considers the procedure and specification of the experimental pendulous stand equipment used for studying capillary phase separators in propellant tanks of liquid-fuel rocket engines, which differ from the existing ones as it gives the opportunity to obtain unambiguous initial boundary conditions in the nonlinear range of sloshing amplitudes. It can also be used in complex propellant tanks. We analyze the operating principle of the pendulous stand with a mounted model liquid tank based on the effect of stabilizing the liquid surface in an upright attitude to the pendulum-supported axis during its oscillation. The description of measuring and recording systems is given based on the initial measuring pressure converters, delta pressure and video recording. The obtained results confirm the possibility of using both the experimental equipment and the model investigation procedure for designing inboard tank intakes of the prospective liquid-fuel rocket engines.

Keywords: liquid-fuel rocket engines, capillary systems of fluid extraction, model tests, weightlessness

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