

SPACE DEBRIS SYMPOSIUM (A6)  
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LIQUID PROPELLANT BEHAVIOUR PECULIARITIES UNDER THEIR DISCHARGE IN VACUUM  
FROM TANKS DURING PASSIVATION OF THE LV WASTED STAGES**Abstract**

In accordance with the international standards for space debris mitigation, the passivation of the LV wasted stages represents one of the most effective measures under which is conducted discharge of residual pressurization gas and propellants in vacuum. Comprehensive physical, heat-mass exchange and gas-dynamic intratank processes and also phase transformations occurring under discharge of residual pressurization gas, vapors and liquid propellants in vacuum are reviewed. On basis of obtained experience, conditions of possible freezing and interaction of propellants and also appearance of explosion-danger situations were analyzed. Some experimental-theoretical dependences and correlations for calculation and definition of affecting factors were defined. Design measures and devices for passivation were classified depending on propellants type, features of propellant tank construction and orbital parameters. Features of technical solutions, implementation and effectiveness of measures taking into account experimental data obtained during some launch-vehicles missions were shown and recommendations were given.