

# HYDRAULIC CALCULATION METHODOLOGY FOR CRYOGENIC SYSTEMS OF SPACE ENVIRONMENT SIMULATORS

S. Kravchenko<sup>1,2</sup>, I. Blumbergs<sup>2</sup>, N. Kuleshov<sup>1,2</sup>, V. Shestakov<sup>1,2</sup>

<sup>1</sup>*Cryogenic and vacuum systems. Ventspils, Latvija*

<sup>2</sup>*Institute of Aeronautics, Faculty of Mechanical Engineering, Transport and Aeronautics, Riga Technical University*

The paper contains the hydraulic calculation methodology description need for proper design of the cryogenic system pipelines, which are a part of space environment simulation facilities. Cryogenic systems are used in space environment simulators for heat dissipation ability simulation to the black space. The problem of proper simulation of outer space is closely related with cryogenic system design. The study offers the ways to have answer for modern satellites testing systems design challenges on the examples of recently functioning testing facilities.

Suggested methodology improves the cryogenic system calculation quality by more detail accounting of hydraulic loses in cryogenic pipelines system of space environment simulators and it was applied in the Metamorphosys project. It helps avoid mistakes in cooling capability of cryogenic shrouds calculation and to provide the proper black space energy dissipation ability simulation, which is quite necessary for modern satellites with passive temperature stabilization system testing. The methodology was practically tested and shows good results of customer technical task implementation.