
Prospect for the development of vehicles for liquid oxygen, nitrogen, argon

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The article discusses developments based on the analysis of previously created vehicle structures for the transportation of air separation products (oxygen, nitrogen, argon), allowing the implementation of current cryogenic technologies in the rocket, space, marine and other industries. The search for optimal solutions when selecting structures and thermal insulation of these vehicles was carried out. The choice of screen-vacuum heat insulation and the depth of vacuum in the interstitial space of the tank is substantiated. On the basis of the analysis, the main admixtures of liquid oxygen were detected and the change in their concentration during transportation was estimated, therefore it was suggested to transport liquid oxygen in railway tanks with an open gas discharge of oxygen vapors from the tank, and to maintain product quality of liquid argon, its transportation was proposed to perform with a closed argon vapor gas discharge (under excess vapor pressure in the tank). The choice of the tank vessel and shell material for safe operation in railway transport is substantiated. For the first time, a description and specifications of an advanced means of transport — a tank container for multimodal transport of liquid oxygen and liquid nitrogen are given.

Keywords: liquid oxygen, liquid argon, liquid nitrogen, railway tank, tank-container, heat insulation, vacuum depth, evaporability, railway platform

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