

Cryogenic pipeline with short fiber basalt insulation

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The paper shows the importance of making pipelines for supplying cryogenic fuel components to aircraft propulsion systems with super-thin basalt fiber insulation and Al_2O_3 mineral binder. In our research, we consider the design and technology solution of a cryogenic fuel pipe consisting of a thin-walled pipeline made of combined materials based on an ultra-thin steel liner and wound carbon fiber reinforced plastics. The optimization of the mass of the pipe flange ending was carried out together with the combined pipeline shell. The thickness and mass of the basalt heat insulation of the pipeline were determined according to the engineering technique for calculating the effective thermal conductivity of a highly porous fibrous coating material. The study shows that the pipeline with basalt thermal insulation has a significantly smaller mass than the cryogenic fuel line with screen-vacuum heat insulation used in the TU-155 airplane.

Keywords: heat-insulated pipeline, combined shell, cryogenic temperature, high porosity basalt heat insulation

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