
Determining the initial level of the reservoir fill with slush cryogen

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The article considers obtained relations for finding the initial degree of filling spherical and toroid reservoirs with the liquid phase and slush taking into account changes in the volume occupied by cryogen due to melting the solid phase and the thermal expansion of the liquid phase. It is assumed that the area of slush is isothermal and has a melting temperature of the solid phase; the sludge — pure liquid interface is flat; free liquid surface is still and has a saturation temperature at a given pressure. In the pure liquid the temperature is distributed linearly. These approximate relationships allow assessing the size of the required “gas cushion” when melting slush cryogen in a reservoir without detailed calculation of temperature fields in the area of pure liquid.

Keywords: cryogenic liquid, cryogen, liquid, slush, “gas cushion”, melting, reservoir, tank

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