Pressure rise in a flat channel during heat carrier freezing

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The article deals with the problem of changing the pressure acting on the walls of a flat rectangular channel filled with freezing liquid. It is supposed that during freezing of the liquid due to the difference in densities between solid and liquid phases the volume, which it occupies in the slot, changes and channel walls deform under the influence of pressure difference between the external environment and the interior medium. Using the assumption of the incompressibility of the liquid and solid phases, the change in the volume of the channel internal area due to the deformation of the enclose walls is equal to the volume change of the liquid by changing the state of aggregation.

It is assumed that the freezing takes place in the upper part of the channel, the liquid temperature is constant and equal to the crystallization temperature, and the interface of the solid and liquid phases is flat. The side walls and the bottom are considered insulated and totally rigid.

The analytical expressions for determining the pressure acting on the walls of a flat rectangular channel filled with a liquid at its freezing are obtained.

Keywords: *liquid, solid phase, plate, channel, pressure, temperature, volume, crystallization, deformation.*

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