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MATHEMATICAL MODEL FOR COMPUTER SIMULATION FOR SELECTION OF THE ORDER FOR THE LAYERS FROM THE WALL OF INDUSTRIAL COOLERS

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Summary:

A mathematical model and computer software was developed for calculating the thickness of the insulation layers (panels) from the walls of the industrial coolers based on the order of their installation. A numerical example is given that is tested on an existing industrial cooler in Bitola, Macedonia. In order to calculate the thickness of the thermal insulation it is necessary to consider a multilayer barrier (wall) where for each layer the thickness is known, except for the insulation material which should be calculated. With the determined geometric and physical characteristics of the wall, it is necessary to determine the temperature at each point of the construction. By connecting these points, the temperature change through the construction creates dependency with its thickness. After calculating the actual specific heat flux, the temperatures between each layer of the wall are calculated. For improved monitoring of the change in the partial pressure of the saturated water vapor through the layers of the wall, the thickness of the insulating material is divided into approximately five parts, and then a table of temperature changes and the corresponding value of the partial pressure of the saturated aqueous vapor is created. In order to avoid condensation of the water vapor when it passes through the wall, a certain condition must be fulfilled. With certain measurements adopted, a computer simulation was created and measurements calculated. The computer simulation enables swift and accurate calculation of thickness of the insulation at multilayer bulkheads found at industrial coolers, and allows selection of the location for the insulation and steam barrier in the bulkhead.

Keywords: *Insulation coolers, industrial coldstorage, panels, multilayer bulkheads, steam barrier*