MODELING OF THE HEAT TRANSFER IN A LIQUID FILM FALLING ON A VERTICAL SURFACE

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The goal of the work. The purpose of this work was to create a computer model of the liquid film falling on a vertical surface and that is in contact with the gas environment, using ANSYS Fluent software and to compare it with the data obtained from the experiments.

Results. On the basis of available experimental data, a simplified two-dimensional computer model of a falling liquid film (water) in contact with the gas environment (air) was created. The results obtained were compared with the experimental data (Fig. 1).
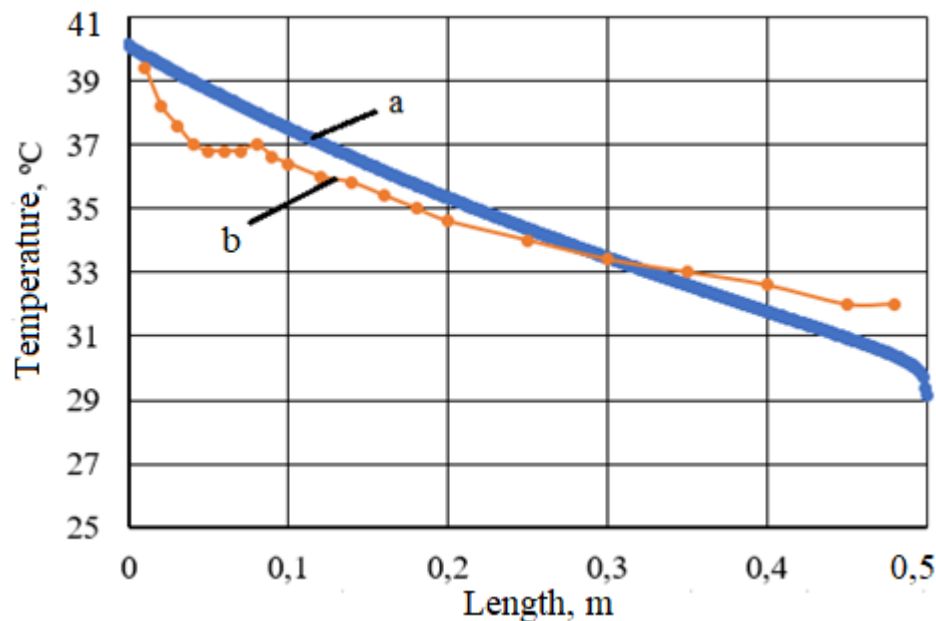
Figure 1 - The temperature distribution of the film along the length of its flow
a – simulation results, b - experimental data

On the graph we can see the similarity of the curves characters, and that the differences with the experimental data do not exceed 5%.

Conclusions. After analyzing the obtained results, it was concluded that the discrepancies with the data obtained as a result of the simulation compared to the experimental data are due to the absence of the initial thermal region and the process of evaporation from the film surface in the computer model. Also, studies have been done that took into account these processes.

Based on the reviewed models, more complicated models can be created and they can be used, for example, to model film machinery for different branches of industry.