

CALCULATION OF HEAT TRANSFER IN AREAS WITH SEPARATED FLOWS. 2. CALCULATION OF HEAT TRANSFER IN THE CORNER AREAS AND SEIZURES

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For many elements of heat exchange equipment necessary to carry out the thermal and hydraulic calculation of heat and mass transfer in the areas of separated stream. These objects include, for example, elements finned surfaces in boilers, heat exchangers for different purposes, cooling systems, electronic equipment and so on. Using the simplified method of calculation of heat transfer in the areas of separated flows in this paper the calculation of heat transfer for individual elements of the finned surfaces are conducted.

The conditions of hydrodynamic flow and heat transfer for the elements with two kinds of finned surface are studied - a surface element tubes with fins and a separate collar edges between neighboring surfaces and a flat finning surface with transverse flow. Conditions of external hydrodynamic flow with a given velocity and temperature on the surface for the fins and fin tube are performed. This emphasis on surface flow hydrodynamic flow three zones: 1) formation of boundary layer zone; 2) zone separated flow; 3) zone after joining the stream of separated zones. When considering flow in the cell transverse flow around the surface of the fins can be divided into a vortex formed therein. According to the developed technique on a finned surface area of separated flow mathematical model of heat and defined boundary conditions are written.

On the basis of the developed model the mathematical modeling of transport processes and local temperature distribution, heat flux, heat transfer coefficients were obtained. The analysis of the results and a comparison with the calculation to the simplified models were performed. It is shown that the use of simplified calculation methods can lead to significant quantitative errors. The proposed approach and methods of calculating separated flow can be used in the design of

various heat-exchange equipment, such as, heat exchangers, steam and hot water boilers and other energy devices.