CALCULATION OF HEAT TRANSFER IN AREAS WITH SEPARATED FLOWS. 1. SIMPLIFIED PROCEDURE OF CALCULATION

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Separated flow in the corner areas, deepening, with areas with ledges characterized by single pull of the vortex, which has a flow rate substantially lower compared to the speed external current. In the simplest approach, based on the Betchelor hypothesis, vortex can be seen as real core liquid, which is washed by the external flow. Experimental and theoretical studies were showed that the rate of flow in the vortex varies from zero at the center of the vortex to some constant value in its external surface. The value of this speed depends on the speed of external potential flow characteristics and viscosity of external coolant. In the separation on the wall on the surface the boundary layer is formed. Between the core and the outer vortex flow is so-called mixing layer structure in which the flow close to the flow in the boundary layer. Based on these assumptions the various models separated flow and methods of calculationwere offered. Especially elaborate calculation methods for this type of separated flow at high speed outer flow and supersonic flows were developed (theory Chapman Korsta etc.). A somewhat different approach was used Lavrent'ev, Shabbat and Holdshtyk for calculating separated flow with a single transverse vortex flow around trenches and performances.

Thus, the separated region can be roughly seen as consisting of several zones that have different structures currents. Namely, in the separated flow is an external potential flow, mixing zone between the outer flow and pull vortex, vortex region of potential flow and boundary layer zone in the near-wall region. The simplified method of calculation of heat transfer in the areas of separated flow was developed. The technique is based on partition separated area for three hydrodynamic zones: 1) zone boundary layer near the wall; 2) zone of the vortex core; 3) attached outdoor area for flow vortex core.

As a result of the simplified calculation method heat transfer characteristics such as flow velocity in the vortex core, heat transfer coefficient on the surface of the wall, the total allotted heat flux and other thermal characteristics were found.