UDC 536.24

METHOD OF CALCULATION OF HEAT EXCHANGE SURFACES ISOTHERMAL DEVELOP RELUCTANTLY PIPE FLOW CHANNELS

The calculation of heat transfer in pipes, as a rule, is conducted coming from pre-condition, that heat transfer coefficient does not depend on the change of temperature gradient for the surfaces of pipe along a stream. The simplified methodology of calculation is thus used, what just for an isothermal surface. At the same time, a size of heat transfer coefficient depends on a size of temperature gradient on the wall surface and for more detailed calculations this factor needs to be taken into account.

To this work the substantive provisions of methodology that gives an opportunity to estimate influence of these factors on the terms of heat exchange in channels at the force convection are driven. For the solution of convective equalization of heat transfer the method of division of variables is used. In an analytical kind the solutions of the indicated equalization are got and own numbers and own functions of these decisions are found. Thus the analytical expressions for the local values of heat transfer coefficient and Nusselt number on the innersurface isothermal tube channel.

Two modes of the developed flow laminar and turbulent are considered: In calculating turbulent flows out of the analogy between momentum and energy transfer (Karman analogy). In constructing the velocity profile in the channels used three-layer circuit currents, when the velocity profile is divided into three sections: laminar sublayer, intermediate layer and the turbulent core.Using got the solutions a superposition principle is applied, that gives an opportunity to write down the generalized functional correlation by the closeness of heat flux that is taken from a surface, and temperature gradients on the walls. The specified distributions of local heat transfer coefficients are calculated, that take into account influence of the indicated factors.