CONJUGATE HEAT TRANSFER IN VERTICAL SURFACES WITH FLAT PARALLEL CONTINUOUS FINS IN NATURAL CONVECTION

GOROBETS V.G., doctor of technical sciences

Finned surfaces widely used in the design of heat transfer equipment, including thermal exchanges of air and thermal batteries used for heating houses and offices, heat exchangers for cooling electronic equipment, economizers, boilers, waste heat from exhaust gases and other heat exchange equipment.

Considered a vertical surface with continuous аШТЅ, for which heat transfer takes place by free convection. In the simulation of transport processes in a system with lots of flat edges located on a vertical basis, the conditions of flow and heat transfer between two parallel vertical plates that are part of finned surface that is repeated.

The method of calculating the conjugate heat transfer for vertical surfaces with planar fin under conditions of free convection are developed. The numerical calculation finned surfaces and obtained the following characteristics: the dependence of Nusselt number on the Reynolds number; dependence of the thermal efficiency of fins of the characteristic parameter edge; temperature distributions height fins. Using a mathematical model, the calculation of conjugate heat transfer for fins, made of steel were made. The dependence of the average Nusselt number along the surface of the Reynolds number are found.

As follows from the calculations, the largest drop in temperature pressure fin height observed in the early parts of the edges where local maximum values of heat transfer coefficients. For sites located at the top of the vertical base, temperature head height edges varies slightly, so the use of long lengths of edges in the design and inefficient cooling devices must use the edge of a small length or cutting edge, which is the failure ML. For surfaces with discrete fin heat transfer coefficients, the total heat flow withdrawn and efficiency fins significantly higher. Comparison of calculated results obtained with known experimental data and calculation results

with simplified methods. There are received their good agreement. The maximum error calculation does not exceed 10-17%.