

MODELING OF TURBULIZED FLOW TYPICAL FOR HEAT POWER EQUIPMENT

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It is known that flows of heat carrier in the flow passages of heat power equipment are substantially turbulized. Modeling of turbulized flows is usually carried out while observing equality of degrees of turbulence Tu in natural and laboratory conditions. Other important characteristics of such flows, in particular characteristic scale of turbulence, are not taken into account. This circumstance is one of the reasons for the inconsistency of experimental data, which are given in the literature, about the effect of turbulence on the intensification of transfer processes, since at the same degrees of turbulence the transfer properties of such flows can be significantly different. To assess the transport properties of turbulized flows in the ITTF of NASU turbulent viscosity is used, which can be determined within the framework of a two-parameter turbulence model taking into account the kinetic energy of turbulence and its characteristic scale L .

Purpose. Modeling of turbulized flows with adjustable intensity and scale of turbulence.

The results of the work. Changing the degree of turbulence in laboratory installations is achieved by using various turbulence generators (grids, wire nettings, perforated plates, etc.). For the organization of turbulized flows two biplanar grids made of round-shaped rods $M \times d = 12 \times 3$ and $M \times d = 6 \times 1,5$ mm were used in this work. The laws of turbulence decay behind grids were determined. As results of experiments at different distances x from these grids have been shown, samples of turbulized flows with an adjustable degree and turbulence scale can be obtained, that is, a number of combinations $Tu = \text{const}$, $L = \text{var}$ and vice versa. For example, when $Tu = 6\%$ at different distances x from these grids, the scales L change 1,8 times, and when $L = \text{const}$, Tu varies from 10,9 to 2,13%, that is, 5 times.

Further, certified turbulence generators were installed in the working part of the special experimental installation of ZMBK Progress for the study of profile losses in laminarized profiles packages. The laws of turbulence decay in the working part of the experimental installation are fully consistent with those obtained at the ITTF NASU.

Summary. Recommendations on the organization of turbulized flows with adjustable degree of turbulence and its scale allow pre-selecting turbulence generators without special experimental studies.